

# CPC COOPERATIVE PATENT CLASSIFICATION

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

### LIGHTING; HEATING

**F27 FURNACES; KILNS; OVENS; RETORTS** (specially adapted for a purpose covered by a single other class and specifically mentioned in that class, [see the class in question](#), e.g. bakery ovens [A21B](#), glass melting furnaces [C03B](#), coke or gas-making apparatus [C10B](#), [C10I](#), apparatus for cracking hydrocarbons [C10G](#), blast furnaces [C21B](#), converters for making steel [C21C](#), furnaces for heat treatment of metal [C21D](#); furnaces for electroslag or arc remelting of metals [C22B 9/00](#); enamelling ovens [C23D](#); combustion apparatus [F23](#); electric heating [H05B](#))  
(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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|---------------|---|------------------|--|
| <b>1/00</b>   | <b>Casings; Linings; Walls; Roofs</b> ( <a href="#">refractory materials C04B</a> ; <a href="#">firebridges for combustion chambers F23M 3/00</a> ) | <b>2001/0046</b> | . {Means to facilitate repair or replacement or prevent quick wearing ( <a href="#">repairing linings F27D 1/16</a> )}   |
| <b>1/0003</b> | . {Linings or walls}  | <b>2001/005</b>  | . . {Removable part or structure with replaceable elements}  |
|               | <b><u>NOTE</u></b><br>not used, see subgroups   | <b>2001/0053</b> | . . {Furnace constructed in modules ( <a href="#">tunnel furnaces with add-on modules F27B 9/029</a> )}  |
| <b>1/0006</b> | . . {Linings or walls formed from bricks or layers with a particular composition or specific characteristics}                                       | <b>2001/0056</b> | . . {Aspects of construction intended to prevent wear}   |
| <b>1/0009</b> | . . . {Comprising ceramic fibre elements}   | <b>2001/0059</b> | . {Construction elements of a furnace}   |
| <b>1/0013</b> | . . . . {the fibre elements being in the form of a folded blanket or a juxtaposition of folded blankets}  | <b>2001/0063</b> | . . {Means to strengthen a part}   |
| <b>1/0016</b> | . . . . . {Interleaved multiple folded blankets}  | <b>2001/0066</b> | . . {Movable or removable parts ( <a href="#">removable parts for replacement because of wearing F27D 2001/005</a> )}  |
| <b>1/002</b>  | . . . . {the fibre elements being composed of adjacent separate strips}   | <b>2001/0069</b> | . . {Means to prevent heat conduction ( <a href="#">heat shields F27D 1/0033</a> )}  |
| <b>1/0023</b> | . . {Linings or walls comprising expansion joints or means to restrain expansion due to thermic flows}  | <b>2001/0073</b> | . . . {Surrounding protection around the furnace, e.g. covers, circulation of gas}   |
| <b>1/0026</b> | . . . {the expansion joint being a resilient element, e.g. a metallic plate between two bricks}   | <b>2001/0076</b> | . . {comprising a corrugated sheet}  |
| <b>1/003</b>  | . . {Linings or walls comprising porous bricks}   | <b>2001/0079</b> | . {Means to assemble at least two parts of a furnace or of any device or accessory associated to its use ( <a href="#">assembling elements for linings parts F27D 1/145</a> )}   |
| <b>1/0033</b> | . . {Linings or walls comprising heat shields, e.g. heat shieldsd ( <a href="#">shields protecting the charge F27D 5/00</a> )}                      | <b>2001/0083</b> | . . {Means to assemble a moving part to a fixed one ( <a href="#">movements due to thermal expansion F27D 1/0003</a> ; <a href="#">movements of the cover F27D 1/18</a> ; <a href="#">movements of the container or of the support of the charge F27D 2003/0085</a> )} |
| <b>1/0036</b> | . . {Linings or walls comprising means for supporting electric resistances in the furnace}  | <b>2001/0086</b> | . . . {the moving part being in rotation}  |
