

CPC COOPERATIVE PATENT CLASSIFICATION

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](#).

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|-------------|---|--------------|--|
| 1/00 | Etching metallic material by chemical means (manufacture of printing surfaces B41C ; manufacture of printed circuits H05K) | 4/04 | . by physical dissolution |
| 1/02 | . Local etching | 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) |
| 1/04 | . . Chemical milling | | |
| 1/06 | . Sharpening files | | |
| 1/08 | . Apparatus, e.g. for photomechanical printing surfaces (photo- mechanical reproduction G03F) | 11/02 | . in air or gases by adding vapour phase inhibitors |
| 1/10 | . Etching compositions (C23F 1/44 takes precedence) | 11/04 | . in markedly acid liquids |
| 1/12 | . . Gaseous compositions | 11/06 | . in markedly alkaline liquids |
| 1/14 | . . Aqueous compositions | 11/08 | . in other liquids |
| 1/16 | . . . Acidic compositions (C23F 1/42 takes precedence) | 11/10 | . . using organic inhibitors |
| 1/18 | for etching copper or alloys thereof | | NOTES |
| 1/20 | for etching aluminium or alloys thereof | | 1. A compound is classified in the last appropriate place. |
| 1/22 | for etching magnesium or alloys thereof | | 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. |
| 1/26 | for etching refractory metals | | |
| 1/28 | for etching iron group metals | | |
| 1/30 | for etching other metallic material | | |
| 1/32 | . . . Alkaline compositions (C23F 1/42 takes precedence) | 11/12 | . . . Oxygen-containing compounds |
| 1/34 | for etching copper or alloys thereof | 11/122 | {Alcohols; Aldehydes; Ketones} |
| 1/36 | for etching aluminium or alloys thereof | 11/124 | {Carboxylic acids} |
| 1/38 | for etching refractory metals | 11/126 | {Aliphatic acids} |
| 1/40 | for etching other metallic material | 11/128 | {Esters of carboxylic acids} |
| 1/42 | . . . containing a dispersed water-immiscible liquid | 11/14 | . . . Nitrogen-containing compounds |
| 1/44 | . Compositions for etching metallic material from a metallic material substrate of different composition | 11/141 | {Amines; Quaternary ammonium compounds} |
| 1/46 | . Regeneration of etching compositions | 11/142 | {Hydroxy amines} |
| 3/00 | Brightening metals by chemical means | 11/143 | {Salts of amines} |
| 3/02 | . Light metals | 11/144 | {Aminocarboxylic acids} |
| 3/03 | . . with acidic solutions | 11/145 | {Amides; N-substituted amides} |
| 3/04 | . Heavy metals | 11/146 | {containing a multiple nitrogen-to-carbon bond} |
| 3/06 | . . with acidic solutions | | |
| 4/00 | Processes for removing metallic material from surfaces, not provided for in group C23F 1/00 or C23F 3/00 | 11/147 | {containing a nitrogen-to-oxygen bond} |
| 4/02 | . by evaporation | 11/148 | {containing a nitrogen-to-nitrogen bond} |
| | | 11/149 | {Heterocyclic compounds containing nitrogen as hetero atom} |

- 11/16 . . . Sulfur-containing compounds
- 11/161 {Mercaptans}
- 11/162 {Thioaldehydes; Thioketones}
- 11/163 {Sulfonic acids}
- 11/164 {containing a -SO₂-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}
- 11/184 . . . {Phosphorous, arsenic, antimony or bismuth containing compounds}
- 11/185 . . . {Refractory metal-containing compounds}
- 11/187 . . . {Mixtures of inorganic inhibitors}
- 11/188 {containing phosphates}

13/00 Inhibiting corrosion of metals by anodic or cathodic protection

- 13/005 . {Anodic protection}
- 13/02 . cathodic; Selection of conditions, parameters or procedures for cathodic protection, e.g. of electrical conditions
- 13/04 . . Controlling or regulating desired parameters
- 13/06 . . Constructional parts, or assemblies of cathodic-protection apparatus
- 13/08 . . . Electrodes specially adapted for inhibiting corrosion by cathodic protection; Manufacture thereof; Conducting electric current thereto
- 13/10 Electrodes characterised by the structure ([C23F 13/16 takes precedence](#))
- 13/12 Electrodes characterised by the material ([C23F 13/16 takes precedence](#))
- 13/14 Material for sacrificial anodes
- 13/16 Electrodes characterised by the combination of the structure and the material
- 13/18 Means for supporting electrodes
- 13/20 Conducting electric current to electrodes
- 13/22 Monitoring arrangements therefor

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})

- 14/02 . by chemical means

15/00 Other methods of preventing corrosion or incrustation

- 15/005 . {Inhibiting incrustation}

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](#) ([C23C 28/00 takes precedence](#))

2201/00 Type of materials to be protected by cathodic protection

- 2201/02 . Concrete, e.g. reinforced

2213/00 Aspects of inhibiting corrosion of metals by anodic or cathodic protection

- 2213/10 . Controlling or regulating parameters
- 2213/11 . . for structures subject to stray currents
- 2213/20 . Constructional parts or assemblies of the anodic or cathodic protection apparatus
- 2213/21 . . combining at least two types of anodic or cathodic protection
- 2213/22 . . characterized by the ionic conductor, e.g. humectant, hydratant or backfill
- 2213/30 . Anodic or cathodic protection specially adapted for a specific object
- 2213/31 . . Immersed structures, e.g. submarine structures
- 2213/32 . . Pipes