CPC  COOPERATIVE PATENT CLASSIFICATION

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

LIGHTING; HEATING

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

F27B  FURNACES, KILNS, OVENS, OR RETORTS IN GENERAL; OPEN SINTERING OR LIKE APPARATUS

NOTE
Attention is drawn to the references and notes following the title of class F27 and the note (par. III) following the Contents of Section H.

WARNINGS
1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
   - F27B 1/09 covered by F27B 1/08
   - F27B 5/05 covered by F27B 5/04
   - F27B 14/16, F27B 14/18 covered by F27B 14/0806
   - F27B 21/08 - F27B 21/14 covered by F27D 3/00, F27D 21/00

2. 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.

1/00  Shaft or like vertical or substantially vertical furnaces (for preheating, burning, calcining or cooling lime, magnesia or dolomite C04B 2/12)
   1/005 .  [wherein no smelting of the charge occurs, e.g. calcining or sintering furnaces]
   1/02 .  with two or more shafts or chambers, e.g. multi-storey
   1/025 .  [with fore-hearth]
   1/04 .  Combinations or arrangements of shafts
   1/06 .  of other than up-draught type
   1/08 .  heated otherwise than by solid fuel mixed with charge
   1/10 .  Details, accessories, or equipment peculiar to furnaces of these types
   1/12 .  Shells or casings; Supports therefor
   1/14 .  .  Arrangements of linings (linings in general F27D 1/00)
   1/16 .  .  Arrangements of tuyeres
   1/18 .  .  Arrangements of dust collectors
   1/20 .  .  Arrangements of devices for charging
   1/21 .  .  Arrangements of devices for discharging
   1/24 .  .  Cooling arrangements
   1/26 .  .  Arrangements of controlling devices
   1/28 .  .  Arrangements of monitoring devices, of indicators, of alarm devices

3/00  Hearth-type furnaces, e.g. of reverberatory type (F27B 9/00, F27B 11/00, F27B 13/00, F27B 14/00, F27B 15/00, F27B 21/00 take precedence); Tank furnaces
   3/002 .  [Siemens-Martin type furnaces]
5/00 Muffle furnaces; Retort furnaces; Other furnaces in which the charge is held completely isolated (F27B 9/00 takes precedence)

5/02 . . . of multiple-chamber type
5/04 . . . adapted for treating the charge in vacuum or special atmosphere
5/06 . . . Details, accessories, or equipment peculiar to furnaces of these types

2005/062 . . . [Cooling elements]
2005/064 . . . [disposed in the furnace, around the chamber, e.g. coils]
2005/066 . . . [disposed around the fan]
2005/068 . . . [for external cooling]
5/08 . . . Arrangements of linings
10/0 . . . Muffles
12/0 . . . Arrangement of devices for charging
13/0 . . . Arrangement of devices for discharging
14/0 . . . Arrangements of heating devices
2005/143 . . . [Heating rods disposed in the chamber]
2005/146 . . . [the heating rods being in the tubes which conduct the heating gases]
5/16 . . . Arrangements of air or gas supply devices
2005/161 . . . [Gas inflow or outflow]
2005/162 . . . [through closable or non-closable openings of the chamber walls]
2005/163 . . . [Controlled openings, e.g. orientable]
2005/164 . . . [Air supply through a set of tubes with openings]
2005/165 . . . [Controlled tubes, e.g. orientable or with closable openings]
2005/166 . . . [Means to circulate the atmosphere]
2005/167 . . . [the atmosphere being recirculated through the treatment chamber by a turbine]
2005/168 . . . [by more than one turbine]
2005/169 . . . [the atmosphere being continuously renewed by exterior means]
5/18 . . . Arrangement of controlling, monitoring, alarm or like devices

7/00 Rotary-drum furnaces, i.e. horizontal or slightly inclined

2007/005 . . . [for the treatment of slurries or wet materials]
7/02 . . . of multiple-chamber or multiple-drum type
2007/022 . . . [the drum having a non-uniform section along its length]
2007/025 . . . [with different chambers, e.g. treatment zones]
2007/027 . . . [with more than one drum]
7/04 . . . with longitudinal divisions
2007/041 . . . [Longitudinal tubes]
2007/043 . . . [the partition being a cylinder, coaxial to the rotary drum, defining two chambers]
2007/045 . . . [the charge going in one direction in one chamber, then after a turn coming back in the other direction in the other chamber]
2007/046 . . . [Radial partitions]
2007/048 . . . [defining an helical chamber]
7/06 . . . adapted for treating the charge in vacuum or special atmosphere

