

CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

SEPARATING; MIXING

B04 CENTRIFUGAL APPARATUS OR MACHINES FOR CARRYING-OUT PHYSICAL OR CHEMICAL PROCESSES (using centrifugal force for the separation of particles from liquids or gases, in general [B01D](#), e.g. [B01D 21/26](#), [B01D 43/00](#), [B01D 45/12](#))

B04C APPARATUS USING FREE VORTEX FLOW, e.g. CYCLONES ({centrifugal separation of water from steam [B01D 45/12](#); } jet mills [B02C 19/06](#); { wind sifters [B07B 7/00](#); } cyclonic type combustion apparatus [F23](#); { vortex burners for cyclone-type combustion apparatus [F23D 1/02](#); cyclonic type combustion apparatus for gas turbines [F23R 3/00](#)})

NOTE

This subclass covers apparatus for separating, mixing or like treating in which centrifugal effects are generated by free vortex flow, otherwise than by rotary bowls, rotors or curved passages.

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.

1/00	Apparatus in which the main direction of flow follows a flat spiral {; so-called flat cyclones or vortex chambers}	5/103	. . Bodies or members, e.g. bulkheads, guides, in the vortex chamber (cores B04C 5/107)
3/00	Apparatus in which the axial direction of the vortex {(flow following a screw-thread type line)} remains unchanged {Also devices in which one of the two discharge ducts returns centrally through the vortex chamber, a reverse-flow vortex being prevented by bulkheads in the central discharge duct (combined with other devices B04C 9/00)}	5/107	. . Cores; Devices for inducing an air-core in hydrocyclones (forming part of the outlet pipe B04C 5/13)
2003/003	. {Shapes or dimensions of vortex chambers}	5/12	. Construction of the overflow ducting, e.g. diffusing or spiral exits
2003/006	. {Construction of elements by which the vortex flow is generated or degenerated}	5/13	. . formed as a vortex finder and extending into the vortex chamber {(exits with bulkheads preventing reverse flow vortex B04C 3/00)}; Discharge from vortex finder otherwise than at the top of the cyclone; Devices for controlling the overflow
3/02	. with heating or cooling, e.g. quenching, means	2005/133	. . . {Adjustable vortex finder}
3/04	. Multiple arrangement thereof {(combined with types according to other groups, B04C 7/00)}	2005/136	. . . {Baffles in the vortex finder}
3/06	. Construction of inlets or outlets to the vortex chamber	5/14	. Construction of the underflow ducting; Apex constructions; Discharge arrangements {; discharge through sidewall provided with a few slits or perforations (provided with a great number of slits or perforations B04C 5/10)}
5/00	Apparatus in which the axial direction of the vortex is reversed {(combined with other devices B04C 9/00)}	5/15	. . with swinging flaps or revolving sluices; Sluices; Check-valves
5/02	. Construction of inlets by which the vortex flow is generated {, e.g. tangential admission, the fluid flow being forced to follow a downward path by spirally wound bulkheads, or with slightly downwardly-directed tangential admission} (fluid dynamics in general F15D)	5/16	. . with variable-size outlets from the underflow ducting
5/04	. . Tangential inlets	5/18	. . with auxiliary fluid assisting discharge
5/06	. . Axial inlets	5/181	. . Bulkheads or central bodies in the discharge opening
5/08	. Vortex chamber constructions	5/185	. . Dust collectors
5/081	. . Shapes or dimensions	5/187	. . . forming an integral part of the vortex chamber
5/085	. . with wear-resisting arrangements	5/20	. with heating or cooling, e.g. quenching, means
5/087	. . with flexible gas-tight walls	5/22	. with cleaning means
5/10	. . with perforated walls	5/23	. . using liquids
		5/24	. Multiple arrangement thereof {(combination types according to other /00 groups, B04C 7/00)}
		5/26	. . for series flow
		5/28	. . for parallel flow

B04C

- 5/30
 - . . Recirculation constructions in or with cyclones which accomplish a partial recirculation of the medium, e.g. by means of conduits
- 7/00 **Apparatus not provided for in group [B04C 1/00](#), [B04C 3/00](#), or [B04C 5/00](#); Multiple arrangements not provided for in one of the groups [B04C 1/00](#), [B04C 3/00](#), or [B04C 5/00](#); Combinations of apparatus covered by two or more of the groups [B04C 1/00](#), [B04C 3/00](#), or [B04C 5/00](#)**
- 9/00 **Combinations with other devices, e.g. fans, {expansion chambers, diffusors, water locks} (with filters [B01D 50/00](#))**
- 2009/001
 - . {with means for electrostatic separation}
- 2009/002
 - . {with external filters}
- 2009/004
 - . {with internal filters, in the cyclone chamber or in the vortex finder}
- 2009/005
 - . {with external rotors, e.g. impeller, ventilator, fan, blower, pump}
- 2009/007
 - . {with internal rotors, e.g. impeller, ventilator, fan, blower, pump}
- 2009/008
 - . {with injection or suction of gas or liquid into the cyclone}
- 11/00 **Accessories, e.g. safety or control devices, not otherwise provided for {, e.g. regulators, valves in inlet or overflow ducting} (with electrostatic precipitating arrangements [B03C 3/14](#))**