| <b>1/004</b>  | . . {Linings or walls comprising means for securing bricks}   | <b>2001/0089</b> | . . . {the moving part being in translation}   |
| <b>1/0043</b> | . {Floors, hearths}   | <b>2001/0093</b> | . . . {the moving part being hinged to the fixed one}  |
|               |   | <b>2001/0096</b> | . . . {the moving part staying in the same plane}  |

1/02	. Crowns; Roofs	1/1694	. . {Breaking away the lining or removing parts thereof}
1/021	. . {Suspended roofs}	1/18	. Door frames; Doors, lids, removable covers
1/022	. . . {Parts thereof, e.g. noses, arches}	1/1808	. . {Removable covers}
1/024	. . . {having an anchored layer of lining}	1/1816	. . . {Removable covers specially adapted for arc furnaces}
1/025	. . {Roofs supported around their periphery, e.g. arched roofs}	2001/1825	. . . . {Means for moving the cover}
1/027	. . . {Skew backs}	2001/1833	. . . . {comprising a screw mechanism}
1/028	. . . {Means to prevent deformation of the arch}	2001/1841	. . . . {comprising means for rotating or moving the cover in a horizontal or quasi horizontal plane}
1/04	. characterised by the form {, e.g. shape} of the bricks or blocks used	2001/185	. . . . {comprising means for tilting the cover}
1/042	. . {Bricks shaped for use in regenerators}	1/1858	. . {Doors}
1/045	. . {Bricks for lining cylindrical bodies, e.g. skids, tubes}	1/1866	. . . {Door-frames}
2001/047	. . . {Lining of cylindrical vessels}	2001/1875	. . . {Hanging doors and walls (movable partitions <a href="#">F27D 2099/0071</a> )}
1/06	. . Composite bricks or blocks {, e.g. panels, modules}	2001/1883	. . . . {Hanging curtains}
1/063	. . . {Individual composite bricks or blocks}	2001/1891	. . . {Doors for separating two chambers in the furnace}
1/066	. . . . {Individual composite bricks or blocks made from hollow bricks filled up with another material}		
1/08	. . . Bricks or blocks with internal reinforcement or metal backing	<b>3/00</b>	<b>Charging; Discharging; Manipulation of charge (moving charge through a furnace <a href="#">F27B 9/14</a>)</b>
1/10	. Monolithic linings; Supports therefor	2003/0001	. {Positioning the charge}
	<b>NOTE</b>	2003/0002	. . {involving positioning devices, e.g. buffers, buffer zones (involving sensors <a href="#">F27D 2019/0071</a> ; involving sequence controllers <a href="#">F27D 2019/0059</a> ; involving spacers <a href="#">F27M 2002/016</a> )}
	{supports are classified in <a href="#">F27D 1/14</a> }	2003/0003	. . {involving a system for aligning the articles through a lateral guidance, e.g. funnel}
1/12	. incorporating cooling arrangements (constructions of tube assemblies in general <a href="#">F28</a> )	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}
1/14	. Supports for linings ( <a href="#">F27D 1/10</a> takes precedence)	2003/0006	. . {Particulate materials}
1/141	. . {Anchors therefor}	2003/0007	. . . {Circular distribution}
1/142	. . . {Anchors made from ceramic material}	2003/0008	. . . {Longitudinal distribution}
1/144	. . {Supports for ceramic fibre materials}	2003/0009	. . . {Separation of different types of fines, e.g. by a blower}
1/145	. . {Assembling elements}	2003/001	. . . {Series of dispensers or separation in two or more parts}
1/147	. . . {for bricks}	2003/0012	. . {Working with piles}
1/148	. . . . {Means to suspend bricks}	2003/0013	. . . {Unstacking or making stacks}
1/16	. Making or repairing linings {increasing the durability of linings or breaking away linings}	2003/0014	. . {involving the use of magazines}
2001/1605	. . {Repairing linings}	2003/0015	. . . {the magazine being vertical}
2001/161	. . . {Hot repair}	2003/0016	. . . {the magazine being a rotary device}
