

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

Definition statement

This place covers:

Details, accessories of furnaces, kilns or ovens in general, not for specific furnaces, kilns or ovens.

Relationships with other classification places

The details or accessories for specific furnaces, kilns or ovens are classified in [F27B](#) subgroups

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Combustion apparatus	F23
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Special rules of classification

Indexing Codes should be used as additional information or in case a CPC symbol is given and more detailed Indexing Codes are existing, these more detailed Indexing Codes should also be given.

F27D 1/00

Casings; Linings; Walls; Roofs

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Linings for casting-melt holding vessels	B22D 41/02
Refractory materials	C04B
Clay-wares	C04B 33/00
Shaped ceramic products characterised by their composition	C04B 35/00
Walls, e.g. partitions, for buildings	E04B 2/00
Protection of pipes or pipe fittings against corrosion or incrustation	F16L 58/00
Thermal insulation in general	F16L 59/00
Firebridges for combustion chambers	F23M 3/00
Shape of bricks or blocks used in combustion chambers	F23M 5/02

F27D 1/0033**{Linings or walls comprising heat shields, e.g. heat shields}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Shields protecting the charge within the furnace	F27D 5/0062
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F27D 2001/0046**{Means to facilitate repair or replacement or prevent quick wearing}****Special rules of classification**

Making or repairing linings, increasing the durability of linings or breaking away linings are classified in [F27D 1/16](#).

F27D 2001/0053**{Furnace constructed in modules}****Special rules of classification**

Making or repairing linings, increasing the durability of linings or breaking away linings are classified in [F27D 1/16](#).

F27D 2001/0066**{Movable or removable parts}****Special rules of classification**

Removable part or structure with replaceable elements because of wearing is classified in [F27D 2001/005](#).

F27D 2001/0069**{Means to prevent heat conduction}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Linings or walls comprising heat shields, e.g. heat shields	F27D 1/0033
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F27D 2001/0079**{Means to assemble at least two parts of a furnace or of any device or accessory associated to its use}****Special rules of classification**

Assembling elements for supports for linings are classified in [F27D 1/145](#).

F27D 2001/0083**{Means to assemble a moving part to a fixed one}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Linings or walls comprising expansion joints or means to restrain expansion due to thermic flows	F27D 1/0023
Removable covers	F27D 1/1808
Movement of the container or support of the charge in the furnace or in the charging facilities	F27D 2003/0085

F27D 1/02**Crowns; Roofs****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Crowns and roofs in combustion chambers	F23M 5/06
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F27D 1/10**Monolithic linings; Supports therefor****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Supports for linings	F27D 1/14
Heat-exchange apparatus	F28D 1/00 - F28D 21/00

F27D 1/12**incorporating cooling arrangements****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Assemblies of tubular heat-exchange elements in general	F28F 1/00
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F27D 1/14**Supports for linings (supports for monolithic linings [F27D 1/10](#))****References****Limiting references***This place does not cover:*

Supports for monolithic linings	F27D 1/10
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F27D 1/16**Making or repairing linings {; Increasing the durability of linings; Breaking away linings}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Equipment used for making or repairing linings, e.g. by flame gunning	C21C 5/441 , C21C 5/443
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F27D 2001/1875**{Hanging doors and walls}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Partitions	F27D 99/007
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F27D 3/00**Charging; Discharging; Manipulation of charge****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Conveyors in general	B65G
Charging of the electric steel-manufacturing furnace	C21C 5/527
Furnaces through which the charge is moved mechanically or in which the charge moves by gravity	F27B 9/00
Path of the charge through the furnace during treatment; Means by which the charge is moved through the furnace during treatment	F27B 9/14

F27D 2003/0002**{involving positioning devices, e.g. buffers, buffer zones}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Regulation involving the control of the conveyor movement, e.g. speed or sequences	F27D 2019/0059
Regulation using position sensors	F27D 2019/0071
Disposition of the charge in a push furnace type, workpieces being separated by a separating element	F27M 2002/016

