

# CPC COOPERATIVE PATENT CLASSIFICATION

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

### LIGHTING; HEATING

## F23 COMBUSTION APPARATUS; COMBUSTION PROCESSES (NOTE omitted)

## 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](#))

### WARNING

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.

<b>3/00</b>	<b>Continuous combustion chambers using liquid or gaseous fuel</b>	<b>3/343</b>	. . . {Pilot flames, i.e. fuel nozzles or injectors using only a very small proportion of the total fuel to insure continuous combustion (ignition in gas-turbine plants <a href="#">F02C 7/264</a> ; pilot flame igniters <a href="#">F23Q 9/00</a> )}
3/002	. {Wall structures ( <a href="#">F23R 3/02</a> and <a href="#">F23R 3/007</a> take precedence)}		
3/005	. {Combined with pressure or heat exchangers}		
3/007	. {constructed mainly of ceramic components}	<b>3/346</b>	. . . {for staged combustion}
3/02	. characterised by the air-flow or gas-flow configuration (reverse-flow combustion chambers <a href="#">F23R 3/54</a> ; cyclone or vortex type combustion chambers <a href="#">F23R 3/58</a> )	<b>3/36</b>	. . Supply of different fuels
		<b>3/38</b>	. . comprising rotary fuel injection means
3/04	. . Air inlet arrangements	<b>3/40</b>	. characterised by the use of catalytic means
3/045	. . . {using pipes}	<b>3/42</b>	. characterised by the arrangement or form of the flame tubes or combustion chambers
3/06	. . . Arrangement of apertures along the flame tube	<b>3/425</b>	. . {Combustion chambers comprising a tangential or helicoidal arrangement of the flame tubes}
3/08	. . . . between annular flame tube sections, e.g. flame tubes with telescopic sections	<b>3/44</b>	. . Combustion chambers comprising a {single} tubular flame tube within a tubular casing (reverse-flow combustion chambers <a href="#">F23R 3/54</a> )
3/10	. . . for primary air ( <a href="#">F23R 3/06</a> , <a href="#">F23R 3/045</a> take precedence)	<b>3/46</b>	. . Combustion chambers comprising an annular arrangement of {several essentially tubular} flame tubes within a common annular casing or within individual casings
3/12	. . . . inducing a vortex		
3/14	. . . . . by using swirl vanes	<b>3/48</b>	. . . Flame tube interconnectors, e.g. cross-over tubes
3/16	. . with devices inside the flame tube or the combustion chamber to influence the air or gas flow	<b>3/50</b>	. . Combustion chambers comprising an annular flame tube within an annular casing (toroidal combustion chambers <a href="#">F23R 3/52</a> )
3/18	. . . Flame stabilising means, e.g. flame holders for after-burners of jet-propulsion plants	<b>3/52</b>	. . Toroidal combustion chambers
3/20	. . . . incorporating fuel injection means	<b>3/54</b>	. . Reverse-flow combustion chambers
3/22	. . . . movable, e.g. to an inoperative position; adjustable, e.g. self-adjusting	<b>3/56</b>	. . Combustion chambers having rotary flame tubes
3/24	. . . . of the fluid-screen type	<b>3/58</b>	. . Cyclone or vortex type combustion chambers
3/26	. . Controlling the air flow	<b>3/60</b>	. . Support structures; Attaching or mounting means
3/28	. characterised by the fuel supply ( <a href="#">burners F23D</a> )		
3/283	. . {Attaching or cooling of fuel injecting means including supports for fuel injectors, stems, or lances}	<b>5/00</b>	<b>Continuous combustion chambers using solid or pulverulent fuel</b>
3/286	. . {having fuel-air premixing devices ( <a href="#">F23R 3/30</a> takes precedence)}	<b>7/00</b>	<b>Intermittent or explosive combustion chambers</b>
3/30	. . comprising fuel prevapourising devices	<b>2900/00</b>	<b>Special features of, or arrangements for continuous combustion chambers; Combustion processes therefor</b>
3/32	. . . being tubular	<b>2900/00001</b>	. Arrangements using bellows, e.g. to adjust volumes or reduce thermal stresses
3/34	. . Feeding into different combustion zones	<b>2900/00002</b>	. Gas turbine combustors adapted for fuels having low heating value [LHV]

## F23R

- 2900/00004 . Preventing formation of deposits on surfaces of gas turbine components, e.g. coke deposits
- 2900/00005 . Preventing fatigue failures or reducing mechanical stress in gas turbine components
- 2900/00006 . Using laser for starting or improving the combustion process
- 2900/00008 . Combustion techniques using plasma gas ([plasma torches F23R 2900/00009](#))
- 2900/00009 . Using plasma torches for igniting, stabilizing, or improving the combustion process
- 2900/00012 . Details of sealing devices
- 2900/00013 . Reducing thermo-acoustic vibrations by active means
- 2900/00014 . Reducing thermo-acoustic vibrations by passive means, e.g. by Helmholtz resonators ([silence apparatus using resonance F01N 1/023](#))
- 2900/00015 . Trapped vortex combustion chambers
- 2900/00016 . Retrofitting in general, e.g. to respect new regulations on pollution
- 2900/00017 . Assembling combustion chamber liners or subparts
- 2900/00018 . Manufacturing combustion chamber liners or subparts
- 2900/00019 . Repairing or maintaining combustion chamber liners or subparts
- 2900/03041 . Effusion cooled combustion chamber walls or domes
- 2900/03042 . Film cooled combustion chamber walls or domes
- 2900/03043 . Convection cooled combustion chamber walls with means for guiding the cooling air flow ([means for creating turbulence F23R 2900/03045](#))
- 2900/03044 . Impingement cooled combustion chamber walls or subassemblies
- 2900/03045 . Convection cooled combustion chamber walls provided with turbulators or means for creating turbulences to increase cooling
- 2900/03281 . Intermittent fuel injection or supply with plunger pump or other means therefor
- 2900/03282 . High speed injection of air and/or fuel inducing internal recirculation
- 2900/03341 . Sequential combustion chambers or burners
- 2900/03342 . Arrangement of silo-type combustion chambers
- 2900/03343 . Pilot burners operating in premixed mode