2001/1615	. . . {through a hole in the casing, e.g. injecting refractory from outside the vessel}	2003/0018	. . {comprising means to introduce or extract the charge in series of separate containers or zones}
1/1621	. . {Making linings by using shaped elements, e.g. bricks}	2003/0019	. . . {simultaneously}
1/1626	. . {Making linings by compacting a refractory mass in the space defined by a backing mould or pattern and the furnace wall}	2003/002	. . {Transforming a single row in a multiple row}
2001/1631	. . . {using an expandable core}	3/0021	. {of ceramic ware}
1/1636	. . {Repairing linings by projecting or spraying refractory materials on the lining}	3/0022	. . {Disposition of the charge}
1/1642	. . . {using a gunning apparatus}	3/0024	. {of metallic workpieces}
1/1647	. . . . {the projected materials being partly melted, e.g. by exothermic reactions of metals (Al, Si) with oxygen}	3/0025	. {Charging or loading melting furnaces with material in the solid state}
1/1652	. . . . . {Flame guniting; Use of a fuel}	3/0026	. . {Introducing additives into the melt}
2001/1657	. . . . . {Solid fuel}	3/0027	. . {Charging vertically with corbs}
2001/1663	. . . . . {Fluid fuel, e.g. gas}	3/0028	. . . {Corbs}
1/1668	. . . . . {Plasma guniting}	3/003	. . {Charging laterally, e.g. with a charging box}
1/1673	. . . {applied centrifugally}	3/0031	. . {Charging with tiltable dumpers}
1/1678	. . {Increasing the durability of linings; Means for protecting}	3/0032	. . {using an air-lock}
1/1684	. . . {by a special coating applied to the lining}	3/0033	. {charging of particulate material}
2001/1689	. . . . {obtained from materials added to the melt}		

2003/0034	. {Means for moving, conveying, transporting the charge in the furnace or in the charging facilities}	2003/0093	. . {Movement on a slope}
2003/0036	. . {comprising inflatable or extendable parts}	2003/0095	. . {the advancement being step by step}
2003/0037	. . {comprising friction surfaces}	2003/0096	. . {Advancement along the longitudinal axis of the workpiece}
2003/0038	. . {comprising shakers}	2003/0097	. . {Advancement along an axis perpendicular to the axis of the workpiece}
2003/0039	. . {comprising magnetic means}	2003/0098	. . . {Workpiece rolling on its support}
2003/004	. . . {Magnetic lifters}	3/02	. Skids or tracks for heavy objects
2003/0042	. . {comprising roller trains}	3/022	. . {Skids}
2003/0043	. . . {at least one of them being driven separately}	3/024	. . . {Details of skids, e.g. riders}
2003/0044	. . . {at least one of them being removable}	3/026	. . {transport or conveyor rolls for furnaces; roller rails ( <a href="#">conveyor rolls in general B65G</a> )}
2003/0045	. . . {Use of rollable bodies, e.g. balls}	3/028	. . . {Roller rails or succession of small sized rollers}
2003/0046	. . {comprising one or more movable arms, e.g. forks}	3/04	. Ram or pusher apparatus
2003/0048	. . . {Walking beams}	2003/045	. . {used to pull the charge}
2003/0049	. . . . {comprising eccentrics or lever arms}	3/06	. Charging or discharging machines on travelling carriages
2003/005	. . . . {comprising ramps}	3/08	. Screw feeders; Screw dischargers
2003/0051	. . {comprising means to pick up the charge and put it down}	3/10	. Charging directly from hoppers or shoots
2003/0053	. . {comprising a device for charging with the doors closed}	2003/105	. . {using shutters}
2003/0054	. . {Means to move molten metal, e.g. electromagnetic pump}	3/12	. Travelling or movable supports or containers for the charge
2003/0055	. . . {with flow regulation}	2003/121	. . {Band, belt or mesh}
2003/0056	. . . {through a syphon in a vacuum chamber, e.g. involving aspiration or pressure on the bath}	2003/122	. . . {Band made from longitudinal wires or bars}
2003/0057	. . {Fast-outlet or inlet means}	3/123	. . {Furnace cars}
