

## SECTION C — CHEMISTRY; METALLURGY

### C25 ELECTROLYTIC OR ELECTROPHORETIC PROCESSES; APPARATUS THEREFOR

**C25D PROCESSES FOR THE ELECTROLYTIC OR ELECTROPHORETIC PRODUCTION OF COATINGS; ELECTROFORMING** (manufacturing printed circuits by metal deposition H05K 3/18); **JOINING WORKPIECES BY ELECTROLYSIS; APPARATUS THEREFOR** (anodic or cathodic protection C23F 13/00; single-crystal growth C30B) [2, 6]

#### Note(s) [2012.01]

Coating with two or more superposed coatings obtained by combination of methods provided for in this subclass and in subclass C23C is classified in group C23C 28/00.

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|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>1/00 Electroforming [2, 2006.01]</b>                                                        | 3/44 • • • Aluminium [2, 2006.01]                                                                                              |
| 1/02 • Tubes; Rings; Hollow bodies [2, 2006.01]                                                | 3/46 • • of silver [2, 2006.01]                                                                                                |
| 1/04 • Wires; Strips; Foils [2, 2006.01]                                                       | 3/48 • • of gold [2, 2006.01]                                                                                                  |
| 1/06 • Wholly-metallic mirrors [2, 2006.01]                                                    | 3/50 • • of platinum group metals [2, 2006.01]                                                                                 |
| 1/08 • Perforated or foraminous objects, e.g. sieves (C25D 1/10 takes precedence) [2, 2006.01] | 3/52 • • • characterised by the organic bath constituents used [2, 2006.01]                                                    |
| 1/10 • Moulds; Masks; Masterforms [2, 2006.01]                                                 | 3/54 • • of metals not provided for in groups C25D 3/04-C25D 3/50 [2, 2006.01]                                                 |
| 1/12 • by electrophoresis [2, 2006.01]                                                         | 3/56 • • of alloys [2, 2006.01]                                                                                                |
| 1/14 • • of inorganic material [2, 2006.01]                                                    | 3/58 • • • containing more than 50% by weight of copper [2, 2006.01]                                                           |
| 1/16 • • • Metals [2, 2006.01]                                                                 | 3/60 • • • containing more than 50% by weight of tin [2, 2006.01]                                                              |
| 1/18 • • of organic material [2, 2006.01]                                                      | 3/62 • • • containing more than 50% by weight of gold [2, 2006.01]                                                             |
| 1/20 • Separation of the formed objects from the electrodes [2, 2006.01]                       | 3/64 • • • containing more than 50% by weight of silver [2, 2006.01]                                                           |
| 1/22 • • Separating compounds [2, 2006.01]                                                     | 3/66 • from melts [2, 2006.01]                                                                                                 |
| <b>2/00 Joining workpieces by electrolysis [6, 2006.01]</b>                                    | <b>5/00 Electroplating characterised by the process; Pretreatment or after-treatment of workpieces [2, 2006.01]</b>            |
| <b>3/00 Electroplating; Baths therefor [2, 2006.01]</b>                                        | 5/02 • Electroplating of selected surface areas [2, 2006.01]                                                                   |
| 3/02 • from solutions (C25D 5/24-C25D 5/32 take precedence) [2, 2006.01]                       | 5/04 • Electroplating with moving electrodes [2, 2006.01]                                                                      |
| 3/04 • • of chromium [2, 2006.01]                                                              | 5/06 • • Brush or pad plating [2, 2006.01]                                                                                     |
| 3/06 • • • from solutions of trivalent chromium [2, 2006.01]                                   | 5/08 • Electroplating with moving electrolyte, e.g. jet electroplating [2, 2006.01]                                            |
| 3/08 • • • Deposition of black chromium [2, 2006.01]                                           | 5/10 • Electroplating with more than one layer of the same or of different metals (for bearings C25D 7/10) [2, 2006.01]        |
| 3/10 • • • characterised by the organic bath constituents used [2, 2006.01]                    | 5/12 • • at least one layer being of nickel or chromium [2, 2006.01]                                                           |
| 3/12 • • of nickel or cobalt [2, 2006.01]                                                      | 5/14 • • • two or more layers being of nickel or chromium, e.g. duplex or triplex layers [2, 2006.01]                          |
| 3/14 • • • from baths containing acetylenic or heterocyclic compounds [2, 2006.01]             | 5/16 • Electroplating with layers of varying thickness [2, 2006.01]                                                            |
| 3/16 • • • • Acetylenic compounds [2, 2006.01]                                                 | 5/18 • Electroplating using modulated, pulsed or reversing current [2, 2006.01]                                                |
| 3/18 • • • • Heterocyclic compounds [2, 2006.01]                                               | 5/20 • Electroplating using ultrasonics [2, 2006.01]                                                                           |
| 3/20 • • of iron [2, 2006.01]                                                                  | 5/22 • Electroplating combined with mechanical treatment during the deposition [2, 2006.01]                                    |
| 3/22 • • of zinc [2, 2006.01]                                                                  | 5/24 • Electroplating of metal surfaces to which a coating cannot readily be applied (C25D 5/34 takes precedence) [2, 2006.01] |
| 3/24 • • • from cyanide baths [2, 2006.01]                                                     | 5/26 • • of iron or steel surfaces [2, 2006.01]                                                                                |
| 3/26 • • of cadmium [2, 2006.01]                                                               |                                                                                                                                |
| 3/28 • • • from cyanide baths [2, 2006.01]                                                     |                                                                                                                                |
| 3/30 • • of tin [2, 2006.01]                                                                   |                                                                                                                                |
| 3/32 • • • characterised by the organic bath constituents used [2, 2006.01]                    |                                                                                                                                |
| 3/34 • • of lead [2, 2006.01]                                                                  |                                                                                                                                |
| 3/36 • • • characterised by the organic bath constituents used [2, 2006.01]                    |                                                                                                                                |
| 3/38 • • of copper [2, 2006.01]                                                                |                                                                                                                                |
| 3/40 • • • from cyanide baths [2, 2006.01]                                                     |                                                                                                                                |
| 3/42 • • of light metals [2, 2006.01]                                                          |                                                                                                                                |

