

Title (en)  
SURFACE HARDENING APPARATUS AND SURFACE HARDENING METHOD

Title (de)  
VORRICHTUNG UND VERFAHREN ZUR OBERFLÄCHENHÄRTUNG

Title (fr)  
APPAREIL DE DURCISSEMENT DE SURFACE ET PROCÉDÉ DE DURCISSEMENT DE SURFACE

Publication  
**EP 4043606 A4 20230614 (EN)**

Application  
**EP 20873990 A 20201009**

Priority  
• JP 2019187310 A 20191011  
• JP 2020038315 W 20201009

Abstract (en)  
[origin: EP4043606A1] The present invention includes: an in-furnace atmospheric gas concentration detector configured to detect a hydrogen concentration or an ammonia concentration in a processing furnace; an in-furnace nitriding potential calculator configured to calculate a nitriding potential in the processing furnace based on the hydrogen concentration or the ammonia concentration detected by the in-furnace atmospheric gas concentration detector; and a gas-introduction-amount controller configured to change an introduction amount of each of the plurality of furnace introduction gases except for the ammonia decomposition gas while keeping an introduction amount of the ammonia decomposition gas constant, based on the calculated nitriding potential in the processing furnace and a target nitriding potential, such that the nitriding potential in the processing furnace is brought close to the target nitriding potential.

IPC 8 full level  
**C21D 1/06** (2006.01); **C21D 1/76** (2006.01); **C23C 8/30** (2006.01); **C23C 8/32** (2006.01); **C23C 8/80** (2006.01)

CPC (source: CN EP KR US)  
**C21D 1/06** (2013.01 - EP); **C21D 1/76** (2013.01 - EP); **C23C 8/30** (2013.01 - CN EP KR US); **C23C 8/32** (2013.01 - CN EP); **C23C 8/80** (2013.01 - EP)

Citation (search report)  
• [XYI] JP 6503122 B1 20190417  
• [XI] JP 6345320 B1 20180620  
• [XI] WO 2016129333 A1 20160818 - SUNCALL CORP [JP]  
• [I] WO 2019131602 A1 20190704 - PARKER NETSUSHORI KOGYO CO LTD [JP]  
• [E] JP 2021120471 A 20210819 - PARKER NETSU SHORI KOGYO KK  
• [Y] JP H07173602 A 19950711 - SKF IND TRADING & DEV

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 4043606 A1 20220817; EP 4043606 A4 20230614**; CN 114829668 A 20220729; JP WO2021070938 A1 20210415; KR 20220057601 A 20220509; MX 2022002518 A 20220401; TW 202124731 A 20210701; US 2022341021 A1 20221027; WO 2021070938 A1 20210415

DOCDB simple family (application)  
**EP 20873990 A 20201009**; CN 202080069395 A 20201009; JP 2020038315 W 20201009; JP 2021551722 A 20201009; KR 20227011252 A 20201009; MX 2022002518 A 20201009; TW 109134933 A 20201008; US 202017641165 A 20201009