2003/0059	. . {comprising tracks, e.g. rails and wagon}	2003/124	. . {Sleds; Transport supports}
2003/006	. . . {with a return track}	2003/125	. . {Charging cars, lift trolleys}
2003/0061	. . . {with means for changing track}	2003/126	. . . {with long arms, charging forks}
2003/0062	. . {using devices for tilting or rocking the charge}	2003/127	. . . {for carrying pots ( <a href="#">slag pots F27D 2099/0095</a> )}
2003/0063	. . {comprising endless belts}	2003/128	. . . {for carrying stacks of articles, e.g. bricks}
2003/0065	. . {Lifts, e.g. containing the bucket elevators}	3/14	. Charging or discharging liquid or molten material
2003/0066	. . {comprising scrapers or systems to pull out}	3/145	. . {Runners therefor}
2003/0067	. . {comprising conveyors where the translation is communicated by friction from at least one rotating element, e.g. two opposed rotations combined}	3/15	. Tapping equipment; Equipment for removing {or retaining} slag
2003/0068	. . {comprising clamps or tongs}	3/1509	. . {Tapping equipment}
2003/0069	. . {the device being suspended, e.g. from a crane}	3/1518	. . . {Tapholes}
2003/0071	. . {Use of a comminuting device, e.g. grinding mill}	3/1527	. . . {Taphole forming equipment, e.g. boring machines, piercing tools}
2003/0072	. . {Use of a pinion and a rack}	3/1536	. . . {Devices for plugging tap holes, e.g. plugs stoppers}
2003/0073	. . {the charge floating on a liquid, e.g. water}	<b>NOTE</b>	
2003/0074	. . . {floating on water}	{ the devices fixed permanently to the melt container are classified in <a href="#">F27D 3/1509</a> }	
2003/0075	. . {Charging or discharging vertically, e.g. through a bottom opening}	3/1545	. . {Equipment for removing or retaining slag}
2003/0077	. . {Use of centrifugal devices}	3/1554	. . . {for removing the slag from the surface of the melt}
2003/0078	. . {comprising jacks, e.g. hydraulic jacks}	3/1563	. . . . {by the use of scrapers}
2003/0079	. . {Use of cams}	3/1572	. . . . {by suction}
2003/008	. . {comprising cross-beams or gantry cranes}	3/1581	. . . . {by the use of blowers}
2003/0081	. . {Series of little rams}	3/159	. . . {for retaining slag during the pouring of the metal or retaining metal during the pouring of the slag}
2003/0083	. . {Means for stirring the charge}	3/16	. Introducing a fluid jet or current into the charge
3/0084	. {Charging; Manipulation of SC or SC wafers}	{( <a href="#">porous elements for gas flushing of molten metals B22D 1/005</a> )}	
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}		
2003/0092	. . . {with a reciprocating movement}		

2003/166	. . {the fluid being a treatment gas}	2009/0035	. . . {arranged for the covering of a cylindrical surface}
2003/167	. . {the fluid being a neutral gas}	2009/0037	. . {the cooling medium passing a radiator}
2003/168	. . {through a lance}	2009/004	. . {the cooling medium passing a waterbox}
2003/169	. . . {Construction of the lance, e.g. lances for injecting particles}	2009/0043	. . . {Insert type waterbox, e.g. cylindrical or flat type}
3/18	. Charging particulate material using a fluid carrier	2009/0045	. . {the cooling medium passing a block, e.g. metallic}
2003/185	. . {Conveying particles in a conduct using a fluid}	2009/0048	. . . {incorporating conduits for the medium}
<b>5/00</b>	<b>Supports, screens, or the like for the charge within the furnace (travelling or movable supports <a href="#">F27D 3/12</a>)</b>	2009/0051	. . {comprising use of studs to transfer heat or retain the liner}
5/0006	. {Composite supporting structures}	2009/0054	. . . {adapted to retain formed bricks}
5/0012	. . {Modules of the sagger or setter type; Supports built up from them}	2009/0056	. . {Use of high thermoconductive elements}
5/0018	. . {Separating elements}	2009/0059	. . . {made mostly from graphite}