- 5/28 • • of surfaces of refractory metals [2, 2006.01]
- 5/30 • • of surfaces of light metals [2, 2006.01]
- 5/32 • • of surfaces of actinides [2, 2006.01]
- 5/34 • Pretreatment of metallic surfaces to be electroplated [2, 2006.01]
- 5/36 • • of iron or steel [2, 2006.01]
- 5/38 • • of refractory metals or nickel [2, 2006.01]
- 5/40 • • • Nickel; Chromium [2, 2006.01]
- 5/42 • • of light metals [2, 2006.01]
- 5/44 • • • Aluminium [2, 2006.01]
- 5/46 • • of actinides [2, 2006.01]
- 5/48 • After-treatment of electroplated surfaces [2, 2006.01]
- 5/50 • • by heat-treatment [2, 2006.01]
- 5/52 • • by brightening or burnishing [2, 2006.01]
- 5/54 • Electroplating of non-metallic surfaces (C25D 7/12 takes precedence) [2, 2006.01]
- 5/56 • • of plastics [2, 2006.01]

#### **7/00 Electroplating characterised by the article coated [2, 2006.01]**

- 7/02 • Slide fasteners [2, 2006.01]
- 7/04 • Tubes; Rings; Hollow bodies [2, 2006.01]
- 7/06 • Wires; Strips; Foils [2, 2006.01]
- 7/08 • Mirrors; Reflectors [2, 2006.01]
- 7/10 • Bearings [2, 2006.01]
- 7/12 • Semiconductors [2, 2006.01]

#### **9/00 Electrolytic coating other than with metals (C25D 11/00, C25D 15/00 take precedence; electrophoretic coating C25D 13/00) [2, 2006.01]**

- 9/02 • with organic materials [2, 2006.01]
- 9/04 • with inorganic materials [2, 2006.01]
- 9/06 • • by anodic processes [2, 2006.01]
- 9/08 • • by cathodic processes [2, 2006.01]
- 9/10 • • • on iron or steel [2, 2006.01]
- 9/12 • • • on light metals [2, 2006.01]