F27D 3/0024**{of metallic workpieces}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Charging, discharging and manipulation of charges in heat treatment furnaces, e.g. with rolls	C21D 9/0012 , C21D 9/0018
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F27D 3/026**{transport or conveyor rolls for furnaces; roller rails}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Rollers in rolling mills	B21B 39/00
Rolls in continuous casting	B22D 11/1287
Conveyor rolls in general	B65G 39/02 , B65G 13/00 , B65G 13/02 , B65G 13/04
Roller conveyors for transporting glass sheets	C03B 35/16

F27D 3/08**Screw feeders; Screw dischargers****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Screw conveyors in general processes	B01J 8/0045
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Screw conveyors in general	B65G 65/46 , B65G 33/18 , B65G 53/48
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F27D 2003/127

{for carrying pots}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Means to collect the slag or spilled metal, e.g. vessels	F27D 2099/0095
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F27D 3/15

Tapping equipment; Equipment for removing {or retaining} slag

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Closure equipment in casting melt-holding vessels	B22D 41/14 , B22D 41/16 , B22D 41/22 , B22D 41/44
Tap-holes and repairing top-holes in steel making converters	C21C 5/4653 , C21C 5/445

F27D 3/1527

{Taphole forming equipment, e.g. boring machines, piercing tools}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Opening or sealing the tap-hole of blast furnaces	C21B 7/12
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F27D 3/16

Introducing a fluid jet or current into the charge ([F27D 3/18](#) takes precedence)

References

Limiting references

This place does not cover:

Charging particulate material using a fluid carrier	F27D 3/18
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Injection assemblies for treating melt in ladles or runners before casting	B22D 1/005
Devices for accelerating or decelerating flow of the materials	B65G 53/58
Tuyeres for blast furnaces	C21B 7/16
Bottoms or tuyeres for converters	C21C 5/48
Burners or injectors for injecting pulverulent materials into the furnace	C21C 5/5217
Treating molten ferrous alloy by injecting powdered material	C21C 7/0037

F27D 3/18**Charging particulate material using a fluid carrier****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Lances or injectors for steel production in converters	C21C 5/4606
Burners or injectors for injecting gas	C21C 5/5217

F27D 5/00**Supports, screens or the like for the charge within the furnace****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Travelling or movable supports	F27D 3/12
Setting, e.g. drying, dehydrating or firing ceramic articles	B28B 11/243
Supports, baskets, containers or covers for heat treatment of metal articles	C21D 9/0025
Details of grates for burning waste materials	F23H 17/00
Elements for supporting goods to be dried	F26B 25/185

F27D 5/0031**{Treatment baskets for ceramic articles}****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Heat treatment baskets for metallic articles	C21D 9/0025
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F27D 5/0062**{Shields for the charge}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Heat shields for linings	F27D 1/0033
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F27D 7/00**Forming, maintaining or circulating atmospheres in heating chambers****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

General devices for heat treatment with forced gas circulation	C21D 1/767
General devices for heat treatment under reduced pressure or vacuum	C21D 1/773

F27D 2007/026**{Dampers}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Partitions used as registers	F27D 2099/0071
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F27D 11/00**Arrangement of elements for electric heating in or on furnaces****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Electric heating, per se	H05B
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F27D 11/02**Ohmic resistance heating****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Ohmic resistance heating in general and specially adapted for furnaces	H05B 3/00 , H05B 3/62 , H05B 3/64
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F27D 11/10**Disposition of electrodes****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

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

F27D 13/002**{Preheating scrap}****References****Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Preheating of scrap for steel production	C21C 5/565
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F27D 15/0213**{comprising a cooling grate}****Definition statement**

This place covers:

Cooling of discharged material comprising a cooling grate.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Conveyors in general comprising a cyclically-moving	B65G 25/00
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Heat-exchange apparatus, whereby particulate material forming a bed, e.g. fluidised, on vibratory sieves	F28C 3/16
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F27D 15/0286