5/0025	. . {assembled to present a three-point support}	2009/0062	. . . {made from copper or copper alloy}
5/0031	. {Treatment baskets for ceramic articles (for metallic articles <a href="#">C21D 9/0025</a> )}	2009/0064	. . {Cooling of furnace arches}
5/0037	. {Supports specially adapted for semi-conductors}	2009/0067	. . {Cooling element inlet and outlet tubes}
5/0043	. {Supports specially adapted for dental prosthesis}	2009/007	. {Cooling of charges therein}
5/005	. {Supports specially adapted for holding elongated articles in an upright position, e.g. sparking plugs}	2009/0072	. . {the cooling medium being a gas}
5/0056	. {Hangers}	2009/0075	. . . {in direct contact with the charge}
5/0062	. {Shields for the charge (shields for the lining <a href="#">F27D 1/0033</a> )}	2009/0078	. . . {in indirect contact with the charge}
5/0068	. {Containers}	2009/0081	. . {the cooling medium being a fluid (other than a gas in direct or indirect contact with the charge)}
2005/0075	. . {Pots, e.g. slag pots, ladles}	2009/0083	. . . {the fluid being water}
2005/0081	. {Details}	2009/0086	. . . . {applied in spray form}
2005/0087	. . {Means to prevent the adherence of the charge}	2009/0089	. . {Quenching}
2005/0093	. . {Means to maintain the form of the article}	2009/0091	. . {in a fluidised bed of cooling elements}
<b>7/00</b>	<b>Forming, maintaining, or circulating atmospheres in heating chambers</b>	2009/0094	. . {making use of already cooled material, e.g. forming a layer}
7/02	. Supplying steam, vapour, gases, or liquids	2009/0097	. . . {the charge being used as a coolant}
2007/023	. . {Conduits}	<b>11/00</b>	<b>Arrangement of elements for electric heating in or on furnaces (electric heating per se <a href="#">H05B</a>)</b>
2007/026	. . {Dampers (registers for granular flows <a href="#">F27D 2099/0071</a> )}	11/02	. Ohmic resistance heating
7/04	. Circulating atmospheres by mechanical means	11/04	. . with direct passage of current through the material being heated
2007/045	. . {Fans}	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
7/06	. Forming or maintaining special atmospheres or vacuum within heating chambers ( <a href="#">F27D 7/02</a> takes precedence)	11/08	. Heating by electric discharge, e.g. arc discharge
2007/063	. . {Special atmospheres, e.g. high pressure atmospheres}	11/10	. . Disposition of electrodes (automatic control of temperature <a href="#">G05D 23/00</a> ; electric discharge apparatus <a href="#">H01T</a> ; arrangements for feeding or guiding electrodes <a href="#">H05B 7/10</a> ; automatic control of power by positioning of electrodes <a href="#">H05B 7/144</a> )
2007/066	. . {Vacuum}	11/12	. with electromagnetic fields acting directly on the material being heated
<b>9/00</b>	<b>Cooling of furnaces or of charges therein (<a href="#">F27D 1/00</a>, <a href="#">F27D 3/00</a> take precedence)</b>	<b>13/00</b>	<b>Apparatus for preheating charges; Arrangements for preheating charges</b>
2009/0002	. {Cooling of furnaces}	13/002	. {Preheating scrap (preheating of scrap for steel making <a href="#">C21C 5/565</a> )}
2009/0005	. . {the cooling medium being a gas}	13/005	. {Drying of green clay prior to baking}
2009/0008	. . . {Ways to inject gases against surfaces}	2013/007	. {using a rotary furnace}
2009/001	. . {the cooling medium being a fluid other than a gas}	<b>15/00</b>	<b>Handling or treating discharged material; Supports or receiving chambers therefor</b>
2009/0013	. . . {the fluid being water}	15/02	. Cooling
2009/0016	. . . . {Water-spray}	15/0206	. . {with means to convey the charge}
2009/0018	. . {the cooling medium passing through a pattern of tubes}	15/0213	. . . {comprising a cooling grate}
2009/0021	. . . {with the parallel tube parts close to each other, e.g. a serpentine}	15/022	. . . . {grate plates}
