

CPC COOPERATIVE PATENT CLASSIFICATION

F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING (NOTE omitted)

LIGHTING; HEATING

F27 FURNACES; KILNS; OVENS; RETORTS (NOTES omitted)

F27D DETAILS OR ACCESSORIES OF FURNACES, KILNS, OVENS, OR RETORTS, IN SO FAR AS THEY ARE OF KINDS OCCURRING IN MORE THAN ONE KIND OF FURNACE (combustion apparatus F23)

NOTE

Attention is drawn to the references and Notes following the title of class [F27](#) and the Note III following the Contents of Section [H](#).

WARNING

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.

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|-------------|--|-----------|---|
| 1/00 | Casings; Linings; Walls; Roofs (refractory materials C04B ; firebridges for combustion chambers F23M 3/00) | 2001/0056 | . . {Aspects of construction intended to prevent wear} |
| 1/0003 | . {Linings or walls} | 2001/0059 | . {Construction elements of a furnace} |
| | NOTE | 2001/0063 | . . {Means to strengthen a part} |
| | not used, see subgroups | 2001/0066 | . . {Movable or removable parts (removable parts for replacement because of wearing F27D 2001/005)} |
| 1/0006 | . . {Linings or walls formed from bricks or layers with a particular composition or specific characteristics} | 2001/0069 | . . {Means to prevent heat conduction (heat shields F27D 1/0033)} |
| 1/0009 | . . . {Comprising ceramic fibre elements} | 2001/0073 | . . . {Surrounding protection around the furnace, e.g. covers, circulation of gas} |
| 1/0013 | {the fibre elements being in the form of a folded blanket or a juxtaposition of folded blankets} | 2001/0076 | . . {comprising a corrugated sheet} |
| 1/0016 | {Interleaved multiple folded blankets} | 2001/0079 | . {Means to assemble at least two parts of a furnace or of any device or accessory associated to its use (assembling elements for linings parts F27D 1/145)} |
| 1/002 | {the fibre elements being composed of adjacent separate strips} | 2001/0083 | . . {Means to assemble a moving part to a fixed one (movements due to thermal expansion F27D 1/0003 ; movements of the cover F27D 1/18 ; movements of the container or of the support of the charge F27D 2003/0085)} |
| 1/0023 | . . {Linings or walls comprising expansion joints or means to restrain expansion due to thermic flows} | 2001/0086 | . . . {the moving part being in rotation} |
| 1/0026 | . . . {the expansion joint being a resilient element, e.g. a metallic plate between two bricks} | 2001/0089 | . . . {the moving part being in translation} |
| 1/003 | . . {Linings or walls comprising porous bricks} | 2001/0093 | . . . {the moving part being hinged to the fixed one} |
| 1/0033 | . . {Linings or walls comprising heat shields, e.g. heat shields (shields protecting the charge F27D 5/00)} | 2001/0096 | . . . {the moving part staying in the same plane} |
| 1/0036 | . . {Linings or walls comprising means for supporting electric resistances in the furnace} | 1/02 | . Crowns; Roofs |
| 1/004 | . . {Linings or walls comprising means for securing bricks} | 1/021 | . . {Suspended roofs} |
| 1/0043 | . {Floors, hearths} | 1/022 | . . . {Parts thereof, e.g. noses, arches} |
| 2001/0046 | . {Means to facilitate repair or replacement or prevent quick wearing (repairing linings F27D 1/16)} | 1/024 | . . . {having an anchored layer of lining} |
| 2001/005 | . . {Removable part or structure with replaceable elements} | 1/025 | . . {Roofs supported around their periphery, e.g. arched roofs} |
| 2001/0053 | . . {Furnace constructed in modules (tunnel furnaces with add-on modules F27B 9/029)} | 1/027 | . . . {Skew backs} |
| | | 1/028 | . . . {Means to prevent deformation of the arch} |
| | | 1/04 | . characterised by the form {, e.g. shape} of the bricks or blocks used |
| | | 1/042 | . . {Bricks shaped for use in regenerators} |
| | | 1/045 | . . {Bricks for lining cylindrical bodies, e.g. skids, tubes} |

