

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.

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|----------|---|----------|---|
| 1/00 | Apparatus in which the main direction of flow follows a flat spiral {; so-called flat cyclones or vortex chambers} | 5/107 | . . Cores; Devices for inducing an air-core in hydrocyclones (forming part of the outlet pipe B04C 5/13) |
| 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)} | 5/12 | . Construction of the overflow ducting, e.g. diffusing or spiral exits |
| 2003/003 | . {Shapes or dimensions of vortex chambers} | 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 |
| 2003/006 | . {Construction of elements by which the vortex flow is generated or degenerated} | 2005/133 | . . . {Adjustable vortex finder} |
| 3/02 | . with heating or cooling, e.g. quenching, means | 2005/136 | . . . {Baffles in the vortex finder} |
| 3/04 | . Multiple arrangement thereof {(combined with types according to other groups, B04C 7/00)} | 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)} |
| 3/06 | . Construction of inlets or outlets to the vortex chamber | 5/15 | . . with swinging flaps or revolving sluices; Sluices; Check-valves |
| 5/00 | Apparatus in which the axial direction of the vortex is reversed {(combined with other devices B04C 9/00)} | 5/16 | . . with variable-size outlets from the underflow ducting |
| 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) | 5/18 | . . with auxiliary fluid assisting discharge |
| 5/04 | . . Tangential inlets | 5/181 | . . Bulkheads or central bodies in the discharge opening |
| 5/06 | . . Axial inlets | 5/185 | . . Dust collectors |
| 5/08 | . Vortex chamber constructions | 5/187 | . . . forming an integral part of the vortex chamber |
| 5/081 | . . Shapes or dimensions | 5/20 | . with heating or cooling, e.g. quenching, means |
| 5/085 | . . with wear-resisting arrangements | 5/22 | . with cleaning means |
| 5/087 | . . with flexible gas-tight walls | 5/23 | . . using liquids |
| 5/10 | . . with perforated walls | 5/24 | . Multiple arrangement thereof {(combination types according to other /00 groups, B04C 7/00)} |
| 5/103 | . . Bodies or members, e.g. bulkheads, guides, in the vortex chamber (cores B04C 5/107) | 5/26 | . . for series flow |
| | | 5/28 | . . for parallel flow |
| | | 5/30 | . . Recirculation constructions in or with cyclones which accomplish a partial recirculation of the medium, e.g. by means of conduits |

B04C

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](#))