

# CPC COOPERATIVE PATENT CLASSIFICATION

## B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

### SEPARATING; MIXING

## B04 CENTRIFUGAL APPARATUS OR MACHINES FOR CARRYING-OUT PHYSICAL OR CHEMICAL PROCESSES

### 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 ( <a href="#">cores B04C 5/107</a> )
3/00	Apparatus in which the axial direction of the vortex {flow following a screw-thread type line} remains unchanged {; 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 <a href="#">B04C 9/00</a> )}	5/107	. . Cores; Devices for inducing an air-core in hydrocyclones ( <a href="#">forming part of the outlet pipe B04C 5/13</a> )
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 {( <a href="#">exits with bulkheads preventing reverse flow vortex B04C 3/00</a> )}; 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, <a href="#">B04C 7/00</a> )}	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 <a href="#">B04C 5/10</a> )}
5/00	Apparatus in which the axial direction of the vortex is reversed {(combined with other devices <a href="#">B04C 9/00</a> )}	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 <a href="#">F15D</a> )	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, <a href="#">B04C 7/00</a> )}
		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](#))**