

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](#); 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)	7/166	. . {Tuyere replacement apparatus}
3/02	. by applying additives, e.g. fluxing agents	7/18	. Bell-and-hopper arrangements
3/04	. Recovery of by-products, e.g. slag	7/20	. . with appliances for distributing the burden
3/06	. . Treatment of liquid slag (slag wool C03B ; slag stones C04B)	7/22	. Dust arresters
3/08	. . . Cooling slag	7/24	. Test rods or other checking devices
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 (valves in general F16K)
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 (in coke ovens C10B)	13/00	Making spongy iron or liquid steel, by direct processes
7/00	Blast furnaces (lifts associated with blast furnaces B66B 9/06)	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 (refractory materials C04B)	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	. Tuyères		
7/163	. . {Blowpipe assembly}		

13/0093	. . {Protecting against oxidation}	2100/20	. Increasing the gas reduction potential of recycled exhaust gases
13/02	. in shaft furnaces		
	WARNING		WARNING
	Group C21B 13/02 is impacted by reclassification into group C21B 13/029 .		Groups C21B 2100/20 - C21B 2100/284 are incomplete pending reclassification of documents from groups C21B 2100/02 - C21B 2100/06 .
	Groups C21B 13/02 and C21B 13/029 should be considered in order to perform a complete search.		Groups C21B 2100/02 - C21B 2100/06 and C21B 2100/20 - C21B 2100/284 should be considered in order to perform a complete search.
13/023	. . {wherein iron or steel is obtained in a molten state}	2100/22	. . by reforming
13/026	. . . {heated electrically}	2100/24	. . by shift reactions
13/029	. . {Introducing coolant gas in the shaft furnaces}	2100/26	. . by adding additional fuel in recirculation pipes
	WARNING	2100/28	. . by separation
	Group C21B 13/029 is incomplete pending reclassification of documents from group C21B 13/02 .	2100/282	. . . of carbon dioxide
	Groups C21B 13/02 and C21B 13/029 should be considered in order to perform a complete search.	2100/284	. . . of nitrogen
		2100/40	. Gas purification of exhaust gases to be recirculated or used in other metallurgical processes
			WARNING
13/04	. in retorts		Groups C21B 2100/40 - C21B 2100/44 are incomplete pending reclassification of documents from groups C21B 2100/02 - C21B 2100/06 .
13/06	. in multi-storied furnaces		Groups C21B 2100/02 - C21B 2100/06 and C21B 2100/40 - C21B 2100/44 should be considered in order to perform a complete search.
13/08	. in rotary furnaces	2100/42	. . Sulphur removal
13/085	. . {wherein iron or steel is obtained in a molten state}	2100/44	. . Removing particles, e.g. by scrubbing, dedusting
13/10	. in hearth-type furnaces	2100/60	. Process control or energy utilisation in the manufacture of iron or steel
13/105	. . {Rotary hearth-type furnaces}		WARNING
13/12	. in electric furnaces		Groups C21B 2100/60 - C21B 2100/66 are incomplete pending reclassification of documents from groups C21B 2100/02 - C21B 2100/06 .
13/125	. . {By using plasma}		Groups C21B 2100/02 - C21B 2100/06 and C21B 2100/60 - C21B 2100/66 should be considered in order to perform a complete search.
13/14	. Multi-stage processes {processes carried out in different vessels or furnaces}	2100/62	. . Energy conversion other than by heat exchange, e.g. by use of exhaust gas in energy production
13/143	. . {Injection of partially reduced ore into a molten bath}	2100/64	. . Controlling the physical properties of the gas, e.g. pressure or temperature
13/146	. . {Multi-step reduction without melting}	2100/66	. . Heat exchange
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)	2100/80	. Interaction of exhaust gases produced during the manufacture of iron or steel with other processes
15/003	. {By using nuclear energy}		WARNING
15/006	. {By a chloride process}		Group C21B 2100/80 is incomplete pending reclassification of documents from groups C21B 2100/02 - C21B 2100/06 .
15/02	. Metallothermic processes, e.g. thermit reduction		Groups C21B 2100/02 - C21B 2100/06 and C21B 2100/60 - C21B 2100/66 should be considered in order to perform a complete search.
15/04	. from iron carbonyl		
2100/00	Handling of exhaust gases produced during the manufacture of iron or steel		
	WARNING		
	Groups C21B 2100/02 - C21B 2100/06 are no longer used for the classification of documents as of May 1, 2017. The content of these groups is being reclassified into groups C21B 2100/20 - C21B 2100/80 .		
	Groups C21B 2100/02 - C21B 2100/06 and C21B 2100/20 - C21B 2100/80 should be considered in order to perform a complete search.		
2100/02	. Treatment of the exhaust gases (Frozen)		
2100/04	. Recirculation of the exhaust gases (Frozen)		
2100/06	. Energy from waste gases used in other processes (Frozen)		
		2200/00	Recycling of non-gaseous waste material
		2300/00	Process aspects

C21B

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