

(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国际局

(43) 国际公布日
2023 年 5 月 25 日 (25.05.2023)



(10) 国际公布号
WO 2023/088237 A1

- (51) 国际专利分类号:
C22C 19/05 (2006.01) *B21J 5/02* (2006.01)
C22F 1/10 (2006.01) *B21J 5/08* (2006.01)
- (21) 国际申请号: PCT/CN2022/131933
- (22) 国际申请日: 2022 年 11 月 15 日 (15.11.2022)
- (25) 申请语言: 中文
- (26) 公布语言: 中文
- (30) 优先权:
202111356334.9 2021 年 11 月 16 日 (16.11.2021) CN
- (71) 申请人: 南京中远海运船舶设备配件有限公司 (COSCO SHIPPING MARINE EQUIPMENT & SPARES (NANJING) CO., LTD) [CN/CN]; 中国江苏省南京市江宁区湖熟街道灵顺北路 276 号, Jiangsu 211121 (CN)。
- (72) 发明人: 鲁宏 (LU, Hong); 中国江苏省南京市江宁区湖熟街道灵顺北路 276 号, Jiangsu 211121 (CN)。戴魏魏 (DAI, Weiwei); 中国江苏省南京市江宁区湖熟街道灵顺北路 276 号, Jiangsu

211121 (CN)。蒋立鹤 (JIANG, Lihé); 中国江苏省南京市江宁区湖熟街道灵顺北路 276 号, Jiangsu 211121 (CN)。权国政 (QUAN, Guozheng); 中国重庆市沙坪坝区沙正街 174 号, Chongqing 400030 (CN)。张小林 (ZHANG, Xiaolin); 中国江苏省南京市江宁区湖熟街道灵顺北路 276 号, Jiangsu 211121 (CN)。

(74) 代理人: 北京高沃律师事务所 (BEIJING GAOWO LAW FIRM); 中国北京市海淀区彩和坊路 11 号 6 层 602 室, Beijing 100080 (CN)。

(81) 指定国 (除另有指明, 要求每一种可提供的国家保护): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE,

(54) Title: LARGE-SIZE DIESEL ENGINE AIR VALVE AND MANUFACTURING METHOD THEREFOR

(54) 发明名称: 一种大规格柴油机气阀及其制造方法

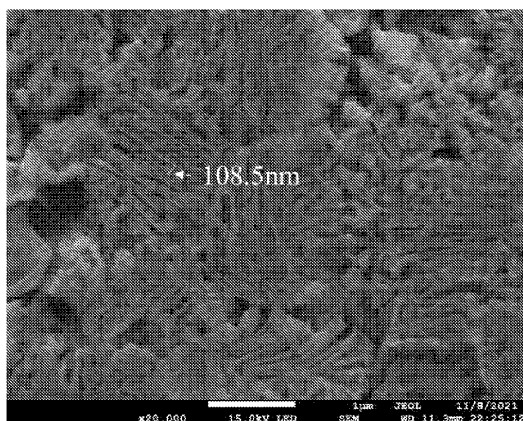


图 8

(57) Abstract: The present invention relates to the technical field of large-size marine diesel engine air valve manufacturing. The present invention provides a large-size diesel engine air valve and a manufacturing method therefor. The large-size diesel engine air valve comprises an air valve disc part made of 3J40 alloy and having the following component structure: ultrafine grains having a grain size of 10 or higher, α -Cr lamellar phases uniformly distributed at grain boundaries of the ultrafine grains, and nickel-poor Cr-Al-Ce particle phases uniformly distributed in a matrix, a lamellar thickness of a single α -Cr lamellar phase being less than 140 nm, and a diameter of the nickel-poor Cr-Al-Ce particle phase being less than 10 μ m. Pretreatment: solid solution treatment is performed on a 3J40 alloy bar, a solid solution treatment temperature being 1000-1050 °C and a solid solution treatment time being 50-70 min, then oil cooling is performed; and an air valve is obtained by sequentially performing electric upsetting, supplementary heat treatment, heat preservation treatment, and die forging; finally, post-treatment: aging heat treatment is performed on the air valve, an aging heat treatment temperature being 770-790 °C and an aging heat treatment time being 16-18 h, and air cooling is performed after the aging heat treatment. The present

[见续页]

SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ,
UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW。

(84) 指定国(除另有指明, 要求每一种可提供的地区
保护): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW,
MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), 欧亚
(AM, AZ, BY, KG, KZ, RU, TJ, TM), 欧洲 (AL, AT, BE,
BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR,
HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO,
PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF,
CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN,
TD, TG)。

本国际公布:

— 包括国际检索报告(条约第21条(3))。

invention resolves the technical problem of how to improve both the comprehensive mechanical performance and the vibration reduction performance of a large-size diesel engine air valve.

(57) 摘要: 本发明涉及大规格船用柴油机气阀制造技术领域, 本发明提供一种大规格柴油机气阀及其制造方法, 包括由3J40合金制造成型的气阀盘部, 并具有如下组织结构: 晶粒度达到10级以上的超细化晶粒, 超细化晶粒的晶界处均匀分布 α -Cr片层相及基体中均匀分布贫镍Cr-Al-Ce颗粒相, α -Cr片层相的单片片层厚度小于140nm, 贫镍Cr-Al-Ce颗粒相直径小于10 μ m。前处理: 对3J40合金棒材进行固溶处理, 固溶处理的温度为1000-1050 $^{\circ}$ C, 固溶处理的时间为50~70min, 油冷; 依次经过电镀锌、补热处理、保温处理、模锻加工得到气阀, 最后后处理: 对所述气阀进行时效热处理, 时效热处理的温度为770-790 $^{\circ}$ C, 时效热处理的时间为16~18h, 时效热处理后空冷。本发明解决了如何同时提高大规格柴油机气阀的综合力学性能和减振性能的技术问题。