{in a vertical, e.g. annular, shaft}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cooling discharged material on a rotary hearth	F27D 15/0273
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F27D 17/00

Arrangements for using waste heat; Arrangements for using, or disposing of, waste gases

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Preventing escape of dirt or fumes from the area where they are produced	B08B 15/00
Heat-exchangers in general	F28

F27D 17/10

Arrangements for using waste heat

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Heat treatment of metals	C21D 1/00
Vapour generation using waste gases	F22B 1/18

F27D 17/102

{including pyrolysing the waste gases}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements for treatment or cleaning of waste gases	F27D 17/20
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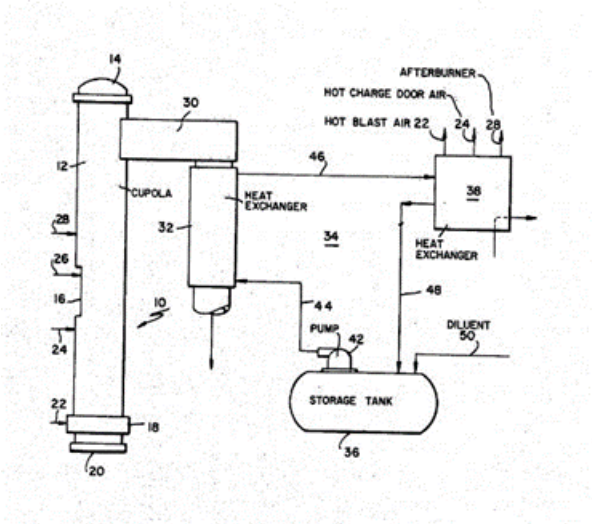
F27D 17/12

using heat storage

Definition statement

This place covers:

Illustrative example of subject matter classified in this place:



The Figure illustrates a waste heat recovery apparatus where exhaust gas from cupola (10) passes through heat exchanger (32) to heat fluid stored in tank (36). The heat is subsequently utilised at heat exchanger (38).

References

Informative references

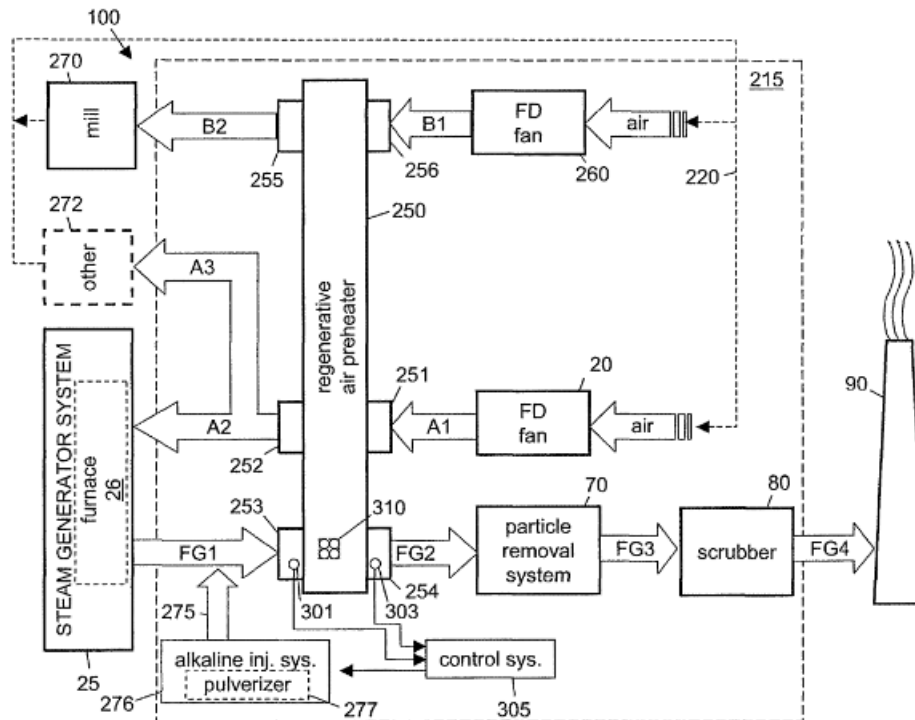
Attention is drawn to the following places, which may be of interest for search:

