

Title (en)

ELECTROLYTIC PROCESS FOR COATING METAL SURFACES TO PROVIDE HIGH WEAR RESISTANCE

Title (de)

ELEKTROLYTISCHES VERFAHREN ZUR BESCHICHTUNG VON METALLISCHEN OBERFLÄCHEN ZUR BEREITSTELLUNG HOHER VERSCHLEISSFESTIGKEIT

Title (fr)

PROCÉDÉ ÉLECTROLYTIQUE POUR LE REVÊTEMENT DE SURFACES MÉTALLIQUES POUR FOURNIR UNE RÉSISTANCE ÉLEVÉE À L'USURE

Publication

EP 3098334 A1 20161130 (EN)

Application

EP 16171777 A 20160527

Priority

IT UB20151322 A 20150529

Abstract (en)

Process for coating a metal article, which comprises: providing an electrolytic bath comprising a suspension of boron carbide particles, having an average size from 0.01 μm to 2 μm , in an aqueous solution comprising: at least one nickel (II) salt; at least one phosphorous compound selected from: phosphoric acid, phosphorous acid, hypophosphorous acid or salts thereof; at least one surfactant; immersing in the electrolytic bath a cathode comprising the article to be coated and an anode, and carrying out an electrodeposition by passing direct current in the electrolytic bath; subjecting the thus coated metal article to a heat treatment. In such a way a coating layer comprising a phosphorus/nickel alloy matrix and boron carbide particles having an average size from 0.01 μm to 2 μm is obtained. The coating layer thus obtained has very high wear resistance, also at high temperatures, and high hardness (up to 1500 HV), and at the same time high thickness uniformity.

IPC 8 full level

B01F 5/00 (2006.01); **B01F 5/10** (2006.01); **C25D 3/12** (2006.01); **C25D 5/08** (2006.01); **C25D 5/14** (2006.01); **C25D 5/50** (2006.01); **C25D 15/00** (2006.01); **C25D 21/10** (2006.01)

CPC (source: EP US)

B01F 23/023 (2022.01 - EP); **B01F 25/10** (2022.01 - EP); **B01F 25/50** (2022.01 - EP); **C25D 3/12** (2013.01 - EP); **C25D 5/08** (2013.01 - EP US); **C25D 5/14** (2013.01 - EP US); **C25D 5/50** (2013.01 - EP); **C25D 5/617** (2020.08 - EP US); **C25D 5/619** (2020.08 - EP US); **C25D 15/00** (2013.01 - EP US); **C25D 21/10** (2013.01 - EP)

Citation (applicant)

EP 1067220 A2 20010110 - SBR S R L [IT]

Citation (search report)

- [A] JP S6411998 A 19890117 - RIKEN KK
- [Y] EP 0005890 A2 19791212 - AKZO NV [NL]
- [Y] US 2011308958 A1 20111222 - KURRLE MATTHIAS [DE]
- [Y] US 6109778 A 20000829 - WILMER JEFFREY A [US]
- [IY] Z. GUO ET AL: "Microstructure and wear resistance of electrodeposited RE-Ni-Mo-P-B 4 C-PTFE composite coating", MATERIALS SCIENCE AND TECHNOLOGY, vol. 20, no. 2, 1 February 2004 (2004-02-01), GB, pages 257 - 260, XP055245785, ISSN: 0267-0836, DOI: 10.1179/026708304225011270
- [Y] JI BO JIANG ET AL: "Electrodeposition and Hardness and Corrosion Resistance Propertie of Ni/Nano-B₄C Composite Coatings", ADVANCED MATERIALS RESEARCH, vol. 399-401, 22 November 2011 (2011-11-22), pages 2055 - 2060, XP055245791, DOI: 10.4028/www.scientific.net/AMR.399-401.2055

Cited by

IT201700079843A1; US11242608B2; JP2017110276A; WO2019012496A1; WO2020083808A1

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

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

EP 3098334 A1 20161130; IT UB20151322 A1 20161129

DOCDB simple family (application)

EP 16171777 A 20160527; IT UB20151322 A 20150529