2001/047	. . . {Lining of cylindrical vessels}	1/1866	. . . {Door-frames}
1/06	. . Composite bricks or blocks {, e.g. panels, modules}	2001/1875	. . . {Hanging doors and walls (movable partitions F27D 2099/0071)}
1/063	. . . {Individual composite bricks or blocks}	2001/1883	. . . . {Hanging curtains}
1/066	. . . . {Individual composite bricks or blocks made from hollow bricks filled up with another material}	2001/1891	. . . {Doors for separating two chambers in the furnace}
1/08	. . . Bricks or blocks with internal reinforcement or metal backing		
1/10	. Monolithic linings; Supports therefor	3/00	Charging; Discharging; Manipulation of charge (moving charge through a furnace F27B 9/14)
	NOTE	2003/0001	. {Positioning the charge}
	{supports are classified in F27D 1/14 }	2003/0002	. . {involving positioning devices, e.g. buffers, buffer zones (involving sensors F27D 2019/0071 ; involving sequence controllers F27D 2019/0059 ; involving spacers F27M 2002/016)}
1/12	. incorporating cooling arrangements (constructions of tube assemblies in general F28)	2003/0003	. . {involving a system for aligning the articles through a lateral guidance, e.g. funnel}
1/14	. Supports for linings (F27D 1/10 takes precedence)	2003/0004	. . {involving devices for measuring the article, the stack of articles or the height of the furnace passage or for adjusting the height of the passage to the charge or for putting the articles in the same position}
1/141	. . {Anchors therefor}	2003/0006	. . {Particulate materials}
1/142	. . . {Anchors made from ceramic material}	2003/0007	. . . {Circular distribution}
1/144	. . {Supports for ceramic fibre materials}	2003/0008	. . . {Longitudinal distribution}
1/145	. . {Assembling elements}	2003/0009	. . . {Separation of different types of fines, e.g. by a blower}
1/147	. . . {for bricks}	2003/001	. . . {Series of dispensers or separation in two or more parts}
1/148	. . . . {Means to suspend bricks}	2003/0012	. . {Working with piles}
1/16	. Making or repairing linings {increasing the durability of linings or breaking away linings}	2003/0013	. . . {Unstacking or making stacks}
2001/1605	. . {Repairing linings}	2003/0014	. . {involving the use of magazines}
2001/161	. . . {Hot repair}	2003/0015	. . . {the magazine being vertical}
2001/1615	. . . {through a hole in the casing, e.g. injecting refractory from outside the vessel}	2003/0016	. . . {the magazine being a rotary device}
1/1621	. . {Making linings by using shaped elements, e.g. bricks}	2003/0018	. . {comprising means to introduce or extract the charge in series of separate containers or zones}
1/1626	. . {Making linings by compacting a refractory mass in the space defined by a backing mould or pattern and the furnace wall}	2003/0019	. . . {simultaneously}
2001/1631	. . . {using an expandable core}	2003/002	. . {Transforming a single row in a multiple row}
1/1636	. . {Repairing linings by projecting or spraying refractory materials on the lining}	3/0021	. {of ceramic ware}
1/1642	. . . {using a gunning apparatus}	3/0022	. . {Disposition of the charge}
1/1647	. . . . {the projected materials being partly melted, e.g. by exothermic reactions of metals (Al, Si) with oxygen}	3/0024	. {of metallic workpieces}
1/1652	. . . . . {Flame guniting; Use of a fuel}	3/0025	. {Charging or loading melting furnaces with material in the solid state}
2001/1657	. . . . . {Solid fuel}	3/0026	. . {Introducing additives into the melt}
2001/1663	. . . . . {Fluid fuel, e.g. gas}	3/0027	. . {Charging vertically with corbs}
1/1668	. . . . . {Plasma guniting}	3/0028	. . . {Corbs}
1/1673	. . . {applied centrifugally}	3/003	. . {Charging laterally, e.g. with a charging box}
1/1678	. . {Increasing the durability of linings; Means for protecting}	3/0031	. . {Charging with tiltable dumpers}
1/1684	. . . {by a special coating applied to the lining}	3/0032	. . {using an air-lock}
2001/1689	. . . . {obtained from materials added to the melt}	3/0033	. {charging of particulate material}
1/1694	. . {Breaking away the lining or removing parts thereof}	2003/0034	. {Means for moving, conveying, transporting the charge in the furnace or in the charging facilities}
1/18	. Door frames; Doors, lids, removable covers	2003/0036	. . {comprising inflatable or extendable parts}
1/1808	. . {Removable covers}	2003/0037	. . {comprising friction surfaces}
1/1816	. . . {Removable covers specially adapted for arc furnaces}	2003/0038	. . {comprising shakers}
2001/1825	. . . {Means for moving the cover}	2003/0039	. . {comprising magnetic means}
2001/1833	. . . . {comprising a screw mechanism}	2003/004	. . . {Magnetic lifters}
2001/1841	. . . . {comprising means for rotating or moving the cover in a horizontal or quasi horizontal plane}	2003/0042	. . {comprising roller trains}
2001/185	. . . . {comprising means for tilting the cover}	2003/0043	. . . {at least one of them being driven separately}
1/1858	. . {Doors}	2003/0044	. . . {at least one of them being removable}
		2003/0045	. . . {Use of rollable bodies, e.g. balls}
		2003/0046	. . {comprising one or more movable arms, e.g. forks}
		2003/0048	. . . {Walking beams}

