

CPC**COOPERATIVE PATENT CLASSIFICATION****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.

B04C 1/00

Apparatus in which the main direction of flow follows a flat spiral; {so-called flat cyclones or vortex chambers}

B04C 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](#))}

[B04C 2003/003](#)

. {Shapes or dimensions of vortex chambers}

[B04C 2003/006](#)

. {Construction of elements by which the vortex flow is generated or degenerated}

[B04C 3/02](#)

. with heating or cooling, e.g. quenching, means

[B04C 3/04](#)

. Multiple arrangement thereof {(combined with types according to other groups, [B04C 7/00](#))}

[B04C 3/06](#)

. Construction of inlets or outlets to the vortex chamber

B04C 5/00

Apparatus in which the axial direction of the vortex is reversed {(combined with other devices [B04C 9/00](#))}

[B04C 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](#))

[B04C 5/04](#)

.. Tangential inlets

[B04C 5/06](#)

.. Axial inlets

[B04C 5/08](#)

. Vortex chamber constructions

[B04C 5/081](#)

.. Shapes or dimensions

[B04C 5/085](#)

.. with wear-resisting arrangements

[B04C 5/087](#)

.. with flexible gas-tight walls

[B04C 5/10](#)

.. with perforated walls

[B04C 5/103](#)

.. Bodies or members, e.g. bulkheads, guides, in the vortex chamber (cores [B04C 5/107](#))

[B04C 5/107](#)

.. Cores; Devices for inducing an air-core in hydrocyclones (forming part of the outlet pipe [B04C 5/13](#))

B04C 5/12	. Construction of the overflow ducting, e.g. diffusing or spiral exits
B04C 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
B04C 2005/133	. . . {Adjustable vortex finder}
B04C 2005/136	. . . {Baffles in the vortex finder}
B04C 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)}
B04C 5/15	. . with swinging flaps or revolving sluices; Sluices; Check-valves
B04C 5/16	. . with variable-size outlets from the underflow ducting
B04C 5/18	. . with auxiliary fluid assisting discharge
B04C 5/181	. . Bulkheads or central bodies in the discharge opening
B04C 5/185	. . Dust collectors
B04C 5/187	. . . forming an integral part of the vortex chamber
B04C 5/20	. with heating or cooling, e.g. quenching, means
B04C 5/22	. with cleaning means
B04C 5/23	. . using liquids
B04C 5/24	. Multiple arrangement thereof {(combination types according to other /00 groups, B04C 7/00)}
B04C 5/26	. . for series flow
B04C 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
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
B04C 9/00	Combinations with other devices, e.g. fans, {expansion chambers, diffusors, water locks} (with filters B01D 50/00)
B04C 2009/001	. {with means for electrostatic separation}
B04C 2009/002	. {with external filters}
B04C 2009/004	. {with internal filters, in the cyclone chamber or in the vortex finder}
B04C 2009/005	. {with external rotors, e.g. impeller, ventilator, fan, blower, pump}
B04C 2009/007	. {with internal rotors, e.g. impeller, ventilator, fan, blower, pump}
B04C 2009/008	. {with injection or suction of gas or liquid into the cyclone}
B04C 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)