### 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:

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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.

#### F27B 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 discharging

1/21 . . . Arrangements of heat-exchange apparatus (heat-exchangers in general F28C; F28D)

1/22 . . . Cooling arrangements

1/24 . . . 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]

3/005 . . . { Port construction }

3/007 . . . { Removable burner head }

3/02 . . . of single-chamber fixed-hearth type

3/04 . . . of multiple-hearth type; of multiple-chamber type; Combinations of hearth-type furnaces

3/045 . . . { Multiple chambers, e.g. one of which is used for charging }

3/06 . . . with movable working chambers or hearths, e.g. tiltable [, oscillating or describing a composed movement]

3/065 . . . { tiltable }

3/08 . . . heated electrically, with or without any other source of heat

3/085 . . . { Arc furnaces }

3/10 . . . Details, accessories, or equipment peculiar to hearth-type furnaces

3/105 . . . { Slag chamber }

3/12 . . . Working chambers or casings; Supports therefor

3/14 . . . Arrangements of linings

3/16 . . . Walls; Roofs

3/18 . . . Arrangements of devices for charging

3/183 . . . [Charging of arc furnaces vertically through the roof, e.g. in three points]

3/186 . . . [Charging in a vertical chamber adjacent to the melting chamber]

3/19 . . . Arrangements of devices for discharging

3/20 . . . Arrangements of heating devices

3/205 . . . { Burners }

3/22 . . . Arrangements of air or gas supply devices

3/225 . . . { Oxygen blowing }

3/24 . . . Cooling arrangements
inclined Rotary-drum furnaces, i.e. horizontal or slightly inclined

Muffle furnaces; Retort furnaces; Other furnaces in which the charge is held completely isolated

Rotary-drum furnaces, i.e. horizontal or slightly inclined
9/00  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

9/02  of multiple-track type; of multiple-chamber type; Combinations of furnaces

9/021  [having two or more parallel tracks]

9/022  [With two tracks moving in opposite directions]

9/023  [with a U turn at one end]

9/024  [with superimposed tracks]

9/025  [having two or more superimposed tracks (F27B 9/024 takes precedence)]

2009/026  [Two or more conveyors, e.g. mounted successively]

2009/027  [working in parallel]

9/028  [Multi-chamber type furnaces, (F27B 9/029 takes precedence)]

9/029  [Multicellular type furnaces constructed with add-on modules]

9/04  adapted for treating the charge in vacuum or special atmosphere

9/042  [Vacuum furnaces]

9/045  [Furnaces with controlled atmosphere]

9/047  [the atmosphere consisting of protective gases]

9/06  heated without contact between combustion gases and charge; electrically heated

9/061  [with at least two longitudinal chambers carrying combustion gases, i.e. of the Dressler type]

9/062  [electrically heated]

9/063  [Resistor heating, e.g. with resistors also emitting IR rays]

9/065  [the resistance being transported by the conveyor]

9/066  [heated by lamps]

9/067  [heated by induction]

9/068  [heated by radiant tubes, the tube being heated by a hot medium, e.g. hot gases]

9/08  heated through chamber walls

9/082  [Muffle furnaces]

9/084  [the muffle being fixed and in a single piece]

9/086  [with two or more fixed muffles]

9/088  [Series of separate muffles conveyed through the furnace]

9/10  heated by hot air or gas

9/12  with special arrangements for preheating or cooling the charge

2009/122  [Preheating]

2009/124  [Cooling]

2009/126  [involving the circulation of cooling gases, e.g. air]

2009/128  [the gases being further utilised as oxidants in the burners]

9/14  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)

9/142  [the charge moving along a vertical axis]

9/145  [the charge moving along a serpentine path]

9/147  [the charge moving on an inclined floor]

9/16  the charge moving in a circular or arcuate path

9/18  under the action of scrapers or pushers

9/185  [multiple hearth type furnaces]

9/20  the charge moving in a substantially straight path (tunnel furnace)

9/201  [walking beam furnace]

9/202  [Conveyor mechanisms therefor]

9/203  [having ramps (F27B 9/206 takes precedence)]

9/205  [having eccentrices or lever arms (F27B 9/206 takes precedence)]

9/206  [consisting of a single central beam]

9/207  [consisting of two or more conveyors]
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}
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}
9/2484...{the conveyor being a helical device}
9/2492...{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}
9/264...{the truck carrying a partition}
9/266...{the truck having conducts for guiding the oven atmosphere}
9/268...{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}
9/3016...{with arrangements to circulate gases through the charge}
9/3022...{with arrangements to maintain oxidising reducing or neutral zones}
9/3027...{Use of registers, partitions}
9/3033...{Fumes circulating in the same direction as the charge}
9/3038...{Fumes or gases alternatively changing their longitudinal direction}
9/3044...{Furnace regenerators}
9/305...{Particular conformation of the furnace}
9/3055...{Non-uniform section through the length of the furnace}
9/3061...{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)

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. vapourisation}
2014/006...{Involving a salt bath or help metal bath}
Fluidised-bed furnaces; Other furnaces using or treating finely-divided materials in dispersion

(\text{apparatus in general for carrying out chemical or physical processes in a fluidised bed reactor \textit{B01J 8/24 - B01J 8/44}})

\begin{enumerate}
  \item 15/00 . . Fluidised-bed furnaces; Other furnaces using or treating finely-divided materials in dispersion
  \item 15/02 . . Details, accessories, or equipment peculiar to furnaces of these types
  \item 15/04 . . Casings; Supports thereof
  \item 15/06 . . Arrangements of linings
  \item 15/08 . . Arrangements of devices for charging
  \item 15/09 . . Arrangements of devices for discharging
  \item 15/10 . . Arrangements of air or gas supply devices
  \item 15/12 . . Arrangements of dust collectors
  \item 15/14 . . Arrangements of heating devices
  \item 15/16 . . Arrangements of cooling devices
  \item 15/18 . . Arrangements of controlling devices
  \item 15/20 . . Arrangements of monitoring devices, of indicators, of alarm devices
\end{enumerate}

17/00 Furnaces of a kind not covered by any preceding group (structural combinations of furnaces \textit{F27B 17/00})

\begin{enumerate}
  \item 17/00016 . . [Chamber type furnaces]
  \item 17/0025 . . [Especially adapted for treating semiconductor wafers]
  \item 17/0033 . . [the floor of the furnaces consisting of the support carrying the charge, e.g. car type furnaces]
  \item 17/0041 . . [specially adapted for burning bricks or pottery \textit{(F27B 17/0033 takes precedence)}]
  \item 17/005 . . [with cylindrical chambers]
  \item 17/0058 . . [with superposed cylindrical chambers]
  \item 17/0066 . . [arrangement of the charge, e.g. bricks]
  \item 17/0075 . . [Heating devices therefor]
  \item 17/0083 . . [with means for circulating the atmosphere]
  \item 19/00 Combinations of furnaces of kinds not covered by a single preceding main group
  \item 19/02 . . combined in one structure
  \item 19/04 . . arranged for associated working
\end{enumerate}

21/00 Open or uncovered sintering apparatus; Other heat-treatment apparatus of like construction

\begin{enumerate}
  \item 21/02 . . Sintering grates or tables
  \item 21/04 . . Sintering pots or sintering pans
  \item 21/06 . . Endless-strand sintering machines
\end{enumerate}