

SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

F23 COMBUSTION APPARATUS; COMBUSTION PROCESSES

F23D BURNERS

Subclass index

BURNERS FOR PULVERULENT FUEL.....	1/00
BURNERS FOR COMBUSTION OF A LIQUID	
Using capillary action.....	3/00
Using fuel evaporation; direct spraying action.....	5/00, 11/00
Using fuel impingement on a surface.....	7/00, 9/00
BURNERS FOR COMBUSTION OF A GAS.....	14/00
BURNERS FOR COMBUSTION OF GASEOUS OR LIQUID OR PULVERULENT FUEL.....	17/00
ASSEMBLIES OF TWO OR MORE BURNERS.....	23/00
OTHER BURNERS.....	99/00

1/00	Burners for combustion of pulverulent fuel [1, 2006.01]		
1/02	• Vortex burners, e.g. for cyclone-type combustion apparatus [1, 2006.01]	3/36	• • • Devices for trimming wicks [1, 2006.01]
1/04	• Burners producing cylindrical flames without centrifugal action [1, 2006.01]	3/38	• • • Devices for replacement of wicks [1, 2006.01]
1/06	• Burners producing sheet flames [1, 2006.01]	3/40	• the capillary action taking place in one or more rigid porous bodies [1, 2006.01]
Combustion of a liquid			
3/00	Burners using capillary action [1, 2006.01]	5/00	Burners in which liquid fuel evaporates in the combustion space, with or without chemical conversion of evaporated fuel [1, 2006.01]
3/02	• Wick burners [1, 2006.01]	5/02	• the liquid forming a pool, e.g. bowl-type evaporators, dish-type evaporators [1, 2006.01]
3/04	• • with flame spreaders (F23D 3/12 takes precedence) [1, 2006.01]	5/04	• • Pot-type evaporators, i.e. using a partially-enclosed combustion space [1, 2006.01]
3/06	• • Inverted wick burners, e.g. for illumination [1, 2006.01]	5/06	• the liquid forming a film on one or more plane or convex surfaces [1, 2006.01]
3/08	• • characterised by shape, construction, or material, of wick [1, 2006.01]	5/08	• • on cascaded surfaces [1, 2006.01]
3/10	• • Blue-flame burners [1, 2006.01]	5/10	• • on grids [1, 2006.01]
3/12	• • • with flame spreaders [1, 2006.01]	5/12	• Details [1, 2006.01]
3/14	• • • with mixing of air and fuel vapour in a chamber before the flame [1, 2006.01]	5/14	• • Maintaining predetermined amount of fuel in evaporator [1, 2006.01]
3/16	• • using candles [1, 2006.01]	5/16	• • Safety devices [1, 2006.01]
3/18	• • Details of wick burners [1, 2006.01]	5/18	• • Preheating devices [1, 2006.01]
3/20	• • • Flame spreaders [1, 2006.01]	7/00	Burners in which drops of liquid fuel impinge on a surface [1, 2006.01]
3/22	• • • Devices for mixing evaporated fuel with air [1, 2006.01]	9/00	Burners in which a stream of liquid fuel impinges intermittently on a hot surface [1, 2006.01]
3/24	• • • Carriers for wicks [1, 2006.01]	11/00	Burners using a direct spraying action of liquid droplets or vaporised liquid into the combustion space [1, 2006.01]
3/26	• • • • Safety devices thereon [1, 2006.01]	11/02	• the combustion space being a chamber substantially at atmospheric pressure [1, 2006.01]
3/28	• • • Wick-adjusting devices [1, 2006.01]	11/04	• the spraying action being obtained by centrifugal action [1, 2006.01]
3/30	• • • • directly engaging with the wick [1, 2006.01]	11/06	• • using a horizontal shaft [1, 2006.01]
3/32	• • • • engaging with a tube carrying the wick [1, 2006.01]	11/08	• • using a vertical shaft [1, 2006.01]
3/34	• • • • Wick stop devices; Wick-fixing devices [1, 2006.01]	11/10	• the spraying being induced by a gaseous medium, e.g. water vapour [1, 2006.01]

