

F23R

GENERATING COMBUSTION PRODUCTS OF HIGH PRESSURE OR HIGH VELOCITY, e.g. GAS-TURBINE COMBUSTION CHAMBERS (fluidised bed combustion apparatus specially adapted for operation at superatmospheric pressures [F23C 10/16](#))

Definition statement

This place covers:

Combustion chambers that are specially adapted for generation of gaseous combustion products of high pressure or high velocity, and therefore suitable for use as a source of motive power rather than merely a source of heat. Examples of such special adaptations are:

- Specialised configuration in order to be incorporated in a power plant, for example as a combustion chamber between the compressor stage and the turbine stage of a gas turbine plant, or as an afterburner in a jet engine;
- Specialised construction for tolerating high temperatures, for example film cooling or diffusion cooling;
- Specialised arrangements for supplying combustion air, cooling air or dilution air;
- Specialised arrangements for fuel injection.

Methods of combustion in combustion chambers that are specially adapted for generation of combustion products of high pressure or high velocity.

Relationships with other classification places

This subclass is to be seen as an application place in relation to the function-oriented aspects covered by other subclasses of [F23](#). If a method or apparatus is of general interest for combustion it should be classified in other subclasses of [F23](#), for example subclasses [F23C](#), methods or apparatus for combustion using fluent fuel and [F23D](#), burners. If a detail is of general interest for combustion apparatus it should also be classified in other subclasses of [F23](#), for example subclasses [F23K](#), feeding fuel to combustion apparatus or [F23N](#), regulating or controlling combustion. It is sometimes difficult to decide whether an apparatus or a detail is specially adapted or not. In doubtful situations classification should therefore be made in both this subclass and other subclasses of [F23](#).

This subclass covers the configuration of single combustion chambers or flame tubes, or the mutual, e.g. annular arrangement of several combustion chambers or flame tubes. The incorporation or arrangement of combustion chambers within a power plant is classified in the place for the power plant as a whole, for example in subclasses [F02C](#), gas turbine plants or [F02K](#), jet propulsion plants.

When the control of the combustion is integrated in the control system of an entire power plant it is classified in the place for the control system as a whole, for example in groups [F02C 9/00](#) or [F02K 3/08](#).

References

Limiting references

This place does not cover:

Fluidised bed combustion chambers specially adapted for operation at super-atmospheric pressures	F23C 10/16
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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:

Combined gas turbine and steam turbine plants	F01K 23/00
Gas turbine plants	F02C , F02C 3/14 , F02C 5/02
Combustion-product positive-displacement engine plants	F02G
Jet-propulsion plants	F02K , F02K 3/10
Combustion chambers for rocket engine plants, i.e. plants carrying both fuel and oxidant therefor	F02K 9/00
Starting of engines by supplying pressure fluid generated directly by combustion	F02N 9/02

Informative references

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

Generation of pressure gas by chemical means	C06D 5/00
Gas turbines	F01D
Combustion chambers for internal combustion engines, combustion in internal combustion engines	F02B
Cooling of gas turbine plants	F02C 7/12
Mounting or supporting of gas turbine plants, accommodating heat expansion or creep in gas turbine plants	F02C 7/20
Arrangement of seals in gas turbine plants	F02C 7/28
Cylinders for combustion engines	F02F 1/00
Supplying combustion engines in general with combustible mixtures or constituents thereof	F02M
Steam generation using combustion under pressure substantially exceeding atmospheric pressure	F22B 1/22
Methods or apparatus for combustion using fluent fuel in general	F23C
Air supply to combustion chambers in general	F23C 7/00 , F23L
Burners in general	F23D
Feeding fuel to combustion apparatus in general	F23K
Details of combustion chambers in general	F23M
E.g. walls	F23M 5/00
Regulating or controlling combustion in general	F23N
Igniting	F23Q

Special rules of classification

In this subclass methods are classified in the groups that cover the apparatus used.

If the invention deals also with methods of controlling the combustion process, then classification in [F23N](#) and/or [F23N](#) shall be considered. In this case, use also code [F23N 2241/20](#).

When classifying in this subclass, add also codes [F23R 2900/00001](#)-[F23R 2900/03343](#).

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Air	a mixture of gases containing free oxygen and able to promote or support combustion
Primary air	air supplied to the burning fuel in order to liberate combustible gases
Secondary air	air supplied to the combustible gases liberated by the primary air in order to complete their combustion. The expression "secondary air" covers "tertiary air" etc.
Burner	a device by which fluid fuel or solid fuel suspended in air is passed to a combustion space where it burns to produce a self-supporting flame. A burner includes means for feeding air that are arranged in immediate connection with a fuel feeding conduit, for example concentric with it.
Combustion	the direct combination of oxygen gas, e.g. in air, and a burnable substance
Combustion chamber	a chamber in which fuel is burned to establish a self-supporting fire or flame and which surrounds that fire or flame
Combustion zone	the part of a combustion apparatus where the reaction takes place between air and fuel
Flame tube	The portion of a combustion chamber downstream of the zone where fuel and primary air are mixed.
Fuel	any combustible material that can be burned, regardless of whether the main purpose of burning it is for releasing energy therefrom or for disposing of it or rendering it less harmful
Pilot flame	a small flame that is lit or kept alight in order to provide ignition to a more powerful burner
Retention flame	a small flame that is kept alight in order to maintain the uninterrupted operation of a more powerful burner
Torch	a burner fired with fuel gas and oxygen and specially adapted to apply heat to a workpiece, for example for use in welding, cutting or brazing

F23R 3/00

Continuous combustion chambers using liquid or gaseous fuel

Definition statement

This place covers:

Continuous combustion chambers using liquid or gaseous fuel.

