

Title (en)
METHOD FOR MANUFACTURING HOLLOW ENGINE VALVE

Title (de)
VERFAHREN ZUR HERSTELLUNG EINES MOTORHOHLVENTILS

Title (fr)
PROCÉDÉ DE FABRICATION DE SOUPAPE DE MOTEUR CREUSE

Publication
EP 3815811 A4 20220316 (EN)

Application
EP 19827277 A 20190621

Priority
• JP 2018123686 A 20180628
• JP 2019024806 W 20190621

Abstract (en)
[origin: EP3815811A1] A method for manufacturing a hollow engine valve, by which method the surface condition of an inner surface making up a hollow is made fine and the volume of the hollow is increased, is provided. The method for manufacturing includes a forging step (S3) of obtaining an intermediate part (7) by a forging process, the intermediate part having a cylindrical portion (8B) and a semi-umbrella-shaped portion (9B) continuous with an axial end of the cylindrical portion; a heat treatment step (S4) of keeping the intermediate part at a given heating temperature for a temperature-keeping time (t2) determined in accordance with a wall-thickness (t) of the cylindrical portion (8B), to soften the intermediate part; a spinning step (S5) of drawing the cylindrical portion of the heat-treated intermediate part in an axial direction by a spinning process; and a necking step (S6) of reducing the diameter of the cylindrical portion drawn in the axial direction, by a drawing process to form a shank (2) and an umbrella-shaped portion (3).

IPC 8 full level
B21K 1/22 (2006.01); **B21D 22/16** (2006.01); **B21D 22/28** (2006.01); **B21D 53/84** (2006.01); **C21D 1/26** (2006.01); **C21D 1/60** (2006.01); **C21D 9/00** (2006.01); **C22F 1/10** (2006.01); **F01L 3/14** (2006.01)

CPC (source: EP)
B21D 22/16 (2013.01); **B21D 22/28** (2013.01); **B21D 53/84** (2013.01); **B21K 1/22** (2013.01); **C21D 1/26** (2013.01); **C21D 1/60** (2013.01); **C21D 9/0062** (2013.01); **C21D 9/0068** (2013.01); **C22F 1/10** (2013.01); **F01L 3/14** (2013.01); **C21D 2211/001** (2013.01); **F01L 2301/00** (2020.05); **F01L 2303/00** (2020.05); **F01L 2303/01** (2020.05); **F01L 2820/01** (2013.01)

Citation (search report)
• [AD] WO 2011104903 A1 20110901 - MITSUBISHI HEAVY IND LTD [JP], et al
• [A] JP 2012125777 A 20120705 - TOA TANKOSHO KK
• See references of WO 2020004286A1

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)
EP 3815811 A1 20210505; **EP 3815811 A4 20220316**; AR 115596 A1 20210203; JP 6719142 B2 20200708; JP WO2020004286 A1 20200702; WO 2020004286 A1 20200102

DOCDB simple family (application)
EP 19827277 A 20190621; AR P190101714 A 20190621; JP 2019024806 W 20190621; JP 2019570144 A 20190621