2003/0049	. . . . {comprising eccentrics or lever arms}	2003/045	. . {used to pull the charge}
2003/005	. . . . {comprising ramps}	3/06	. Charging or discharging machines on travelling carriages
2003/0051	. . {comprising means to pick up the charge and put it down}	3/08	. Screw feeders; Screw dischargers
2003/0053	. . {comprising a device for charging with the doors closed}	3/10	. Charging directly from hoppers or shoots
2003/0054	. . {Means to move molten metal, e.g. electromagnetic pump}	2003/105	. . {using shutters}
2003/0055	. . . . {with flow regulation}	3/12	. Travelling or movable supports or containers for the charge
2003/0056	. . . . {through a syphon in a vacuum chamber, e.g. involving aspiration or pressure on the bath}	2003/121	. . {Band, belt or mesh}
2003/0057	. . {Fast-outlet or inlet means}	2003/122	. . . . {Band made from longitudinal wires or bars}
2003/0059	. . {comprising tracks, e.g. rails and wagon}	3/123	. . {Furnace cars}
2003/006	. . . . {with a return track}	2003/124	. . {Sleds; Transport supports}
2003/0061	. . . . {with means for changing track}	2003/125	. . {Charging cars, lift trolleys}
2003/0062	. . {using devices for tilting or rocking the charge}	2003/126	. . . . {with long arms, charging forks}
2003/0063	. . {comprising endless belts}	2003/127	. . . . {for carrying pots (slag pots F27D 2099/0095)}
2003/0065	. . {Lifts, e.g. containing the bucket elevators}	2003/128	. . . . {for carrying stacks of articles, e.g. bricks}
2003/0066	. . {comprising scrapers or systems to pull out}	3/14	. Charging or discharging liquid or molten material
2003/0067	. . {comprising conveyors where the translation is communicated by friction from at least one rotating element, e.g. two opposed rotations combined}	3/145	. . {Runners therefor}
2003/0068	. . {comprising clamps or tongs}	3/15	. Tapping equipment; Equipment for removing {or retaining} slag
2003/0069	. . {the device being suspended, e.g. from a crane}	3/1509	. . {Tapping equipment}
2003/0071	. . {Use of a comminuting device, e.g. grinding mill}	3/1518	. . . . {Tapholes}
2003/0072	. . {Use of a pinion and a rack}	3/1527	. . . . {Taphole forming equipment, e.g. boring machines, piercing tools}
2003/0073	. . {the charge floating on a liquid, e.g. water}	3/1536	. . . . {Devices for plugging tap holes, e.g. plugs stoppers}
2003/0074	. . . . {floating on water}	NOTE	
2003/0075	. . {Charging or discharging vertically, e.g. through a bottom opening}	{ the devices fixed permanently to the melt container are classified in F27D 3/1509 }	
2003/0077	. . {Use of centrifugal devices}	3/1545	. . {Equipment for removing or retaining slag}
2003/0078	. . {comprising jacks, e.g. hydraulic jacks}	3/1554	. . . . {for removing the slag from the surface of the melt}
2003/0079	. . {Use of cams}	3/1563	. . . . {by the use of scrapers}
2003/008	. . {comprising cross-beams or gantry cranes}	3/1572	. . . . {by suction}
2003/0081	. . {Series of little rams}	3/1581	. . . . {by the use of blowers}
2003/0083	. . {Means for stirring the charge}	3/159	. . . . {for retaining slag during the pouring of the metal or retaining metal during the pouring of the slag}
3/0084	. {Charging; Manipulation of SC or SC wafers}	3/16	. Introducing a fluid jet or current into the charge {porous elements for gas flushing of molten metals B22D 1/005 }
2003/0085	. {Movement of the container or support of the charge in the furnace or in the charging facilities}	2003/161	. . {through a porous element}
2003/0086	. . {Up or down}	2003/162	. . {the fluid being an oxidant or a fuel}
2003/0087	. . {Rotation about a vertical axis}	2003/163	. . . . {the fluid being an oxidant}
2003/0089	. . {Rotation about a horizontal or slightly inclined axis}	2003/164	. . . . {Oxygen}
2003/009	. . . . {Oscillations about a horizontal axis; Rocking}	2003/165	. . . . {the fluid being a fuel}
2003/0091	. . {Horizontally}	2003/166	. . {the fluid being a treatment gas}
2003/0092	. . . . {with a reciprocating movement}	2003/167	. . {the fluid being a neutral gas}
2003/0093	. . {Movement on a slope}	2003/168	. . {through a lance}
2003/0095	. . {the advancement being step by step}	2003/169	. . . . {Construction of the lance, e.g. lances for injecting particles}
2003/0096	. . {Advancement along the longitudinal axis of the workpiece}	3/18	. Charging particulate material using a fluid carrier
2003/0097	. . {Advancement along an axis perpendicular to the axis of the workpiece}	2003/185	. . {Conveying particles in a conduct using a fluid}
2003/0098	. . . . {Workpiece rolling on its support}	5/00 Supports, screens, or the like for the charge within the furnace (travelling or movable supports F27D 3/12)	
3/02	. Skids or tracks for heavy objects	5/0006	. {Composite supporting structures}
3/022	. . {Skids}	5/0012	. . {Modules of the sagger or setter type; Supports built up from them}
3/024	. . . . {Details of skids, e.g. riders}	5/0018	. . {Separating elements}
3/026	. . {transport or conveyor rolls for furnaces; roller rails (conveyor rolls in general B65G)}	5/0025	. . {assembled to present a three-point support}
3/028	. . . . {Roller rails or succession of small sized rollers}		
3/04	. Ram or pusher apparatus		