7/08 . . . externally heated
7/10 . . . internally heated, e.g. by means of passages in the wall
7/12 . . . tiltable
7/14 . . . with means for agitating or moving the charge
7/16 . . . the means being fixed relatively to the drum, {e.g. composite means} (F27B 7/04 takes precedence)
7/161 . . . [the means comprising projections jutting out from the wall]
7/162 . . . [the projections consisting of separate lifting elements, e.g. lifting shovels]
2007/163 . . . [using only a ring of lifting elements to lift the charge]
7/165 . . . [forming a helical lifting projection]
7/166 . . . [the means comprising chains]
7/167 . . . [the means comprising partitions]
2007/168 . . . [Annular partition]
7/18 . . . the means being movable within the drum
7/20 . . . Details, accessories, or equipment peculiar to rotary-drum furnaces
2007/2008 . . . [Devices for reintroducing dust in the drum]
7/2016 . . . [Arrangements of preheating devices for the charge]
7/2025 . . . [consisting of a single string of cyclones]
7/2033 . . . [with means for precalcining the raw material]
7/2041 . . . [consisting of at least two strings of cyclones with two different admissions of raw material]
7/205 . . . [with precalcining means on the string supplied with exhaust gases from the cooler]
7/2058 . . . [with precalcining means on each string]
7/2066 . . . [comprising a band transporter]
7/2075 . . . [Removing incrustations]
7/2083 . . . [Arrangements for the melting of metals or the treatment of molten metals]
2007/2091 . . . [Means for eliminating compounds from gases by condensation, e.g. alkali metals]
7/22 . . . Rotary drums; Supports therefor
7/2206 . . . [Bearing rings]
2007/2213 . . . [mounted floatingly on the drum]
7/2222 . . . [the mounting comprising radially resilient elements, e.g. springs]
2007/2226 . . . [the mounting comprising elements to maintain the ring between series of abutments]
2007/2233 . . . [the ring being fixed to the drum, e.g. welded]
7/224 . . . [Discharge ends]
2007/2246 . . . [Support rollers]
2007/2253 . . . [mounted movable, e.g. resiliently on the ground]
2007/226 . . . [constituted of series of two rollers mounted on tiltable support along the drum]
2007/2266 . . . [the mounting allowing a movement of the rollers support in a horizontal plane]
2007/2273 . . . [with arrangements, e.g. rollers, to maintain the drum against longitudinal movement]
2007/228 . . . [comprising rollable bodies]
2007/2286 . . . [supporting the drum directly, without the use of a bearing ring]
2007/2293 . . . [the furnace being suspended]
7/24 . . . Seals between rotary and stationary parts
Combinations of furnaces of multiple-track type; of multiple-chamber type; (having two or more parallel tracks)

 Rotary-drum cooler

 Furnaces with controlled atmosphere

 (the atmosphere consisting of protective gases)

 heated without contact between combustion gases and charge; electrically heated

 [with at least two longitudinal chambers carrying combustion gases, i.e. of the Dressler type]

 [electrically heated]

 [Resistor heating, e.g. with resistors also emitting IR rays]

 [the resistance being transported by the conveyor]

 [heated by lamps]

 [heated by induction]

 [heated by radiant tubes, the tube being heated by a hot medium, e.g. hot gases]

 heated through chamber walls

 [Muffle furnaces]

 [the muffle being fixed and in a single piece]

 [with two or more fixed muffles]

 [Series of separate muffles conveyed through the furnace]

 heated by hot air or gas

 with special arrangements for preheating or cooling the charge

 [Preheating]

 [Cooling]

 [involving the circulation of cooling gases, e.g. air]

 [the gases being further utilised as oxidants in the burners]

 characterised by the path of the charge during treatment; characterised by the means by which the charge is moved during treatment (F27B 9/28 takes precedence; travelling or movable supports or containers for the charge (F27D 3/12)

 [the charge moving along a vertical axis]

 [the charge moving along a serpentine path]

 [the charge moving on an inclined floor]

 [the charge moving in a circular or arcuate path]

 under the action of scrapers or pushers

 [multiple hearth type furnaces]

 the charge moving in a substantially straight path

 [tunnel furnace]

 [walking beam furnace]

 [Conveyor mechanisms therefor]

 [having ramps (F27B 9/206 takes precedence)]

 [having eccentric or lever arms (F27B 9/206 takes precedence)]

 [consisting of a single central beam]

 [consisting of two or more conveyors]

 Furnaces through which the charge is moved mechanically, e.g. of tunnel type (F27B 7/14 takes precedence); Similar furnaces in which the charge moves by gravity

 of multiple-track type; of multiple-chamber type; Combinations of furnaces

 [having two or more parallel tracks]

 [With two tracks moving in opposite directions]

 [with a U turn at one end]

 [with superimposed tracks]

