**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.

### Etching metallic material by chemical means

<table>
<thead>
<tr>
<th>Subclass</th>
<th>Description</th>
<th>Precedence</th>
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<tbody>
<tr>
<td>1/00</td>
<td>Etching metallic material by chemical means</td>
<td>1/26</td>
</tr>
<tr>
<td></td>
<td>(manufacture of printing surfaces B41C; manufacture of printed circuits H05K)</td>
<td>1/28, 1/30</td>
</tr>
<tr>
<td>1/02</td>
<td>Local etching</td>
<td>1/32</td>
</tr>
<tr>
<td>1/04</td>
<td>Chemical milling</td>
<td>1/34</td>
</tr>
<tr>
<td>1/06</td>
<td>Sharpening files</td>
<td>1/36, 1/38</td>
</tr>
<tr>
<td>1/08</td>
<td>Apparatus, e.g. for photomechanical printing surfaces (photo- mechanical reproduction G03F)</td>
<td>1/40, 1/42</td>
</tr>
<tr>
<td>1/10</td>
<td>Etching compositions (C23F 1/44 takes precedence)</td>
<td>1/44</td>
</tr>
<tr>
<td>1/12</td>
<td>Gaseous compositions</td>
<td>1/46</td>
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<tr>
<td>1/14</td>
<td>Aqueous compositions</td>
<td></td>
</tr>
<tr>
<td>1/16</td>
<td>Acidic compositions (C23F 1/42 takes precedence)</td>
<td>3/00, 3/02</td>
</tr>
<tr>
<td>1/18</td>
<td>for etching copper or alloys thereof</td>
<td>3/03</td>
</tr>
<tr>
<td>1/20</td>
<td>for etching aluminium or alloys thereof</td>
<td></td>
</tr>
<tr>
<td>1/22</td>
<td>for etching magnesium or alloys thereof</td>
<td></td>
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</tbody>
</table>

**Brightening metals by chemical means**

- Light metals
- with acidic solutions
3/04 . . . Heavy metals
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
4/02 . . . by evaporation
4/04 . . . by physical dissolution

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)
11/02 . . . in air or gases by adding vapour phase inhibitors
11/04 . . . in markedly acid liquids
11/06 . . . in markedly alkaline liquids
11/08 . . . in other liquids
11/10 . . . using organic inhibitors

NOTES
1. A compound is classified in the last appropriate place.
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.

11/12 . . . Oxygen-containing compounds
11/122 . . . { Alcohols; Aldehydes; Ketones }
11/124 . . . { Carboxylic acids }
11/126 . . . { Aliphatic acids }
11/128 . . . { Esters of carboxylic acids }
11/14 . . . Nitrogen-containing compounds
11/141 . . . { Amines; Quaternary ammonium compounds }
11/142 . . . { Hydroxy amines }
11/143 . . . { Salts of amines }
11/144 . . . { Aminocarboxylic acids }
11/145 . . . { Amides; N-substituted amides }
11/146 . . . { containing a multiple nitrogen-to-carbon bond }
11/147 . . . { containing a nitrogen-to-oxygen bond }
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 . . . Electodes specially adapted for inhibiting corrosion by cathodic protection; Manufacture thereof; Conducting electric current therefor
13/10 . . . Electodes characterised by the structure (C23F 13/16 takes precedence)
13/12 . . . Electodes characterised by the material (C23F 13/16 takes precedence)
13/14 . . . Material for sacrificial anodes
13/16 . . . Electodes 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 (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)

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
Immersed structures, e.g. submarine structures
Pipes