

CPC COOPERATIVE PATENT CLASSIFICATION

C CHEMISTRY; METALLURGY
(NOTES omitted)

METALLURGY

C23 COATING METALLIC MATERIAL; COATING MATERIAL WITH METALLIC MATERIAL; CHEMICAL SURFACE TREATMENT; DIFFUSION TREATMENT OF METALLIC MATERIAL; COATING BY VACUUM EVAPORATION, BY SPUTTERING, BY ION IMPLANTATION OR BY CHEMICAL VAPOUR DEPOSITION, IN GENERAL; INHIBITING CORROSION OF METALLIC MATERIAL OR INCRUSTATION IN GENERAL
(NOTES omitted)

C23F NON-MECHANICAL REMOVAL OF METALLIC MATERIAL FROM SURFACE (working metal by laser beams [B23K 26/00](#); desurfacing by applying flames [B23K 7/00](#); working of metal by electro-erosion [B23H](#); producing decorative effects by removing surface material, e.g. by engraving, by etching, [B44C 1/22](#); electrolytic etching or polishing [C25F](#)); **INHIBITING CORROSION OF METALLIC MATERIAL OR INCRUSTATION IN GENERAL; MULTI-STEP PROCESSES FOR SURFACE TREATMENT OF METALLIC MATERIAL INVOLVING AT LEAST ONE PROCESS PROVIDED FOR IN CLASS [C23](#) AND AT LEAST ONE PROCESS COVERED BY SUBCLASS [C21D](#) OR [C22F](#) OR CLASS [C25](#)**

NOTES

1. protective layers or coating compositions or methods of applying them; these are classified in the appropriate places, e.g. [B05](#), [B44](#), [C09D](#), [C23C](#).
2. mechanical devices or constructional features of particular articles for inhibiting incrustation; these are classified in the appropriate places, e.g. in pipes or pipe fittings [F16L 58/00](#).
3. articles characterised by being made of materials selected for their properties of resistance to corrosion or incrustation; these are classified in the appropriate places, e.g. turbine blades [F01D 5/28](#).

WARNINGS

1. The following IPC group is not in the CPC scheme. The subject matter for this IPC group is classified in the following CPC groups:
[C23F 1/24](#) covered by [C09K 13/00](#), [H01L 21/00](#)
2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

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| 1/00 | Etching metallic material by chemical means (manufacture of printing surfaces B41C ; manufacture of printed circuits H05K) | 1/26 | for etching refractory metals |
| | | 1/28 | for etching iron group metals |
| | | 1/30 | for etching other metallic material |
| 1/02 | . Local etching | 1/32 | . . . Alkaline compositions (C23F 1/42 takes precedence) |
| 1/04 | . . Chemical milling | | |
| 1/06 | . Sharpening files | 1/34 | for etching copper or alloys thereof |
| 1/08 | . Apparatus, e.g. for photomechanical printing surfaces (photo- mechanical reproduction G03F) | 1/36 | for etching aluminium or alloys thereof |
| | | 1/38 | for etching refractory metals |
| 1/10 | . Etching compositions (C23F 1/44 takes precedence) | 1/40 | for etching other metallic material |
| 1/12 | . . Gaseous compositions | 1/42 | . . . containing a dispersed water-immiscible liquid |
| 1/14 | . . Aqueous compositions | 1/44 | . Compositions for etching metallic material from a metallic material substrate of different composition |
| 1/16 | . . . Acidic compositions (C23F 1/42 takes precedence) | 1/46 | . Regeneration of etching compositions |
| 1/18 | for etching copper or alloys thereof | | |
| 1/20 | for etching aluminium or alloys thereof | 3/00 | Brightening metals by chemical means |
| 1/22 | for etching magnesium or alloys thereof | 3/02 | . Light metals |
| | | 3/03 | . . with acidic solutions |