 [having two or more superimposed tracks (F27B 9/024 takes precedence)]
9/208 . . . [the workpieces being rotated during their advance]
9/22 . . . [on rails, e.g.] under the action of scrapers or pushers (F27B 9/26 takes precedence)
9/222 . . . [the path comprising a section specially adapted for effecting equalisation of the temperature of the charge]
9/225 . . . [the charge being subjected to an additional manipulation along the path]
9/227 . . . [with rotation of the charge (F27B 9/147 takes precedence)]
9/24 . . . being carried by a conveyor [(transport by conveyors in general B65G)]
9/2407 . . . [the conveyor being constituted by rollers (roller hearth furnace)]
9/2415 . . . [the charge rotating about an axis transversal to the axis of advancement of the charge]
9/2423 . . . [the charge rotating about an axis parallel to the axis of advancement of the charge]
9/243 . . . [Endless-strand conveyor]
2009/2438 . . . [with means to transfer the heat from the outgoing band to the incoming band]
2009/2446 . . . [with means to control the tension of the band]
9/2453 . . . [Vibrating conveyor (shaker hearth furnace)]
9/2461 . . . [the charge being suspended from the conveyor]
9/2469 . . . [the conveyor being constituted by rollable bodies]
9/2476 . . . [the conveyor being constituted by air cushion]
2009/2484 . . . [the conveyor being a helical device]
2009/2492 . . . [the conveyor being constituted by series of little rams or ratchets, moving the charge along]
9/26 . . . on or in trucks, sleds, or containers
9/262 . . . [on or in trucks]
2009/264 . . . [the truck carrying a partition]
2009/266 . . . [the truck having conduits for guiding the oven atmosphere]
2009/268 . . . [through the structure of the car and through the charge]
9/28 . . . for treating continuous lengths of work
9/30 . . . Details, accessories, or equipment peculiar to furnaces of these types
9/3005 . . . [arrangements for circulating gases]
9/3011 . . . [arrangements for circulating gases transversally]
2009/3016 . . . [with arrangements to circulate gases through the charge]
2009/3022 . . . [with arrangements to maintain oxidising reducing or neutral zones]
2009/3027 . . . [Use of registers, partitions]
2009/3033 . . . [Fumes circulating in the same direction as the charge]
2009/3038 . . . [Fumes or gases alternatively changing their longitudinal direction]
9/3044 . . . [Furnace regenerators]
2009/305 . . . [Particular conformation of the furnace]
2009/3055 . . . [Non-uniform section through the length of the furnace]
2009/3061 . . . [Furnaces with longitudinal grooves]
2009/3066 . . . [Cooling the under-structure of the kiln, e.g. under the cars]
2009/3072 . . . [Balancing the pressure between the upper part and the lower part of the kiln, above and under the track]
9/3077 . . . [Arrangements for treating electronic components, e.g. semiconductors]
2009/3083 . . . [Arrangements to handle skid marks]
2009/3088 . . . [Drying arrangements]
2009/3094 . . . [Means to store a part of the charge in the furnace]
9/32 . . . Casings
9/34 . . . Arrangements of linings
9/36 . . . Arrangements of heating devices
2009/3607 . . . [Heaters located above the track of the charge]
2009/3615 . . . [Burner in the ceiling directed vertically downwards]
2009/3623 . . . [Heaters located under the track]
2009/363 . . . [Burners in the hearth directed towards the ceiling]
2009/3638 . . . [Heaters located above and under the track]
2009/3646 . . . [Heating the ceiling or the walls for a reverberatory effect]
2009/3653 . . . [Preheated fuel]
2009/3661 . . . [preheated with the exhaust gases]
2009/3669 . . . [preheated with the gases of the cooling zone]
2009/3676 . . . [preheated with the gases of the preheating zone]
2009/3684 . . . [Combustion within a combustion chamber with outlets in the kiln chamber]
2009/3692 . . . [The charge containing combustible materials]
9/38 . . . Arrangements of devices for charging
2009/382 . . . [Charging]
2009/384 . . . [Discharging]
2009/386 . . . [Lateral intake or outtake]
2009/388 . . . [Centrally in the lateral wall]
9/39 . . . Arrangements of devices for discharging
9/40 . . . Arrangements of controlling or monitoring devices
11/00 Bell-type furnaces (for treating metal strips or wire C21D 9/663)
13/00 Furnaces with both stationary charge and progression of heating, e.g. of ring type, of type in which segmental kiln moves over stationary charge
13/02 . . . of multiple-chamber type with permanent partitions; Combinations of furnaces
13/04 . . . of single-chamber type with temporary partitions
13/06 . . . Details, accessories, or equipment peculiar to furnaces of this type
13/08 . . . Casings
13/10 . . . Arrangements of linings
13/12 . . . Arrangements of heating devices
13/14 . . . Arrangement of controlling, monitoring, alarm or like devices
14/00 Crucible or pot furnaces
2014/002 . . . [Smelting process, e.g. sequences to melt a specific material]
2014/004 . . . [Process involving a smelting step, e.g. vaporisation]
2014/006 . . . [Involving a salt bath or help metal bath]
F27B

15/00 Fluidised-bed furnaces; Other furnaces using or treating finely-divided materials in dispersion (apparatus in general for carrying out chemical or physical processes in a fluidised bed reactor B01J 8/24 - B01J 8/44)

15/003 . . . (Cyclones or chain of cyclones)
15/006 . . . (Equipment for treating dispersed material falling under gravity with ascending gases)
15/02 . . . Details, accessories, or equipment peculiar to furnaces of these types
15/04 . . . Casings; Supports therefor
15/06 . . . Arrangements of linings
15/08 . . . Arrangements of devices for charging
15/09 . . . Arrangements of devices for discharging
15/10 . . . Arrangements of air or gas supply devices