

C21C

PROCESSING OF PIG-IRON, e.g. REFINING, MANUFACTURE OF WROUGHT-IRON OR STEEL; TREATMENT IN MOLTEN STATE OF FERROUS ALLOYS (refining metals in general [C22B 9/00](#))

Definition statement

This place covers:

all treatments of molten iron or steel, including the apparatuses specifically related thereto, e.g. converter, electric furnace.

References

Limiting references

This place does not cover:

Cast iron alloys	C22C 37/00
Ferrous alloy compositions	C22C 38/00

C21C 1/02

Dephosphorising or desulfurising

Definition statement

This place covers:

Also the specific treating agents

References

Informative references

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

Dephosphorising or desulfurising of molten ferrous alloys	C21C 7/064
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Special rules of classification

In case the dephosphorising, desulfurising are more generally claimed and could also apply to ferrous alloys (incl. steel), [C21C 7/064](#) should be attributed as well.

If the method of introduction is specifically claimed, the corresponding class in [C21C 7/00](#) should be attributed

C21C 1/04

Removing impurities other than carbon, phosphorus or sulfur

References

Informative references

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

Removing impurities of ferrous alloys	C21C 7/04
General processes of refining metals	C22B 9/00 - C22B 9/22

Special rules of classification

In case the treatments to remove other impurities are more generally claimed and could also apply to ferrous alloys (incl. steel), [C21C 7/04](#) or any appropriate class below should be attributed as well.

If the method of introduction is specifically claimed, the corresponding class in [C21C 7/00](#) should be attributed

C21C 1/06

Constructional features of mixers for pig-iron

References

Informative references

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

Stirring devices for molten metal	F27D 27/00 , F27D 27/00
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C21C 1/08

Manufacture of cast-iron

Definition statement

This place covers:

Treatment of pig iron to obtain non-spheroidal cast-iron.

References

Limiting references

This place does not cover:

Cast-iron alloys (composition)	C22C 37/00 - C22C 37/10
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Informative references

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

Making of cast-iron alloys	C22C 33/08 , C22C 33/10
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C21C 1/10

Making spheroidal graphite cast-iron

Definition statement

This place covers:

Also the nodularising agents

References

Informative references

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

Making of cast-iron alloys	C22C 33/08 , C22C 33/10
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Cast-iron alloys	C22C 37/00 - C22C 37/10
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C21C 5/00

Manufacture of carbon-steel, e.g. plain mild steel, medium carbon steel or cast steel {or stainless steel}

Definition statement

This place covers:

Also the manufacturing of stainless steels and ferro-alloys; apparatuses, in particular converters, which are specifically dedicated to the steel processing are classified within this group as well

References

Limiting references

This place does not cover:

Ferrous alloy compositions	C22C 38/00 - C22C 38/60
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Special rules of classification

Indexing Codes [C21C 5/00](#) - [C21C 5/56](#) apply for additional information or in case no corresponding EC-subgroup exists.

C21C 5/28

Manufacture of steel in the converter {([C21C 5/005](#) takes precedence)}

Definition statement

This place covers:

Also the full plant lay-out.

C21C 5/30

Regulating or controlling the blowing

Definition statement

This place covers:

Converter processes in which the regulation or control of the blowing is claimed, be it from above, through the bath or a combination thereof, i.e. not specific to one of the methods ; the regulation or control can relate to the amount, the sequence, the composition etc of the gases.

Also post-combustion is considered as a means to control the blowing

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

Post-combustion	after burning
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C21C 5/32

Blowing from above ([C21C 5/35](#) takes precedence)

Definition statement

This place covers:

Regulation or control of blowing ONLY from above, i.e. through a lance

References

Limiting references

This place does not cover:

Lance details	C21C 5/46 , F27D 3/16 , F27D 3/18
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C21C 5/34

Blowing through the bath ([C21C 5/35](#) takes precedence)

Definition statement

This place covers:

Regulation or control of blowing only through the melt, i.e. through a tuyere or bottom

References

Limiting references

This place does not cover:

Tuyere details	C21C 5/48 , B22D 1/005
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C21C 5/38

Removal of waste gases or dust

Definition statement

This place covers:

The treatment of the off-gas

References

Informative references

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

Separation	B01D
In particular of solids from gases or vapours by gravity, inertia or centrifugal forces	B01D 45/00 - B01D 45/18
By filters	B01D 46/00 - B01D 46/54
By liquids	B01D 47/00 - B01D 47/18
By other means	B01D 49/00 - B01D 49/02

Purifying or modifying the chemical composition of combustible gases containing CO	C10K 1/00 - C10K 1/34 , C10K 3/00 - C10K 1/06
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C21C 5/40

Offtakes or separating apparatus for converter waste gases or dust

Definition statement

This place covers:

The installation required for capturing and treating of the off-gas.

References

Informative references

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

Preventing escape from fumes from the area where they are produced, collecting or removing fumes therefrom	B08B 15/00 - B08B 15/04
Devices for conducting smoke or fumes for factories or large buildings	F23J 11/12
Arrangements for using waste heat, using or disposing of waste gas	F27D 17/00 , F27D 17/00

C21C 5/44

Refractory linings

Definition statement

This place covers:

Apart from the lining itself, the equipment to make, apply or repair the lining, both of the vessel and of the taphole in particular.