References

Informative references

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

Ignition in gas turbine plants	F02C 7/264
Burners	F23D

Cooling burner parts in liquid fuel burners	F23D 11/36
Cooling burner parts in gaseous fuel burners	F23D 14/78
Indexing Code for burner cooling in general	F23D 2214/00
Pilot flame igniters	F23Q 9/00

F23R 3/002

{Wall structures ([F23R 3/02](#) and [F23R 3/007](#) take precedence)}

References

Limiting references

This place does not cover:

Combustion chambers constructed mainly of ceramic components	F23R 3/007
Combustion chambers characterised by the air or gas flow configuration	F23R 3/02

F23R 3/02

characterised by the air-flow or gas-flow configuration (reverse- flow combustion chambers [F23R 3/54](#); cyclone or vortex type combustion chambers [F23R 3/58](#))

References

Limiting references

This place does not cover:

Reverse-flow combustion chambers	F23R 3/54
Cyclone or vortex type combustion chambers	F23R 3/58

F23R 3/10

for primary air ([F23R 3/06](#), [F23R 3/045](#) take precedence)

References

Limiting references

This place does not cover:

Air inlet arrangements using pipes	F23R 3/045
Arrangement of apertures along the flame tube	F23R 3/06

F23R 3/286

{having fuel-air premixing devices ([F23R 3/30](#) takes precedence)}

References**Limiting references**

This place does not cover:

Combustion chambers wherein the fuel supply means comprise fuel pre-vaporising devices	F23R 3/30
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F23R 3/44

Combustion chambers comprising a {single} tubular flame tube within a tubular casing (reverse-flow combustion chambers [F23R 3/54](#))

References**Limiting references**

This place does not cover:

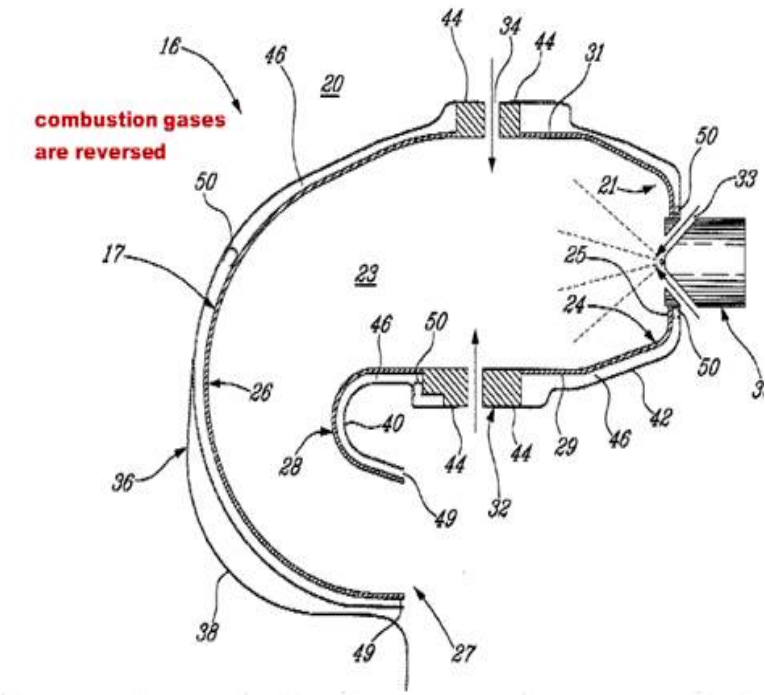
Multiple tubular flame tubes within a common casing	F23R 3/46
Annular combustion chambers	F23R 3/50
Reverse-flow combustion chambers	F23R 3/54

F23R 3/54

Reverse-flow combustion chambers

Definition statement

This place covers:
Combustion gases are reversed in the combustor.



References

Informative references

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

Combustion chambers comprising a single tubular flame tube within a tubular casing	F23R 3/44
Combustion chambers comprising an annular arrangement of several essentially tubular flame tubes within a common annular casing or within individual casings	F23R 3/46

F23R 5/00

Continuous combustion chambers using solid or pulverulent fuel

Definition statement

This place covers:
High pressure or high velocity combustion chambers using solid, e.g. lumps of wood, or pulverulent fuel . e.g. pulverized coal or biomass.

F23R 7/00**Intermittent or explosive combustion chambers****Definition statement**

This place covers:

High pressure or high velocity combustion chambers wherein the combustion is pulsating or resonating type, e.g. pulse detonation

F23R 2900/00008**Combustion techniques using plasma gas****References****Informative references**

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

Using plasma torches for igniting, stabilizing or improving the combustion process in continuous combustion chambers	F23R 2900/00009
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F23R 2900/00014**Reducing thermo-acoustic vibrations by passive means, e.g. by Helmholtz resonators****References****Informative references**

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

Helmholtz resonators	F01N 1/023
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F23R 2900/03043**Convection cooled combustion chamber walls with means for guiding the cooling air flow****References****Informative references**

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

Convection cooled combustion chamber walls provided with turbulators or means for creating turbulences to increase cooling	F23R 2900/03045
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