- 5/0031 . {Treatment baskets for ceramic articles ([for metallic articles C21D 9/0025](#))}
- 5/0037 . {Supports specially adapted for semi-conductors}
- 5/0043 . {Supports specially adapted for dental prosthesis}
- 5/005 . {Supports specially adapted for holding elongated articles in an upright position, e.g. sparking plugs}
- 5/0056 . {Hangers}
- 5/0062 . {Shields for the charge ([shields for the lining F27D 1/0033](#))}
- 5/0068 . {Containers}
- 2005/0075 . . {Pots, e.g. slag pots, ladles}
- 2005/0081 . {Details}
- 2005/0087 . . {Means to prevent the adherence of the charge}
- 2005/0093 . . {Means to maintain the form of the article}
- 7/00 Forming, maintaining, or circulating atmospheres in heating chambers**
 - 7/02 . Supplying steam, vapour, gases, or liquids
 - 2007/023 . . {Conduits}
 - 2007/026 . . {Dampers ([registers for granular flows F27D 2099/0071](#))}
 - 7/04 . Circulating atmospheres by mechanical means
 - 2007/045 . . {Fans}
 - 7/06 . Forming or maintaining special atmospheres or vacuum within heating chambers ([F27D 7/02 takes precedence](#))
 - 2007/063 . . {Special atmospheres, e.g. high pressure atmospheres}
 - 2007/066 . . {Vacuum}
- 9/00 Cooling of furnaces or of charges therein ([F27D 1/00](#), [F27D 3/00 take precedence](#))**
 - 2009/0002 . {Cooling of furnaces}
 - 2009/0005 . . {the cooling medium being a gas}
 - 2009/0008 . . . {Ways to inject gases against surfaces}
 - 2009/001 . . {the cooling medium being a fluid other than a gas}
 - 2009/0013 . . . {the fluid being water}
 - 2009/0016 {Water-spray}
 - 2009/0018 . . {the cooling medium passing through a pattern of tubes}
 - 2009/0021 . . . {with the parallel tube parts close to each other, e.g. a serpentine}
 - 2009/0024 {with contiguous tubes, which may be separately welded one to the other}
 - 2009/0027 {linked by elements}
 - 2009/0029 {fixed, e.g. welded to a supporting surface}
 - 2009/0032 . . . {integrated with refractories in a panel}
 - 2009/0035 . . . {arranged for the covering of a cylindrical surface}
 - 2009/0037 . . {the cooling medium passing a radiator}
 - 2009/004 . . {the cooling medium passing a waterbox}
 - 2009/0043 . . . {Insert type waterbox, e.g. cylindrical or flat type}
 - 2009/0045 . . {the cooling medium passing a block, e.g. metallic}
 - 2009/0048 . . . {incorporating conduits for the medium}
 - 2009/0051 . . {comprising use of studs to transfer heat or retain the liner}
 - 2009/0054 . . . {adapted to retain formed bricks}
 - 2009/0056 . . {Use of high thermoconductive elements}
 - 2009/0059 . . . {made mostly from graphite}
 - 2009/0062 . . . {made from copper or copper alloy}
 - 2009/0064 . . {Cooling of furnace arches}