References

Informative references

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

Linings for furnaces in general, incl. making and repairing	F27D 1/00 , F27D 1/16 , F27D 1/00 , F27D 1/16
Tapholes	F27D 3/15 , F27D 3/15

C21C 5/46

Details or accessories

Definition statement

This place covers:

Lances, means for their handling; supporting means for the converter; cooling arrangements; tapholes, their opening and sealing; charging devices; measuring and sampling devices; support and transport devices for the converter; cleaning and skull removal.

References

Informative references

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

Measuring the weight of the converter	C21C 5/46
Trunnions in general bearings and accessories in general	F16C 11/02 , F16C 17/00 - F16C 43/00
Charging of furnaces	F27D 3/00 - F27D 3/18 , F27D 3/00 - F27D 3/18
Travelling or movable supports for the charge	F27D 3/12 , F27D 3/12
Tapholes, opening and sealing	F27D 3/15 , F27D 3/15 ; C21B 7/12
Lances injecting a gas jet; injecting particulate material using a fluid jet	F27D 3/16 , F27D 3/16 ; F27D 3/18 , F27D 3/18
Devices or methods for removing incrustations	F27D 15/00 , F27D 15/00
Arrangements of controlling devices	F27D 19/00 , F27D 19/00
Arrangements of monitoring devices	F27D 21/00 - F27D 21/04 , F27D 21/00 - F27D 21/04
Measuring, testing in general of weight of vibrations or ultra-, infra- or sonic waves radiation pyrometry other temperature measurements	G01 , G01G , G01H , G01J 5/00 - G01J 5/62 , G01K
Specific techniques for measuring or analysing materials by determining their chemical or physical properties	G01N

C21C 5/48

Bottoms or tuyères of converters

Definition statement

This place covers:

Porous plugs and tuyeres

References

Informative references

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

Treatment of fused masses in a ladle, incl. with gases	B22D 1/00
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C21C 5/50

Tilting mechanisms for converters

References

Informative references

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

Pivotal connections in general ;	F16C 11/00 - F16C 11/12 ;
Bearings and accessories in general	F16C 17/00 - F16C 43/08

C21C 5/52

Manufacture of steel in electric furnaces ([C21C 5/005](#) takes precedence); electric heating per se [H05B](#))

Definition statement

This place covers:

Any type of electric heating : AC, DC, induction or plasma, incl. accessories as burners.

The manufacturing of alloyed steels, incl. ferro-alloys.

The charging of the electric furnace.

Multiple hearth furnaces.

The general lay-out of the melt shop.

References

Informative references

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

Methods or apparatus for combustion using fluent fuel	F23C
Burners	F23D
Electrically heated hearth furnaces hearth furnaces in general and their accessories	F27B 3/08 , F27B 3/08 , F27B 3/00 - F27B 3/26 , F27B 3/00 - F27B 3/26
Arrangements of elements for electric heating in or on furnaces	F27D 11/00 - F27D 11/12 , F27D 11/00 - F27D 11/12
Electric heating elements or system	F27D 99/00
Electric heating in general	H05B

Special rules of classification

specific Indexing Codes exist for the presence/absence of a foam or a molten heel in the electric furnace

C21C 5/56

Manufacture of steel by other methods (making liquid steel by direct processes [C21B 13/00](#) {; [C21C 5/005](#) takes precedence)}

Definition statement

This place covers:

Also methods starting from scrap (with/without preheating) not treated in electric (arc) furnaces

C21C 7/00

Treating molten ferrous alloys, e.g. steel, not covered by groups [C21C 1/00](#) - [C21C 5/00](#) (treating molten metals during moulding [B22D 1/00](#), [B22D 27/00](#); remelting ferrous metals [C22B](#))

Definition statement

This place covers:

Treatments of refining or alloying by means of the treatment agents, the form thereof, purpose or the circumstances.

Metallic, carbonaceous or exothermic treatment agents.

Loose or compacted agents or cored wires.

Treatments in a ladle, under pressure or in a current of streaming metal;

special treatments of the slag.

References

Limiting references

This place does not cover:

Treating molten metals during moulding	B22D
Remelting of ferrous alloys	C22B

Informative references

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

Making tubes by bending sheet	B21D 5/00
Cored wires for welding, soldering	B23K

C21C 7/04

Removing impurities by adding a treating agent

References

Informative references

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

Removal of impurities from pig iron other than carbon, sulfur or phosphor	C21C 1/04
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C21C 7/064

Dephosphorising; Desulfurising

Definition statement

This place covers:

Including specifically disclosed agents for desulfurising and dephosphorising

References

Informative references

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

Removal of phosphor or sulfur from pig iron	C21C 1/02
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C21C 7/068

Decarburising

Definition statement

This place covers:

Including stainless steels

References

Informative references

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

Control and regulation of blowing in a converter	C21C 5/30 - C21C 5/35
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C21C 7/072

Treatment with gases ([C21C 7/06](#), [C21C 7/064](#), [C21C 7/068](#) take precedence)

References

Informative references

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

Refining metals by treating with gases	C22B 9/05
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C21C 7/076

Use of slags or fluxes as treating agents ([C21C 7/06](#), [C21C 7/064](#), [C21C 7/068](#) take precedence)

References

Informative references

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

Refining metals by treating with fluxes	C22B 9/10
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C21C 7/10

Handling in a vacuum

References

Informative references

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

Refining of metals by applying a vacuum	C22B 9/04
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