F23D

11/12	• • characterised by the shape or arrangement of the outlets from the nozzle [1, 2006.01]	14/30	• Inverted burners, e.g. for illumination [4, 2006.01]
11/14	• • • with a single outlet, e.g. slit [1, 2006.01]	14/32	• using a mixture of gaseous fuel and pure oxygen or oxygen-enriched air (F23D 14/38 takes precedence) [4, 2006.01]
11/16	• • in which an emulsion of water and fuel is sprayed [1, 2006.01]	14/34	• Burners specially adapted for use with means for pressurising the gaseous fuel or the combustion air [4, 2006.01]
11/18	• • the gaseous medium being water vapour generated at the nozzle [1, 2006.01]	14/36	• • in which the compressor and burner form a single unit [4, 2006.01]
11/20	• • • the water vapour being superheated [1, 2006.01]	14/38	• Torches, e.g. for brazing or heating (nozzles F23D 14/48) [4, 2006.01]
11/22	• • the gaseous medium being vaporised fuel, e.g. for a soldering lamp [1, 2006.01]	14/40	• • for welding (F23D 14/44 takes precedence) [4, 2006.01]
11/24	• by pressurisation of the fuel before a nozzle through which it is sprayed by a substantial pressure reduction into a space [1, 2006.01]	14/42	• • for cutting (F23D 14/44 takes precedence) [4, 2006.01]
11/26	• • with provision for varying the rate at which the fuel is sprayed [1, 2006.01]	14/44	• • for use under water [4, 2006.01]
11/28	• • • with flow-back of fuel at the burner, e.g. using by-pass [1, 2006.01]	14/46	• Details [4, 2006.01]
11/30	• • • with return feed of uncombusted sprayed fuel to reservoir [1, 2006.01]	14/48	• • Nozzles [4, 2006.01]
11/32	• by electrostatic means [1, 2006.01]	14/50	• • • Cleaning devices therefor [4, 2006.01]
11/34	• by ultrasonic means [1, 2006.01]	14/52	• • • for torches; for blow-pipes [4, 2006.01]
11/36	• Details [1, 2006.01]	14/54	• • • • for cutting or welding metal [4, 2006.01]
11/38	• • Nozzles; Cleaning devices therefor [1, 2006.01]	14/56	• • • for spreading the flame over an area, e.g. for desurfacing of solid material, for surface hardening or for heating workpieces [4, 2006.01]
11/40	• • Mixing tubes; Burner heads [1, 2006.01]	14/58	• • • characterised by the shape or arrangement of the outlet or outlets from the nozzle, e.g. of annular configuration [4, 2006.01]
11/42	• • Starting devices (igniting F23Q) [1, 2006.01]	14/60	• • Devices for simultaneous control of gas and combustion air [4, 2006.01]
11/44	• • Preheating devices; Vaporising devices [1, 2006.01]	14/62	• • Mixing devices; Mixing tubes [4, 2006.01]
11/46	• • Devices on the vaporiser for controlling the feeding of the fuel [1, 2006.01]	14/64	• • • with injectors [4, 2006.01]
<hr/>		14/66	• • Preheating the combustion air or gas [4, 2006.01]
14/00	Burners for combustion of a gas, e.g. of a gas stored under pressure as a liquid [4, 2006.01]	14/68	• • Treating the combustion air or gas, e.g. by filtering or moistening [4, 2006.01]
14/02	• Premix gas burners, i.e. in which gaseous fuel is mixed with combustion air upstream of the combustion zone [4, 2006.01]	14/70	• • Baffles or like flow-disturbing devices [4, 2006.01]
14/04	• • induction type, e.g. Bunsen burner [4, 2006.01]	14/72	• • Safety devices, e.g. operative in case of failure of gas supply [4, 2006.01]
14/06	• • • with radial outlets at the burner head [4, 2006.01]	14/74	• • • Preventing flame lift-off [4, 2006.01]
14/08	• • • with axial outlets at the burner head [4, 2006.01]	14/76	• • • Protecting flame and burner parts [4, 2006.01]
14/10	• • • with elongated tubular burner head [4, 2006.01]	14/78	• • • Cooling burner parts [4, 2006.01]
14/12	• Radiant burners [4, 2006.01]	14/80	• • • Selection of a non-toxic gas [4, 2006.01]
14/14	• • using screens or perforated plates [4, 2006.01]	14/82	• • • Preventing flashback or blowback [4, 2006.01]
14/16	• • using permeable blocks [4, 2006.01]	14/84	• • Flame spreading or otherwise shaping (F23D 14/70 takes precedence) [4, 2006.01]
14/18	• • using catalysis for flameless combustion [4, 2006.01]	<hr/>	
14/20	• Non-premix gas burners, i.e. in which gaseous fuel is mixed with combustion air on arrival at the combustion zone (F23D 14/38 takes precedence) [4, 2006.01]	Other burners	
14/22	• • with separate air and gas feed ducts, e.g. with ducts running parallel or crossing each other [4, 2006.01]	17/00	Burners for combustion simultaneously or alternately of gaseous or liquid or pulverulent fuel [1, 2006.01]
14/24	• • • at least one of the fluids being submitted to a swirling motion [4, 2006.01]	23/00	Assemblies of two or more burners (gas burners with provision for a retention flame F23D 14/26) [1, 2006.01]
14/26	• with provision for a retention flame (pilot flame igniters F23Q 9/00) [4, 2006.01]	<hr/>	
14/28	• in association with a gaseous fuel source, e.g. acetylene generator, or a container for liquefied gas [4, 2006.01]	99/00	Subject matter not provided for in other groups of this subclass [2010.01]