

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](#)).

C21B 3/00

General features in the manufacture of pig-iron (mixers for pig-iron [C21C 1/06](#))

C21B 3/02

- . by applying additives, e.g. fluxing agents

C21B 3/04

- . Recovery of by-products, e.g. slag

C21B 3/06

- .. Treatment of liquid slag ([slag wool C03B](#); [slag stones C04B](#))

C21B 3/08

- ... Cooling slag

C21B 3/10

- ... Slag pots; Slag cars

C21B 5/00

Making pig-iron in the blast furnace

C21B 5/001

- . { Injecting additional fuel or reducing agents }

C21B 5/002

- .. { Heated electrically (plasma) }

C21B 5/003

- .. { Injection of pulverulent coal }

C21B 5/004

- ... { Injection of slurries }

C21B 2005/005

- .. { Selection or treatment of the reducing gases }

C21B 5/006

- . { Automatically controlling the process }

C21B 5/007

- . { Conditions of the cokes or characterised by the cokes used }

C21B 5/008

- . { Composition or distribution of the charge }

C21B 5/02

- . Making special pig-iron, e.g. by applying additives, e.g. oxides of other metals

C21B 5/023

- .. { Injection of the additives into the melting part }

C21B 5/026

- ... { of plastic material }

C21B 5/04

- . Making slag of special composition

C21B 5/06

- . Using top gas in the blast furnace process ([in coke ovens C10B](#))

C21B 7/00

Blast furnaces ([lifts associated with blast furnaces B66B 9/06](#))

- C21B 7/002 . { Evacuating and treating of exhaust gases }
- C21B 7/005 .. { Bleeder valves or slides }
- C21B 7/007 . { Controlling or regulating of the top pressure }
- C21B 7/02 . Internal forms
- C21B 7/04 . with special refractories ([refractory materials C04B](#))
- C21B 7/06 .. Linings for furnaces
- C21B 7/08 . Top armourings
- C21B 7/10 . Cooling; Devices therefor
- C21B 7/103 .. { Detection of leakages of the cooling liquid }
- C21B 7/106 .. { Cooling of the furnace bottom }
- C21B 7/12 . Opening or sealing the tap holes
- C21B 7/125 .. { Refractory plugging mass }
- C21B 7/14 . Discharging devices, e.g. for slag
- C21B 7/16 . Tuyéres
- C21B 7/163 .. { Blowpipe assembly }
- C21B 7/166 .. { Tuyere replacement apparatus }
- C21B 7/18 . Bell-and-hopper arrangements
- C21B 7/20 .. with appliances for distributing the burden
- C21B 7/22 . Dust arresters
- C21B 7/24 . Test rods or other checking devices
- C21B 9/00 Stoves for heating the blast in blast furnaces**
- C21B 9/02 . Brick hot-blast stoves
- C21B 9/04 .. with combustion shaft
- C21B 9/06 .. Linings
- C21B 9/08 . Iron hot-blast stoves
- C21B 9/10 . Other details, e.g. blast mains
- C21B 9/12 .. Hot-blast valves or slides for blast furnaces ([valves in general F16K](#))
- C21B 9/14 . Preheating the combustion air
- C21B 9/16 . Cooling or drying the hot-blast

C21B 11/00 Making pig-iron other than in blast furnaces

- C21B 11/02 . in low shaft furnaces { or shaft furnaces }
- C21B 11/06 . in rotary kilns
- C21B 11/08 . in hearth-type furnaces
- C21B 11/10 . in electric furnaces

C21B 13/00 Making spongy iron or liquid steel, by direct processes

- C21B 13/0006 . { obtaining iron or steel in a molten state }
- C21B 13/0013 . . { introduction of iron oxide into a bath of molten iron containing a carbon reductant }
- C21B 13/002 . . . { Reduction of iron ores by passing through a heated column of carbon }
- C21B 13/0026 . . { introduction of iron oxide in the flame of a burner or a hot gas stream }
- C21B 13/0033 . { In fluidised bed furnaces or apparatus containing a dispersion of the material }
- C21B 13/004 . { in a continuous way by reduction from ores }
- C21B 13/0046 . { making metallised agglomerates or iron oxide }
- C21B 13/0053 . . { On a massing grate }
- C21B 13/006 . { Starting from ores containing non ferrous metallic oxides }
- C21B 13/0066 . { Preliminary conditioning of the solid carbonaceous reductant }
- C21B 13/0073 . { Selection or treatment of the reducing gases }
- C21B 13/008 . { Use of special additives or fluxing agents }
- C21B 13/0086 . { Conditioning, transformation of reduced iron ores }
- C21B 13/0093 . . { Protecting against oxidation }
- C21B 13/02 . in shaft furnaces
- C21B 13/023 . . { wherein iron or steel is obtained in a molten state }
- C21B 13/026 . . . { heated electrically }
- C21B 13/04 . in retorts
- C21B 13/06 . in multi-storied furnaces
- C21B 13/08 . in rotary furnaces
- C21B 13/085 . . { wherein iron or steel is obtained in a molten state }

- C21B 13/10 . in hearth-type furnaces
- C21B 13/105 .. { Rotary hearth-type furnaces }
- C21B 13/12 . in electric furnaces
- C21B 13/125 .. { By using plasma }
- C21B 13/14 . Multi-stage processes { processes carried out in different vessels or furnaces }
- C21B 13/143 .. { Injection of partially reduced ore into a molten bath }
- C21B 13/146 .. { Multi-step reduction without melting }

C21B 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](#))

- C21B 15/003 . { By using nuclear energy }
- C21B 15/006 . { By a chloride process }
- C21B 15/02 . Metallothermic processes, e.g. thermit reduction
- C21B 15/04 . from iron carbonyl

C21B 2100/00 **Exhaust gases**

- C21B 2100/02 . Treatment of the exhaust gases
- C21B 2100/04 . Recirculation of the exhaust gases
- C21B 2100/06 . Energy from waste gases used in other processes

C21B 2200/00 **Recycling of waste material**

C21B 2300/00 **Process aspects**

- C21B 2300/02 . Particular sequence of the process steps
- C21B 2300/04 . Modeling of the process, e.g. for control purposes; CII