- 2009/0067 . . {Cooling element inlet and outlet tubes}
- 2009/007 . {Cooling of charges therein}
- 2009/0072 . . {the cooling medium being a gas}
- 2009/0075 . . . {in direct contact with the charge}
- 2009/0078 . . . {in indirect contact with the charge}
- 2009/0081 . . {the cooling medium being a fluid (other than a gas in direct or indirect contact with the charge)}
- 2009/0083 . . . {the fluid being water}
- 2009/0086 {applied in spray form}
- 2009/0089 . . {Quenching}
- 2009/0091 . . {in a fluidised bed of cooling elements}
- 2009/0094 . . {making use of already cooled material, e.g. forming a layer}
- 2009/0097 . . . {the charge being used as a coolant}
- 11/00 Arrangement of elements for electric heating in or on furnaces ([electric heating per se H05B](#))**
 - 11/02 . Ohmic resistance heating
 - 11/04 . . with direct passage of current through the material being heated
 - 11/06 . Induction heating, i.e. in which the material being heated, or its container or elements embodied therein, form the secondary of a transformer
 - 11/08 . Heating by electric discharge, e.g. arc discharge
 - 11/10 . . Disposition of electrodes ([automatic control of temperature G05D 23/00](#); [electric discharge apparatus H01T](#); [arrangements for feeding or guiding electrodes H05B 7/10](#); [automatic control of power by positioning of electrodes H05B 7/144](#))
 - 11/12 . with electromagnetic fields acting directly on the material being heated
- 13/00 Apparatus for preheating charges; Arrangements for preheating charges**
 - 13/002 . {Preheating scrap ([preheating of scrap for steel making C21C 5/565](#))}
 - 13/005 . {Drying of green clay prior to baking}
 - 2013/007 . {using a rotary furnace}
- 15/00 Handling or treating discharged material; Supports or receiving chambers therefor**
 - 15/02 . Cooling
 - 15/0206 . . {with means to convey the charge}
 - 15/0213 . . . {comprising a cooling grate}
 - 15/022 {grate plates}
 - 2015/0226 {Support, fixation of the grate}
 - 2015/0233 {with gas, e.g. air, supply to the grate}
 - 2015/024 {Multiple grates}
 - 2015/0246 {Combination of fixed and movable grates}
 - 2015/0253 {Gratin grates}
 - 2015/026 {Means to discharge the fines}
 - 15/0266 . . . {on an endless belt}
 - 15/0273 . . . {on a rotary hearth}
 - 15/028 . . . {comprising a rotary drum}
 - 15/0286 . . {in a vertical, e.g. annular, shaft ([shafts including rotating parts F27D 15/0273](#))}
 - 2015/0293 . . . {including rotating parts}
- 17/00 Arrangements for using waste heat ([heat-exchangers per se F28](#)); Arrangements for using, or disposing of, waste gases**
 - 17/001 . {Extraction of waste gases, collection of fumes and hoods used therefor ([in general B08B 15/00](#))}

