

CPC COOPERATIVE PATENT CLASSIFICATION

C CHEMISTRY; METALLURGY

(NOTES omitted)

METALLURGY

C21 METALLURGY OF IRON

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

NOTE

This subclass covers:

- the production of iron or steel from source materials, e.g. the production of pig-iron;
- apparatus specially adapted therefor, e.g. blast furnaces or air heaters.

3/00	General features in the manufacture of pig-iron (mixers for pig-iron C21C 1/06)	7/20	. . with appliances for distributing the burden
3/02	. by applying additives, e.g. fluxing agents	7/205	. . . {Details concerning the gear-box driving the charge distribution system}
3/04	. Recovery of by-products, e.g. slag	7/22	. Dust arresters
3/06	. . Treatment of liquid slag	7/24	. Test rods or other checking devices
3/08	. . . Cooling slag		
3/10	. . . Slag pots; Slag cars	9/00	Stoves for heating the blast in blast furnaces
5/00	Making pig-iron in the blast furnace	9/02	. Brick hot-blast stoves
5/001	. {Injecting additional fuel or reducing agents}	9/04	. . with combustion shaft
5/002	. . {Heated electrically (plasma)}	9/06	. . Linings
5/003	. . {Injection of pulverulent coal}	9/08	. Iron hot-blast stoves
5/004	. . . {Injection of slurries}	9/10	. Other details, e.g. blast mains
2005/005	. . {Selection or treatment of the reducing gases}	9/12	. . Hot-blast valves or slides for blast furnaces
5/006	. {Automatically controlling the process}	9/14	. Preheating the combustion air
5/007	. {Conditions of the cokes or characterised by the cokes used}	9/16	. Cooling or drying the hot-blast
5/008	. {Composition or distribution of the charge}	11/00	Making pig-iron other than in blast furnaces
5/02	. Making special pig-iron, e.g. by applying additives, e.g. oxides of other metals	11/02	. in low shaft furnaces {or shaft furnaces}
5/023	. . {Injection of the additives into the melting part}	11/06	. in rotary kilns
5/026	. . . {of plastic material}	11/08	. in hearth-type furnaces
5/04	. Making slag of special composition	11/10	. in electric furnaces
5/06	. using top gas in the blast furnace process	13/00	Making spongy iron or liquid steel, by direct processes
7/00	Blast furnaces	13/0006	. {obtaining iron or steel in a molten state}
7/002	. {Evacuating and treating of exhaust gases}	13/0013	. . {introduction of iron oxide into a bath of molten iron containing a carbon reductant}
7/005	. . {Bleeder valves or slides}	13/002	. . . {Reduction of iron ores by passing through a heated column of carbon}
7/007	. {Controlling or regulating of the top pressure}	13/0026	. . {introduction of iron oxide in the flame of a burner or a hot gas stream}
7/02	. Internal forms	13/0033	. {In fluidised bed furnaces or apparatus containing a dispersion of the material}
7/04	. with special refractories	13/004	. {in a continuous way by reduction from ores}
7/06	. . Linings for furnaces	13/0046	. {making metallised agglomerates or iron oxide}
7/08	. Top armourings	13/0053	. . {On a massing grate}
7/10	. Cooling; Devices therefor	13/006	. {Starting from ores containing non ferrous metallic oxides}
7/103	. . {Detection of leakages of the cooling liquid}	13/0066	. {Preliminary conditioning of the solid carbonaceous reductant}
7/106	. . {Cooling of the furnace bottom}	13/0073	. {Selection or treatment of the reducing gases}
7/12	. Opening or sealing the tap holes	13/008	. {Use of special additives or fluxing agents}
7/125	. . {Refractory plugging mass}	13/0086	. {Conditioning, transformation of reduced iron ores}
7/14	. Discharging devices, e.g. for slag		
7/16	. Tuyéres		
7/163	. . {Blowpipe assembly}		
7/166	. . {Tuyere replacement apparatus}		
7/18	. Bell-and-hopper arrangements		

- 13/0093 . . {Protecting against oxidation}
- 13/02 . . in shaft furnaces
- 13/023 . . {wherein iron or steel is obtained in a molten state}
- 13/026 . . . {heated electrically}
- 13/029 . . {Introducing coolant gas in the shaft furnaces}
- 13/04 . . in retorts
- 13/06 . . in multi-storied furnaces
- 13/08 . . in rotary furnaces
- 13/085 . . {wherein iron or steel is obtained in a molten state}
- 13/10 . . in hearth-type furnaces
- 13/105 . . {Rotary hearth-type furnaces}
- 13/12 . . in electric furnaces
- 13/125 . . {By using plasma}
- 13/14 . . Multi-stage processes {processes carried out in different vessels or furnaces}
- 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 (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 Handling of exhaust gases produced during the manufacture of iron or steel**
- 2100/20 . . Increasing the gas reduction potential of recycled exhaust gases
- 2100/22 . . by reforming
- 2100/24 . . by shift reactions
- 2100/26 . . by adding additional fuel in recirculation pipes
- 2100/28 . . by separation
- 2100/282 . . . of carbon dioxide
- 2100/284 . . . of nitrogen
- 2100/40 . . Gas purification of exhaust gases to be recirculated or used in other metallurgical processes
- 2100/42 . . Sulphur removal
- 2100/44 . . Removing particles, e.g. by scrubbing, dedusting
- 2100/60 . . Process control or energy utilisation in the manufacture of iron or steel
- 2100/62 . . Energy conversion other than by heat exchange, e.g. by use of exhaust gas in energy production
- 2100/64 . . Controlling the physical properties of the gas, e.g. pressure or temperature
- 2100/66 . . Heat exchange
- 2100/80 . . Interaction of exhaust gases produced during the manufacture of iron or steel with other processes
- 2200/00 Recycling of non-gaseous 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
- 2400/00 Treatment of slags originating from iron or steel processes**
- 2400/02 . . Physical or chemical treatment of slags
- 2400/022 . . . Methods of cooling or quenching molten slag
- 2400/024 . . . with the direct use of steam or liquid coolants, e.g. water
- 2400/026 . . . using air, inert gases or removable conductive bodies
- 2400/028 . . . with the permanent addition of cooled slag or other solids
- 2400/03 . . Removing sulfur
- 2400/032 . . Separating slag from liquid, e.g. from water, after quenching
- 2400/034 . . Stirring or agitating by pressurised fluids or by moving apparatus
- 2400/04 . . Specific shape of slag after cooling
- 2400/042 . . Sheets
- 2400/044 . . Briquettes or moulded bodies other than sheets
- 2400/05 . . Apparatus features
- 2400/052 . . including rotating parts
- 2400/054 . . . Disc-shaped or conical parts for cooling, dispersing or atomising of molten slag rotating along vertical axis
- 2400/056 . . . Drums whereby slag is poured on or in between
- 2400/058 . . . Rotating beds on which slag is cooled
- 2400/06 . . Conveyors on which slag is cooled
- 2400/062 . . Jet nozzles or pressurised fluids for cooling, fragmenting or atomising slag
- 2400/064 . . Thermally-conductive removable bodies, e.g. balls
- 2400/066 . . Receptacle features where the slag is treated
- 2400/068 . . . with a sealed or controlled environment
- 2400/07 . . . open to atmosphere
- 2400/072 . . . Tanks to collect the slag, e.g. water tank
- 2400/074 . . . Tower structures for cooling, being confined but not sealed
- 2400/076 . . . Fluidised bed for cooling
- 2400/08 . . with energy recovery