

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

- protective layers or coating compositions or methods of applying them; these are classified in the appropriate places, e.g. [B05](#), [B44](#), [C09D](#), [C23C](#).
- 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](#).
- 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

- 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
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- 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.

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	. . . .	3/00		Brightening metals by chemical means
1/22	. . . .	3/02	. . .	Light metals
		3/03	. . .	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 . . . 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](#) (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

C23F

- 2213/31 . . Immersed structures, e.g. submarine structures
- 2213/32 . . Pipes