Heat storage type combustion burners	F23C
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F27D 17/13**using regenerative heat exchangers****Definition statement**

This place covers:

Illustrative example of subject matter classified in this place:



The Figure illustrates an exhaust processing and heat recovery system with a regenerative heat exchanger (250), of the rotor type, which stores heat from flue gas (FG1) and then provides that heat to incoming air (A1). Exhaust air streams (A3, B2) use waste heat from furnace (26) to provide heat for other purposes, e.g. coal mill drying and grinding operations, site heating and others.

F27D 17/20**Arrangements for treatment or cleaning of waste gases****Definition statement**

This place covers:

Illustrative examples of subject matter classified in this place:

1.

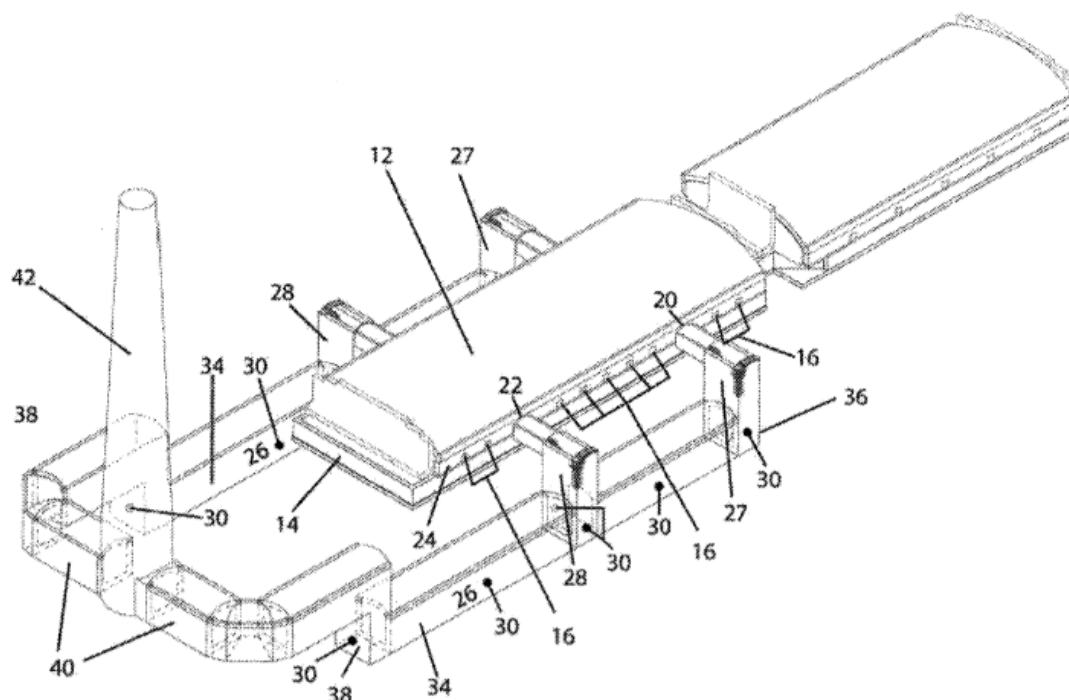


Figure 1 illustrates a plurality of nozzles (30) in the flue of furnace (12) which inject ammonia into the exhaust gas to treat NO_x emissions.

2.

