

## Title (en)

GALVANIZED STEEL PLATE HAVING EXCELLENT CAPABILITY OF PRESS WORKING, CHEMICAL CONVERSION AND THE LIKE, AND PRODUCTION OF SAID PLATE

## Title (de)

VERZINKTES STAHLBLECH MIT AUSGEZEICHNETER PRESSVERFORMUNG, CHEMISCHER OBERFLÄCHENUMWANDLUNG UND ÄHNLICHEN EIGENSCHAFTEN SOWIE HERSTELLUNG EINES SOLCHEN BLECHES

## Title (fr)

TOLE D'ACIER GALVANISEE PRESENTANT UNE APTITUDE EXCELLENTE AU MOULAGE A PRESSION, A LA CONVERSION CHIMIQUE OU ANALOGUE, ET PROCEDE DE FABRICATION

## Publication

**EP 0456834 B1 19960612 (EN)**

## Application

**EP 91900051 A 19901211**

## Priority

- JP 4820790 A 19900228
- JP 4820890 A 19900228
- JP 4820990 A 19900228
- JP 8869390 A 19900403
- JP 8869590 A 19900403
- JP 8869690 A 19900403
- JP 20285090 A 19900731
- JP 20406790 A 19900801
- JP 20406890 A 19900801
- JP 21540690 A 19900814
- JP 30558190 A 19901110
- JP 30558290 A 19901110
- JP 30558390 A 19901110
- JP 32045089 A 19891212
- JP 32878189 A 19891219
- JP 32878289 A 19891219
- JP 32878389 A 19891219
- JP 32878489 A 19891219
- JP 9001615 W 19901211

## Abstract (en)

[origin: EP0456834A1] 28.2.90(3), 3.4.90(3), 31.7.90, 1.8.90(2), 14.8.90, 10.11.90(2)-JP-328781-4, 048207-9, 088693/5/6, 202850, 204067/8, 215406, 305581/2) 9 A galvanised steel plate has a coating layer contg. an inorganic oxide (1-500 mg/cm<sup>2</sup> in terms of the wt. of inorganic element) formed on a Zn plated surface. The inorganic oxide can be an oxide of Mn, Mo, Co, Ni, Ca and P. It is pref. an oxide of Mn opt. contg. phosphonic acid and/or boronic acid, with oxides of W and/or V (1000 mg/m<sup>2</sup>=the total amt.) also opt. present. It may also be an oxide of P opt. contg. boronic acid (1-500 mg/m<sup>2</sup> in terms of the wt. of B), with or without other inorganic oxides. The coating layer (or layers) is (are) formed as follows: (i) a Zn oxide layer is formed on the surface of Zn-plated steel by contacting it with an acidic oxidising reagent sol., by anodic electrolysis in a Zn ion soln. in the presence of an oxidising agent, or by blowing a gas-water mixt. over it at 300-600 deg.C. (ii) on the Zn oxide layer the oxide layer of Mn, Mo, Co, Ni, Ca, V, W, Ti or Al is formed by bringing into contact with an acidic sol. (pH below 5) of an oxoacid of P or B contg. the metal ions or by anodic electrolysis in this sol.

## IPC 1-7

**C23C 22/06**; **C23C 22/58**; **C25D 9/08**; **C25D 11/00**

## IPC 8 full level

**C23C 22/08** (2006.01); **C23C 22/53** (2006.01)

## CPC (source: EP KR)

**C23C 22/08** (2013.01 - EP); **C23C 22/42** (2013.01 - EP); **C23C 22/53** (2013.01 - EP); **C23C 22/73** (2013.01 - EP); **C25D 5/48** (2013.01 - EP); **C25D 9/08** (2013.01 - KR); **C25D 11/34** (2013.01 - EP); **C25D 13/02** (2013.01 - EP); **C25D 13/04** (2013.01 - EP)

## Citation (examination)

- EP 0259657 A1 19880316 - NIPPON STEEL CORP [JP]
- US 4670066 A 19870602 - SCHAPIRA JOSEPH [FR], et al
- RÖMPPS CHEMIE-LEXIKON, 8th edition, 1985, page 3161
- ELEKTRODEPOSITION OF ALLOYS, vol. I, A. Brenner, Academic Press, New York - London, 1963, pages 75-79

## Cited by

EP2071048A1; EP1348780A4; US5714049A; EP1327697A4; EP1439240B2

## Designated contracting state (EPC)

DE FR GB IT NL

## DOCDB simple family (publication)

**EP 0456834 A1 19911121**; **EP 0456834 A4 19920708**; **EP 0456834 B1 19960612**; AU 629724 B2 19921008; AU 6888991 A 19910718; CA 2046288 A1 19910613; CA 2046288 C 20010206; DE 69027428 D1 19960718; DE 69027428 T2 19970213; KR 920701528 A 19920811; KR 940001032 B1 19940208; WO 9109152 A1 19910627

## DOCDB simple family (application)

**EP 91900051 A 19901211**; AU 6888991 A 19901211; CA 2046288 A 19901211; DE 69027428 T 19901211; JP 9001615 W 19901211; KR 910700888 A 19910812