2009/0024	. . . . {with contiguous tubes, which may be separately welded one to the other}	2015/0226	. . . . {Support, fixation of the grate}
2009/0027	. . . . {linked by elements}	2015/0233	. . . . {with gas, e.g. air, supply to the grate}
2009/0029	. . . . {fixed, e.g. welded to a supporting surface}		
2009/0032	. . . {integrated with refractories in a panel}		

2015/024	. . . . {Multiple grates}	2019/0065	. . {Regulation involving controlled section modification}
2015/0246	. . . . {Combination of fixed and movable grates}	2019/0068	. . {Regulation involving a measured inflow of a particular gas in the enclosure}
2015/0253	. . . . . {Gratin grates}	2019/0071	. . {Regulation using position sensors}
2015/026	. . . . {Means to discharge the fines}	2019/0075	. . {Regulation of the charge quantity}
15/0266	. . . {on an endless belt}	2019/0078	. . {Regulation of the speed of the gas through the charge}
15/0273	. . . {on a rotary hearth}	2019/0081	. {Controlling an air-lock chamber}
15/028	. . . {comprising a rotary drum}	2019/0084	. {Controlling closure systems, e.g. doors}
15/0286	. . {in a vertical, e.g. annular, shaft (shafts including rotating parts <a href="#">F27D 15/0273</a> )}	2019/0087	. {Automatisation of the whole plant or activity}
2015/0293	. . . {including rotating parts}	2019/009	. . {Use of codes, e.g. bar codes}
<b>17/00</b>	<b>Arrangements for using waste heat (heat-exchangers <a href="#">per se F28</a>); Arrangements for using, or disposing of, waste gases</b>	2019/0093	. {Maintaining a temperature gradient}
17/001	. {Extraction of waste gases, collection of fumes and hoods used therefor (in general <a href="#">B08B 15/00</a> )}	2019/0096	. {involving simulation means, e.g. of the treating or charging step}
17/002	. . {Details of the installations, e.g. fume conduits or seals}	<b>21/00</b>	<b>Arrangements of monitoring devices; Arrangements of safety devices</b>
17/003	. . {of waste gases emanating from an electric arc furnace}	2021/0007	. {Monitoring the pressure}
17/004	. {Systems for reclaiming waste heat}	21/0014	. {Devices for monitoring temperature}
2017/005	. . {including pyrolysing the waste gases}	21/0021	. {Devices for monitoring linings for wear}
2017/006	. . {using a boiler}	21/0028	. {Devices for monitoring the level of the melt}
2017/007	. . {including regenerators}	21/0035	. {Devices for monitoring the weight of quantities added to the charge}
17/008	. {cleaning gases}	2021/0042	. . {Monitoring the level of the solid charge}
2017/009	. {Cyclone for separating fines from gas}	2021/005	. {Devices for monitoring thermal expansion}
<b>19/00</b>	<b>Arrangements of controlling devices</b>	2021/0057	. {Security or safety devices, e.g. for protection against heat, noise, pollution or too much duress; Ergonomic aspects}
2019/0003	. {Monitoring the temperature or a characteristic of the charge and using it as a controlling value}	2021/0064	. . {against noises}
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}	2021/0071	. . {against explosions}
2019/0009	. . {Monitoring the pressure in an enclosure or kiln zone}	2021/0078	. . {against the presence of an undesirable element in the atmosphere of the furnace}
2019/0012	. . {Monitoring the composition of the atmosphere or of one of their components}	2021/0085	. . {against molten metal, e.g. leakage or splashes}
2019/0015	. . . {Monitoring the composition of the exhaust gases or of one of its components}	2021/0092	. . {against a jam in the transport line or a production interruption}
2019/0018	. . {Monitoring the temperature of the atmosphere of the kiln}	21/02	. Observation or illuminating devices