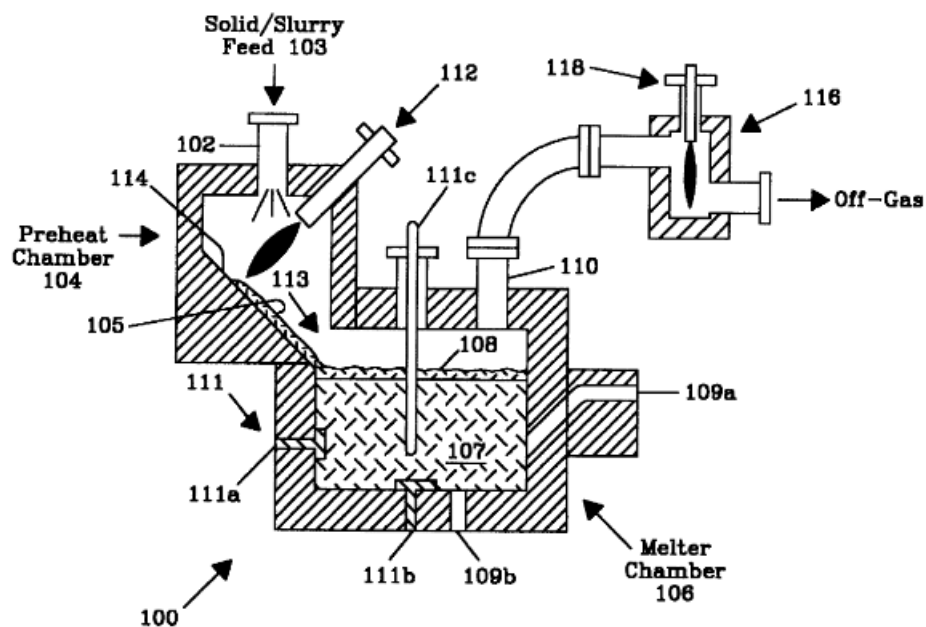


Figure 2 illustrates a plasma torch (118) at chamber (116) for pyrolysing volatile components in the exhaust gas.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Separation in general	B01D
Separation of gases or vapours	B01D 53/00
Removal of waste gases or dust coming from steel making converters	C21C 5/38
Working-up flue dust	C22B 7/02
Apparatus for combustion of waste gases or noxious gases	F23G 7/06

F27D 17/22

for removing solid constituents

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Dust collecting devices for iron or steel blast furnaces	C21B 7/22
Details, accessories or equipment, e.g. dust-collectors, specially adapted for hearth-type furnaces	F27B 3/10

F27D 17/30

Arrangements for extraction or collection of waste gases; Hoods therefor

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Parts, details or accessories of cooking-vessels for withdrawing or condensing cooking vapours from such vessels	A47J 36/38
Preventing escape of dirt or fumes from the area where they are produced	B08B 15/00
Removal of waste gases or dust coming from steel making converters	C21C 5/38
Devices for conducting smoke or fumes, e.g. flues	F23J 11/00
Removing cooking fumes from domestic stoves or ranges	F24C 15/20

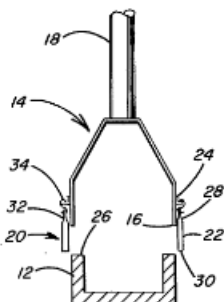
F27D 17/302

{Constructional details of ancillary components, e.g. waste gas conduits or seals}

Definition statement

This place covers:

Illustrative example of subject matter classified in this place:



The Figure illustrates a pipe curtain (20) for confining pollutants emitted from the furnace trough (12).