17/002	. . {Details of the installations, e.g. fume conduits or seals}	21/00	Arrangements of monitoring devices;
17/003	. . {of waste gases emanating from an electric arc furnace}		Arrangements of safety devices
17/004	. {Systems for reclaiming waste heat}	2021/0007	. {Monitoring the pressure}
2017/005	. . {including pyrolysing the waste gases}	21/0014	. {Devices for monitoring temperature}
2017/006	. . {using a boiler}	21/0021	. {Devices for monitoring linings for wear}
2017/007	. . {including regenerators}	21/0028	. {Devices for monitoring the level of the melt}
17/008	. {cleaning gases}	21/0035	. {Devices for monitoring the weight of quantities added to the charge}
2017/009	. {Cyclone for separating fines from gas}	2021/0042	. . {Monitoring the level of the solid charge}
19/00	Arrangements of controlling devices	2021/005	. {Devices for monitoring thermal expansion}
2019/0003	. {Monitoring the temperature or a characteristic of the charge and using it as a controlling value}	2021/0057	. {Security or safety devices, e.g. for protection against heat, noise, pollution or too much duress; Ergonomic aspects}
2019/0006	. {Monitoring the characteristics (composition, quantities, temperature, pressure) of at least one of the gases of the kiln atmosphere and using it as a controlling value}	2021/0064	. . {against noises}
2019/0009	. . {Monitoring the pressure in an enclosure or kiln zone}	2021/0071	. . {against explosions}
2019/0012	. . {Monitoring the composition of the atmosphere or of one of their components}	2021/0078	. . {against the presence of an undesirable element in the atmosphere of the furnace}
2019/0015	. . . {Monitoring the composition of the exhaust gases or of one of its components}	2021/0085	. . {against molten metal, e.g. leakage or splashes}
2019/0018	. . {Monitoring the temperature of the atmosphere of the kiln}	2021/0092	. . {against a jam in the transport line or a production interruption}
2019/0021	. . . {Monitoring the temperature of the exhaust gases}	21/02	. Observation or illuminating devices
2019/0025	. . {Monitoring the temperature of a part or of an element of the furnace structure}	2021/023	. . {Closable inserting openings, e.g. for the introduction of lances, sensors or burners}
2019/0028	. {Regulation}	2021/026	. . {using a video installation}
2019/0031	. . {through control of the flow of the exhaust gases}	21/04	. Arrangements of indicators or alarms
2019/0034	. . {through control of a heating quantity such as fuel, oxidant or intensity of current}	25/00	Devices {or methods} for removing incrustations {, e.g. slag, metal deposits, dust; Devices or methods for preventing the adherence of slag}
2019/0037	. . . {Quantity of electric current}	25/001	. {comprising breaking tools, e.g. hammers, drills, scrapers (breaking away linings F27D 1/1694 ; boring machines for forming tapholes F27D 3/1527)}
2019/004	. . . {Fuel quantity}	25/003	. . {used for punching tuyeres}
2019/0043	. . . . {Amount of air or O ₂ to the burner}	25/005	. . {used for cleaning the channels of induction furnaces}
2019/0046	. . . . {Amount of secondary air to the burner}	25/006	. {using explosives}
2019/005	. . . {Amount of heat given to the charge via a controlled heat exchanger}	25/008	. {using fluids or gases, e.g. blowers, suction units}
2019/0053	. . . . {involving heating the charge in a fluid or fluidised medium}	27/00	Stirring devices for molten material (F27D 3/14 takes precedence)
2019/0056	. . {Regulation involving cooling}	2027/002	. {Gas stirring}
2019/0059	. . {Regulation involving the control of the conveyor movement, e.g. speed or sequences}	27/005	. {Pumps}
2019/0062	. . . {control of the workpiece stay in different zones}	27/007	. . {Pulsating pumps}
2019/0065	. . {Regulation involving controlled section modification}	99/00	Subject matter not provided for in other groups of this subclass
2019/0068	. . {Regulation involving a measured inflow of a particular gas in the enclosure}	99/0001	. {Heating elements or systems}
2019/0071	. . {Regulation using position sensors}	99/0003	. . {with particulate fuel, e.g. aspects relating to the feeding}
2019/0075	. . {Regulation of the charge quantity}	99/0005	. . {Injecting liquid fuel}
2019/0078	. . {Regulation of the speed of the gas through the charge}	99/0006	. . {Electric heating elements or system}
2019/0081	. {Controlling an air-lock chamber}	2099/0008	. . . {Resistor heating}
2019/0084	. {Controlling closure systems, e.g. doors}	2099/001	. . . . {the container being the resistor}
2019/0087	. {Automatisation of the whole plant or activity}	2099/0011	. . . . {The resistor heats a radiant tube or surface}
2019/009	. . {Use of codes, e.g. bar codes}	2099/0013	. . . . . {immersed in the charge}
2019/0093	. {Maintaining a temperature gradient}	2099/0015	. . . {Induction heating}
2019/0096	. {involving simulation means, e.g. of the treating or charging step}	2099/0016	. . . . {Different magnetic fields, e.g. two coils, different characteristics of the same coil along its length or different parts of the same coil used}
		2099/0018	. . . . {Relative movement of the coil and the charge during the heat treatment}
		2099/002	. . . . {Core heating}

