

Title (en)  
METHOD FOR PRODUCING HARDENED STRUCTURAL ELEMENTS

Title (de)  
VERFAHREN ZUM ERZEUGEN GEHÄRTETER BAUTEILE

Title (fr)  
PROCÉDÉ DE FABRICATION DE COMPOSANTS DURCIS

Publication  
**EP 2656187 A2 20131030 (DE)**

Application  
**EP 11811026 A 20111222**

Priority

- DE 102010056265 A 20101224
- DE 102010056264 A 20101224
- DE 102011053941 A 20110926
- DE 102011053939 A 20110926
- EP 2011073892 W 20111222

Abstract (en)  
[origin: WO2012085247A2] The invention relates to a method for producing a hardened structural steel element comprising a zinc or zinc alloy coating. According to the method, a blank is stamped out from sheet metal that is coated with the zinc or zinc alloy, the stamped-out blank is heated to a temperature =Ac3 and optionally held at this temperature for a predetermined time to allow the formation of austenite, and the heated blank is then transferred to a forming tool, is formed in the forming tool and cooled in the forming tool at a rate above the critical quenching rate, thereby being hardened, and the steel material is adjusted to delay conversion such that the steel material is quench-hardened by the conversion of austenite to martensite at a forming temperature in the range of 450°C to 700°C, an active cooling taking place after the conversion and prior to the forming step, the blank or sections of the blank being cooled at a cooling rate of >15K/s.

IPC 8 full level  
**G06F 3/044** (2006.01)

CPC (source: EP KR US)  
**C21D 1/673** (2013.01 - EP KR US); **C21D 8/005** (2013.01 - KR US); **C21D 9/48** (2013.01 - EP KR US); **C23C 2/06** (2013.01 - KR); **C23C 2/28** (2013.01 - EP US); **C23C 2/29** (2022.08 - EP KR US)

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

DOCDB simple family (publication)  
**WO 2012085247 A2 20120628; WO 2012085247 A3 20120816**; CN 103384726 A 20131106; CN 103384726 B 20161123; CN 103392014 A 20131113; CN 103392014 B 20160127; CN 103415630 A 20131127; CN 103415630 B 20150923; CN 103547686 A 20140129; CN 103547686 B 20161123; CN 103547687 A 20140129; EP 2655672 A2 20131030; EP 2655672 B1 20201216; EP 2655673 A2 20131030; EP 2655673 B1 20210203; EP 2655674 A2 20131030; EP 2655674 B1 20210203; EP 2655675 A2 20131030; EP 2655675 B1 20210310; EP 2656187 A2 20131030; EP 2656187 B1 20200909; ES 2829950 T3 20210602; ES 2829950 T8 20210610; ES 2848159 T3 20210805; ES 2851176 T3 20210903; ES 2853207 T3 20210915; ES 2858225 T3 20210929; ES 2858225 T8 20220105; HU E052381 T2 20210428; HU E053150 T2 20210628; HU E054465 T2 20210928; HU E054867 T2 20211028; HU E055049 T2 20211028; JP 2014505791 A 20140306; JP 2014507556 A 20140327; JP 5727037 B2 20150603; KR 101582922 B1 20160107; KR 20130126962 A 20131121; KR 20130132565 A 20131204; KR 20130132566 A 20131204; US 10640838 B2 20200505; US 2014020795 A1 20140123; US 2014027026 A1 20140130; WO 2012085248 A2 20120628; WO 2012085248 A3 20120816; WO 2012085251 A2 20120628; WO 2012085251 A3 20120816; WO 2012085253 A2 20120628; WO 2012085253 A3 20120816; WO 2012085256 A2 20120628; WO 2012085256 A3 20120816

DOCDB simple family (application)  
**EP 2011073880 W 20111222**; CN 201180068492 A 20111222; CN 201180068494 A 20111222; CN 201180068528 A 20111222; CN 201180068534 A 20111222; CN 201180068546 A 20111222; EP 11807691 A 20111222; EP 11808211 A 20111222; EP 11808645 A 20111222; EP 11811025 A 20111222; EP 11811026 A 20111222; EP 2011073882 W 20111222; EP 2011073887 W 20111222; EP 2011073889 W 20111222; EP 2011073892 W 20111222; ES 11807691 T 20111222; ES 11808211 T 20111222; ES 11808645 T 20111222; ES 11811025 T 20111222; ES 11811026 T 20111222; HU E11807691 A 20111222; HU E11808211 A 20111222; HU E11808645 A 20111222; HU E11811025 A 20111222; HU E11811026 A 20111222; JP 2013545421 A 20111222; JP 2013545422 A 20111222; KR 20137019700 A 20111222; KR 20137019701 A 20111222; KR 20137019703 A 20111222; US 201113997416 A 20111222; US 201113997585 A 20111222