2019/0021	. . . {Monitoring the temperature of the exhaust gases}	2021/023	. . {Closable inserting openings, e.g. for the introduction of lances, sensors or burners}
2019/0025	. . {Monitoring the temperature of a part or of an element of the furnace structure}	2021/026	. . {using a video installation}
2019/0028	. {Regulation}	21/04	. Arrangements of indicators or alarms
2019/0031	. . {through control of the flow of the exhaust gases}	<b>25/00</b>	<b>Devices {or methods} for removing incrustations {, e.g. slag, metal deposits, dust; Devices or methods for preventing the adherence of slag}</b>
2019/0034	. . {through control of a heating quantity such as fuel, oxidant or intensity of current}	25/001	. {comprising breaking tools, e.g. hammers, drills, scrapers ( <a href="#">breaking away linings F27D 1/1694</a> ; boring machines for forming tapholes <a href="#">F27D 3/1527</a> )}
2019/0037	. . . {Quantity of electric current}	25/003	. . {used for punching tuyeres}
2019/004	. . . {Fuel quantity}	25/005	. . {used for cleaning the channels of induction furnaces}
2019/0043	. . . . {Amount of air or O <sub>2</sub> to the burner}	25/006	. {using explosives}
2019/0046	. . . . {Amount of secondary air to the burner}	25/008	. {using fluids or gases, e.g. blowers, suction units}
2019/005	. . . {Amount of heat given to the charge via a controlled heat exchanger}	<b>27/00</b>	<b>Stirring devices for molten material (<a href="#">F27D 3/14</a> takes precedence)</b>
2019/0053	. . . . {involving heating the charge in a fluid or fluidised medium}	2027/002	. {Gas stirring}
2019/0056	. . {Regulation involving cooling}	27/005	. {Pumps}
2019/0059	. . {Regulation involving the control of the conveyor movement, e.g. speed or sequences}	27/007	. . {Pulsating pumps}
2019/0062	. . . {control of the workpiece stay in different zones}	<b>99/00</b>	<b>Subject matter not provided for in other groups of this subclass</b>
		99/0001	. {Heating elements or systems}

99/0003	. . {with particulate fuel, e.g. aspects relating to the feeding}	2099/0081	. . {Joint}
99/0005	. . {Injecting liquid fuel}	2099/0083	. {Drives; Auxiliary drives}
99/0006	. . {Electric heating elements or system}	2099/0085	. {Accessories}
2099/0008	. . . {Resistor heating}	2099/0086	. . {Filters, e.g. for molten metals}
2099/001	. . . . {the container being the resistor}	2099/0088	. . {Apparatus to cut metal, e.g. logs, in billets}
2099/0011	. . . . {The resistor heats a radiant tube or surface}	2099/009	. . {Bumpers}
2099/0013	. . . . . {immersed in the charge}	2099/0091	. . {Means to grease or oil}
2099/0015	. . . {Induction heating}	2099/0093	. . {Means to collect ashes or dust, e.g. vessels}
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}	2099/0095	. . {Means to collect the slag or spilled metal, e.g. vessels (cars to carry the pots <a href="#">F27D 2003/127</a> )}
2099/0018	. . . . {Relative movement of the coil and the charge during the heat treatment}	2099/0096	. . {Presses}
2099/002	. . . . {Core heating}	2099/0098	. . {Means for moving the furnace}
2099/0021	. . . {Arc heating}		
2099/0023	. . . . {DC arc heating}	<b>2201/00</b>	<b>Manipulation of furnace parts</b>
2099/0025	. . . {Currents through the charge}		<b>NOTE</b>
2099/0026	. . . {with a generator of electromagnetic radiations}		Indexing code <a href="#">F27D 2201/00</a> can be followed by additional indexing codes preceded by a + sign. These additional indexing codes are chosen from codes of subclass <a href="#">F27D</a> describing similar manipulations of furnace charges.
2099/0028	. . . {Microwave heating}		Example: <a href="#">F27D 2201/00</a> + <a href="#">F27D 2003/0036</a>
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 <a href="#">C21C 5/5217</a> )}		
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 <a href="#">F27D 3/0032</a> )}		