2099/0021	. . .	{ Arc heating }
2099/0023	. . . .	{ DC arc heating }
2099/0025	. . .	{ Currents through the charge }
2099/0026	. . .	{ with a generator of electromagnetic radiations }
2099/0028	. . .	{ Microwave heating }
2099/003	. . .	{ Bombardment heating, e.g. with ions or electrons }
2099/0031	. . .	{ Plasma-torch heating }
99/0033	. .	{ using burners (manufacture of steel in an electric arc furnace equipped with burners C21C 5/5217) }
99/0035	. . .	{ Heating indirectly through a radiant surface }
2099/0036	. . .	{ immersed in the charge }
2099/0038	. . .	{ removable }
2099/004	. . .	{ directed upon the charge, e.g. vertically }
2099/0041	. . . .	{ with a small angle, e.g. almost tangentially }
2099/0043	. . .	{ Impulse burner }
2099/0045	. . .	{ Radiant burner }
2099/0046	. . .	{ with incomplete combustion, e.g. reducing atmosphere }
2099/0048	. . . .	{ Post- combustion }
2099/005	. . .	{ Catalytic burner }
2099/0051	. . .	{ Burning waste as a fuel }
2099/0053	. . .	{ Burner fed with preheated gases }
2099/0055	. . . .	{ Fuel }
2099/0056	. . . .	{ Oxidant }
2099/0058	. .	{ Means for heating the charge locally }
2099/006	. .	{ Auxiliary heating, e.g. in special conditions or at special times }
2099/0061	. .	{ Indirect heating }
2099/0063	. . .	{ Liquid }
2099/0065	. . .	{ Gas }
2099/0066	. . .	{ Particles or solid bodies, e.g. bed of particles }
2099/0068	. .	{ Heating directly by circulation of a fluid other than a gas or by particles }
99/007	. .	{ Partitions }
2099/0071	. .	{ Partitions used as registers }
99/0073	. .	{ Seals }
99/0075	. .	{ Gas curtain seals }
99/0076	. .	{ Furnace car seals, i.e. seals used in continuous furnaces or kilns for preventing gas or heat exchange between heating chamber and the area comprising driving means }
2099/0078	. .	{ Means to minimize the leakage of the furnace atmosphere during charging or discharging }
2099/008	. . .	{ Using an air-lock (use of air-locks for charging smelt furnaces F27D 3/0032) }
2099/0081	. .	{ Joint }
2099/0083	. .	{ Drives; Auxiliary drives }
2099/0085	. .	{ Accessories }
2099/0086	. .	{ Filters, e.g. for molten metals }
2099/0088	. .	{ Apparatus to cut metal, e.g. logs, in billets }
2099/009	. .	{ Bumpers }
2099/0091	. .	{ Means to grease or oil }
2099/0093	. .	{ Means to collect ashes or dust, e.g. vessels }
2099/0095	. .	{ Means to collect the slag or spilled metal, e.g. vessels (cars to carry the pots F27D 2003/127) }
2099/0096	. .	{ Presses }
2099/0098	. .	{ Means for moving the furnace }

2201/00 Manipulation of furnace parts**NOTE**

Indexing code [F27D 2201/00](#) can be followed by additional indexing codes preceded by a + sign. These additional indexing codes are chosen from codes of subclass [F27D](#) describing similar manipulations of furnace charges.

Example: [F27D 2201/00](#) + [F27D 2003/0036](#)