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|--------------|--|----------------|--|
| 3/04 | . Heavy metals | 11/184 | . . . {Phosphorous, arsenic, antimony or bismuth containing compounds} |
| 3/06 | . . with acidic solutions | 11/185 | . . . {Refractory metal-containing compounds} |
| 4/00 | Processes for removing metallic material from surfaces, not provided for in group C23F 1/00 or C23F 3/00 | 11/187 | . . . {Mixtures of inorganic inhibitors} |
| 4/02 | . by evaporation | 11/188 | {containing phosphates} |
| 4/04 | . by physical dissolution | 13/00 | Inhibiting corrosion of metals by anodic or cathodic protection |
| 11/00 | Inhibiting corrosion of metallic material by applying inhibitors to the surface in danger of corrosion or adding them to the corrosive agent (adding inhibitors to mineral oil, fuels, or lubricants C10; adding inhibitors to pickling solutions C23G) | 13/005 | . {Anodic protection} |
| 11/02 | . in air or gases by adding vapour phase inhibitors | 13/02 | . cathodic; Selection of conditions, parameters or procedures for cathodic protection, e.g. of electrical conditions |
| 11/04 | . in markedly acid liquids | 13/04 | . . Controlling or regulating desired parameters |
| 11/06 | . in markedly alkaline liquids | 13/06 | . . Constructional parts, or assemblies of cathodic-protection apparatus |
| 11/08 | . in other liquids | 13/08 | . . . Electrodes specially adapted for inhibiting corrosion by cathodic protection; Manufacture thereof; Conducting electric current thereto |
| 11/10 | . . using organic inhibitors | 13/10 | Electrodes characterised by the structure (C23F 13/16 takes precedence) |
| | NOTES | 13/12 | Electrodes characterised by the material (C23F 13/16 takes precedence) |
| | 1. A compound is classified in the last appropriate place. | 13/14 | Material for sacrificial anodes |
| | 2. Esters or anhydrides of organic acids are classified as the relevant acid unless otherwise indicated. Salts of a compound with an inorganic compound are classified as that compound unless specifically provided for. | 13/16 | Electrodes characterised by the combination of the structure and the material |
| 11/12 | . . . Oxygen-containing compounds | 13/18 | Means for supporting electrodes |
| 11/122 | {Alcohols; Aldehydes; Ketones} | 13/20 | Conducting electric current to electrodes |
| 11/124 | {Carboxylic acids} | 13/22 | Monitoring arrangements therefor |
| 11/126 | {Aliphatic acids} | 14/00 | Inhibiting incrustation in apparatus for heating liquids for physical or chemical purposes (adding scale preventives or removers to water C02F 5/00 ; inhibiting incrustation in polymerisation reactors C23F 15/005) |
| 11/128 | {Esters of carboxylic acids} | 14/02 | . by chemical means |
| 11/14 | . . . Nitrogen-containing compounds | 15/00 | Other methods of preventing corrosion or incrustation |
| 11/141 | {Amines; Quaternary ammonium compounds} | 15/005 | . {Inhibiting incrustation} |
| 11/142 | {Hydroxy amines} | 17/00 | Multi-step processes for surface treatment of metallic material involving at least one process provided for in class C23 and at least one process covered by subclass C21D or C22F or class C25 (coating for obtaining at least two superposed coatings either by methods not provided for in a single one of main groups C23C 2/00 - C23C 26/00, or by combinations of methods provided for in subclasses C23C and C25D, C23C 28/00) |
| 11/143 | {Salts of amines} | 2201/00 | Type of materials to be protected by cathodic protection |
| 11/144 | {Aminocarboxylic acids} | 2201/02 | . Concrete, e.g. reinforced |
| 11/145 | {Amides; N-substituted amides} | 2213/00 | Aspects of inhibiting corrosion of metals by anodic or cathodic protection |
| 11/146 | {containing a multiple nitrogen-to-carbon bond} | 2213/10 | . Controlling or regulating parameters |
| 11/147 | {containing a nitrogen-to-oxygen bond} | 2213/11 | . . for structures subject to stray currents |
| 11/148 | {containing a nitrogen-to-nitrogen bond} | 2213/20 | . Constructional parts or assemblies of the anodic or cathodic protection apparatus |
| 11/149 | {Heterocyclic compounds containing nitrogen as hetero atom} | 2213/21 | . . combining at least two types of anodic or cathodic protection |
| 11/16 | . . . Sulfur-containing compounds | 2213/22 | . . characterized by the ionic conductor, e.g. humectant, hydratant or backfill |
| 11/161 | {Mercaptans} | 2213/30 | . Anodic or cathodic protection specially adapted for a specific object |
| 11/162 | {Thioaldehydes; Thioketones} | | |
| 11/163 | {Sulfonic acids} | | |
| 11/164 | {containing a -SO ₂ -N group} | | |
| 11/165 | {Heterocyclic compounds containing sulfur as hetero atom} | | |
| 11/167 | . . . Phosphorus-containing compounds | | |
| 11/1673 | {Esters of phosphoric or thiophosphoric acids} | | |
| 11/1676 | {Phosphonic acids} | | |
| 11/173 | . . . Macromolecular compounds | | |
| 11/18 | . . using inorganic inhibitors | | |
| 11/181 | . . . {Nitrogen containing compounds} | | |
| 11/182 | . . . {Sulfur, boron or silicon containing compounds} | | |

C23F

2213/31 . . Immersed structures, e.g. submarine structures

2213/32 . . Pipes