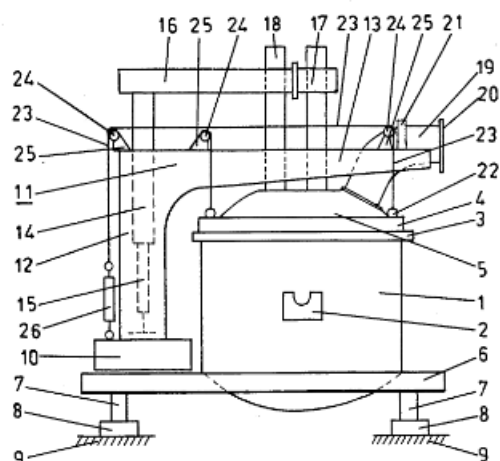
F27D 17/304

{specially adapted for electric arc furnaces}

Definition statement

This place covers:

Illustrative example of subject matter classified in this place:



The Figure illustrates an electric arc furnace with an exhaust nozzle (19) integrated into the lid also supporting electrodes (17, 18).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Working up flue dust to produce non-ferrous metals and compounds thereof	C22B 7/02
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F27D 19/00

Arrangements of controlling devices

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement of controlling devices in shaft furnaces	F27B 1/26
Arrangement of controlling devices in hearth type furnaces	F27B 3/28
Arrangement of controlling devices in muffle furnaces	F27B 5/18
Arrangement of controlling devices in rotary drum furnaces	F27B 7/42
Arrangement of controlling devices in tunnel furnaces	F27B 9/40
Arrangement of controlling devices in ring type furnaces	F27B 13/14
Arrangement of controlling devices in crucible or pot furnaces	F27B 14/20
Arrangement of controlling devices in fluidized bed furnaces	F27B 15/18

F27D 21/00

Arrangement of monitoring devices; Arrangement of safety devices

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Test rods or other checking devices in blast furnaces	C21B 7/24
Measuring and sampling devices in steel making converters	C21C 5/4673 , C21C 2005/5288
Arrangement of monitoring devices in shaft furnaces	F27B 1/28
Arrangement of monitoring devices in hearth type furnaces	F27B 3/28
Arrangement of monitoring devices in muffle furnaces	F27B 5/18
Arrangement of monitoring devices in rotary drum furnaces	F27B 7/42
Arrangement of monitoring devices in tunnel furnaces	F27B 9/40
Arrangement of monitoring devices in ring type furnaces	F27B 13/14
Arrangement of monitoring devices in crucible or pot furnaces	F27B 14/20
Arrangement of monitoring devices in fluidized bed furnaces	F27B 15/18
Measuring temperature and heat quantity in general	G01K 1/00 - G01K 19/00

F27D 25/001**{comprising breaking tools, e.g. hammers, drills, scrapers}****Definition statement***This place covers:*

Devices for removing incrustations, e.g. slag, metal deposits, dust, comprising breaking tools like hammers, drills, scrapers.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Breaking away linings	F27D 1/1694
Boring machines for forming tapholes	F27D 3/1527

F27D 27/00**Stirring devices for molten material (charging or discharging liquid or molten material [F27D 3/14](#))****References****Limiting references***This place does not cover:*

Charging or discharging liquid or molten material	F27D 3/14
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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Mixers in general	B01F 25/00 - B01F 33/00
General processes of refining of metals	C22B 9/00
Obtaining aluminium by refining	C22B 21/06
Electrodynamic pumps	H02K 44/02

F27D 99/00**Subject matter not provided for in other groups of this subclass****Definition statement***This place covers:*

Details or accessories not covered by any preceding group

F27D 99/0006**{Electric heating elements or system}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Electric heating in general	H05B 1/00 - H05B 7/225
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F27D 99/0033**{using burners}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Melting glass by combustion with oxygen	C03B 5/2353
Manufacture of steel in electric arc furnaces equipped with burners	C21C 5/5217
Burners in general for combustion of gas	F23D 14/00
Burners in general for combustion conjointly or alternatively of gaseous or liquid or pulverulent fuel	F23D 17/00

F27D 2099/008**{Using an air-lock}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Charging or loading melting furnaces with material in the solid state using an air-lock	F27D 3/0032
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F27D 2099/0095**{Means to collect the slag or spilled metal, e.g. vessels}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Charging cars or lift trolleys for carrying pots	F27D 2003/127
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