#### **11/00 Electrolytic coating by surface reaction, i.e. forming conversion layers [2, 2006.01]**

- 11/02 • Anodisation [2, 2006.01]
- 11/04 • • of aluminium or alloys based thereon [2, 2006.01]
- 11/06 • • • characterised by the electrolytes used [2, 2006.01]
- 11/08 • • • containing inorganic acids [2, 2006.01]
- 11/10 • • • containing organic acids [2, 2006.01]
- 11/12 • • • Anodising more than once, e.g. in different baths [2, 2006.01]
- 11/14 • • • Producing integrally coloured layers [2, 2006.01]
- 11/16 • • • Pretreatment [2, 2006.01]
- 11/18 • • • After-treatment, e.g. pore-sealing [2, 2006.01]
- 11/20 • • • • Electrolytic after-treatment [2, 2006.01]
- 11/22 • • • • • for colouring layers [2, 2006.01]
- 11/24 • • • • Chemical after-treatment [2, 2006.01]
- 11/26 • • of refractory metals or alloys based thereon [2, 2006.01]
- 11/28 • • of actinides or alloys based thereon [2, 2006.01]
- 11/30 • • of magnesium or alloys based thereon [2, 2006.01]
- 11/32 • • of semiconducting materials [2, 2006.01]
- 11/34 • • of metals or alloys not provided for in groups C25D 11/04-C25D 11/32 [2, 2006.01]
- 11/36 • Phosphatising [2, 2006.01]
- 11/38 • Chromatising [2, 2006.01]

#### **13/00 Electrophoretic coating characterised by the process (C25D 15/00 takes precedence; compositions for electrophoretic coating C09D 5/44) [2, 2006.01]**

- 13/02 • with inorganic material [2, 2006.01]
- 13/04 • with organic material [2, 2006.01]
- 13/06 • • polymers [2, 2006.01]
- 13/08 • • • by polymerisation *in situ* of monomeric materials [2, 2006.01]
- 13/10 • characterised by the additives used [2, 2006.01]
- 13/12 • characterised by the article coated [2, 2006.01]
- 13/14 • • Tubes; Rings; Hollow bodies [2, 2006.01]
- 13/16 • • Wires; Strips; Foils [2, 2006.01]
- 13/18 • using modulated, pulsed or reversing current [2, 2006.01]
- 13/20 • Pretreatment [2, 2006.01]
- 13/22 • Servicing or operating [2, 2006.01]
- 13/24 • • Regeneration of process liquids [2, 2006.01]

#### **15/00 Electrolytic or electrophoretic production of coatings containing embedded materials, e.g. particles, whiskers, wires [2, 2006.01]**

- 15/02 • Combined electrolytic and electrophoretic processes [2, 2006.01]

#### **17/00 Constructional parts, or assemblies thereof, of cells for electrolytic coating [2, 2006.01]**

- 17/02 • Tanks; Installations therefor [2, 2006.01]
- 17/04 • • External supporting frames or structures [2, 2006.01]
- 17/06 • Suspending or supporting devices for articles to be coated [2, 2006.01]
- 17/08 • • Racks [2, 2006.01]
- 17/10 • Electrodes [2, 2006.01]
- 17/12 • • Shape or form (C25D 17/14 takes precedence) [2, 2006.01]
- 17/14 • • for pad-plating [2, 2006.01]
- 17/16 • Apparatus for electrolytic coating of small objects in bulk [2, 2006.01]
- 17/18 • • having closed containers [2, 2006.01]
- 17/20 • • • Horizontal barrels [2, 2006.01]
- 17/22 • • having open containers [2, 2006.01]
- 17/24 • • • Oblique barrels [2, 2006.01]
- 17/26 • • • Oscillating baskets [2, 2006.01]
- 17/28 • • with means for moving the objects individually through the apparatus during the treatment [2, 2006.01]

#### **19/00 Electrolytic coating plants [2, 2006.01]**

#### **21/00 Processes for servicing or operating cells for electrolytic coating [2, 2006.01]**

- 21/02 • Heating or cooling [2, 2006.01]
- 21/04 • Removal of gases or vapours [2, 2006.01]
- 21/06 • Filtering [2, 2006.01]
- 21/08 • Rinsing [2, 2006.01]
- 21/10 • Agitating of electrolytes; Moving of racks [2, 2006.01]
- 21/11 • Use of protective surface layers on electrolytic baths [3, 2006.01]
- 21/12 • Process control or regulation [2, 2006.01]
- 21/14 • • Controlled addition of electrolyte components [2, 2006.01]
- 21/16 • Regeneration of process solutions [2, 2006.01]
- 21/18 • • of electrolytes (C25D 21/22 takes precedence) [2, 2006.01]

21/20 • • of rinse-solutions (C25D 21/22 takes precedence) [2, 2006.01]

21/22 • • by ion-exchange [2, 2006.01]