

CPC COOPERATIVE PATENT CLASSIFICATION

C21B MANUFACTURE OF IRON OR STEEL (preliminary treatment of ferrous ores or scrap [C22B 1/00](#); electric heating [H05B](#))

NOTE

This subclass covers the production of iron or steel from source materials, e.g. the production of pig-iron, and apparatus specially adapted therefor, e.g. blast furnaces, air heaters (furnaces in general [F27](#)).

3/00	General features in the manufacture of pig-iron (mixers for pig-iron C21C 1/06)	9/04	. . with combustion shaft
3/02	. by applying additives, e.g. fluxing agents	9/06	. . Linings
3/04	. Recovery of by-products, e.g. slag	9/08	. Iron hot-blast stoves
3/06	. . Treatment of liquid slag (slag wool C03B ; slag stones C04B)	9/10	. Other details, e.g. blast mains
3/08	. . . Cooling slag	9/12	. . Hot-blast valves or slides for blast furnaces (valves in general F16K)
3/10	. . . Slag pots; Slag cars	9/14	. Preheating the combustion air
		9/16	. Cooling or drying the hot-blast
5/00	Making pig-iron in the blast furnace	11/00	Making pig-iron other than in blast furnaces
5/001	. {Injecting additional fuel or reducing agents}	11/02	. in low shaft furnaces {or shaft furnaces}
5/002	. . {Heated electrically (plasma)}	11/06	. in rotary kilns
5/003	. . {Injection of pulverulent coal}	11/08	. in hearth-type furnaces
5/004	. . . {Injection of slurries}	11/10	. in electric furnaces
2005/005	. . {Selection or treatment of the reducing gases}	13/00	Making spongy iron or liquid steel, by direct processes
5/006	. {Automatically controlling the process}	13/0006	. {obtaining iron or steel in a molten state}
5/007	. {Conditions of the cokes or characterised by the cokes used}	13/0013	. . {introduction of iron oxide into a bath of molten iron containing a carbon reductant}
5/008	. {Composition or distribution of the charge}	13/002	. . . {Reduction of iron ores by passing through a heated column of carbon}
5/02	. Making special pig-iron, e.g. by applying additives, e.g. oxides of other metals	13/0026	. . {introduction of iron oxide in the flame of a burner or a hot gas stream}
5/023	. . {Injection of the additives into the melting part}	13/0033	. {In fluidised bed furnaces or apparatus containing a dispersion of the material}
5/026	. . . {of plastic material}	13/004	. {in a continuous way by reduction from ores}
5/04	. Making slag of special composition	13/0046	. {making metallised agglomerates or iron oxide}
5/06	. Using top gas in the blast furnace process (in coke ovens C10B)	13/0053	. . {On a massing grate}
7/00	Blast furnaces (lifts associated with blast furnaces B66B 9/06)	13/006	. {Starting from ores containing non ferrous metallic oxides}
7/002	. {Evacuating and treating of exhaust gases}	13/0066	. {Preliminary conditioning of the solid carbonaceous reductant}
7/005	. . {Bleeder valves or slides}	13/0073	. {Selection or treatment of the reducing gases}
7/007	. {Controlling or regulating of the top pressure}	13/008	. {Use of special additives or fluxing agents}
7/02	. Internal forms	13/0086	. {Conditioning, transformation of reduced iron ores}
7/04	. with special refractories (refractory materials C04B)	13/0093	. . {Protecting against oxidation}
7/06	. . Linings for furnaces	13/02	. in shaft furnaces
7/08	. Top armourings	13/023	. . {wherein iron or steel is obtained in a molten state}
7/10	. Cooling; Devices therefor	13/026	. . . {heated electrically}
7/103	. . {Detection of leakages of the cooling liquid}	13/04	. in retorts
7/106	. . {Cooling of the furnace bottom}	13/06	. in multi-storied furnaces
7/12	. Opening or sealing the tap holes	13/08	. in rotary furnaces
7/125	. . {Refractory plugging mass}	13/085	. . {wherein iron or steel is obtained in a molten state}
7/14	. Discharging devices, e.g. for slag	13/10	. in hearth-type furnaces
7/16	. Tuyères	13/105	. . {Rotary hearth-type furnaces}
7/163	. . {Blowpipe assembly}	13/12	. in electric furnaces
7/166	. . {Tuyere replacement apparatus}	13/125	. . {By using plasma}
7/18	. Bell-and-hopper arrangements	13/14	. Multi-stage processes {processes carried out in different vessels or furnaces}
7/20	. . with appliances for distributing the burden		
7/22	. Dust arresters		
7/24	. Test rods or other checking devices		
9/00	Stoves for heating the blast in blast furnaces		
9/02	. Brick hot-blast stoves		

- 13/143 . . {Injection of partially reduced ore into a molten bath}
- 13/146 . . {Multi-step reduction without melting}
- 15/00 Other processes for the manufacture of iron from iron compounds** (general methods of reducing to metal [C22B 5/00](#); by electrolysis [C25C 1/06](#))
 - 15/003 . {By using nuclear energy}
 - 15/006 . {By a chloride process}
 - 15/02 . Metallothermic processes, e.g. thermit reduction
 - 15/04 . from iron carbonyl

2100/00 Exhaust gases

- 2100/02 . Treatment of the exhaust gases
- 2100/04 . Recirculation of the exhaust gases
- 2100/06 . Energy from waste gases used in other processes

2200/00 Recycling of waste material

2300/00 Process aspects

- 2300/02 . Particular sequence of the process steps
- 2300/04 . Modeling of the process, e.g. for control purposes; CII