

# 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](#))

**B04B CENTRIFUGES** (high-speed drum mills [B02C 19/11](#); domestic spin driers [D06F](#); analysing, measuring or monitoring physical or chemical properties of samples during centrifuging, [see the relevant subclasses for these procedures](#), e.g. [G01N](#))

#### NOTE

This subclass [covers](#) machines or apparatus for separating, mixing, drying, extracting, purifying, or like treating in which centrifugal effects are generated by rotary bowls or other rotors. Where such machines or apparatus involve pumping effects, such effects must be incidental or subsidiary to the treating.

#### Types of centrifuges; Centrifuges characterised by discharging means

<b>1/00</b>	<b>Centrifuges with rotary bowls provided with solid jackets for separating predominantly liquid mixtures with or without solid particles</b>
1/02	. without inserted separating walls
1/04	. with inserted separating walls
1/06	. . of cylindrical shape
1/08	. . of conical shape
1/10	. with discharging outlets in the plane of the maximum diameter of the bowl {(cleaning <a href="#">B04B 15/06</a> )}
1/12	. . with continuous discharge
1/14	. . with periodical discharge
1/16	. . . with discharging outlets controlled by the rotational speed of the bowl
1/18	. . . controlled by the centrifugal force of an auxiliary liquid
1/20	. discharging solid particles from the bowl by a conveying screw coaxial with the bowl axis and rotating relatively to the bowl
1/2008	. . {with an abrasion-resistant conveyor or drum}
1/2016	. . {Driving control or mechanisms; Arrangement of transmission gearing}
2001/2025	. . . {with drive comprising a planetary gear}
2001/2033	. . {with feed accelerator inside the conveying screw}
2001/2041	. . {with baffles, plates, vanes or discs attached to the conveying screw}
2001/205	. . {with special construction of screw thread, e.g. segments, height}
2001/2058	. . {with ribbon-type screw conveyor}
2001/2066	. . {with additional disc stacks}
2001/2075	. . {with means for recovering the energy of the outflowing liquid}
2001/2083	. . {Configuration of liquid outlets}
2001/2091	. . {Configuration of solids outlets}

<b>3/00</b>	<b>Centrifuges with rotary bowls in which solid particles or bodies become separated by centrifugal force and simultaneous sifting or filtering</b>
3/02	. discharging solid particles from the bowl by means coaxial with the bowl axis and moving to and fro, i.e. push-type centrifuges
3/025	. . {with a reversible filtering device}
3/04	. discharging solid particles from the bowl by a conveying screw coaxial with the bowl axis and rotating relatively to the bowl
3/06	. discharging solid particles by vibrating the bowl
3/08	. discharging solid particles by bowl walls in the form of endless bands
<b>5/00</b>	<b>Other centrifuges</b>
5/005	. {Centrifugal separators or filters for fluid circulation systems, e.g. for lubricant oil circulation systems}
5/02	. Centrifuges consisting of a plurality of separate bowls rotating round an axis situated between the bowls
5/04	. Radial chamber apparatus for separating predominantly liquid mixtures, e.g. butyrometers
5/0407	. . {for liquids contained in receptacles ( <a href="#">B04B 5/0442</a> takes precedence)}
5/0414	. . . {comprising test tubes}
5/0421	. . . . {pivotably mounted}
5/0428	. . . {with flexible receptacles}
2005/0435	. . . {with adapters for centrifuge tubes or bags}
5/0442	. . {with means for adding or withdrawing liquid substances during the centrifugation, e.g. continuous centrifugation}
2005/045	. . . {having annular separation channels}
2005/0457	. . . {having three-dimensional spirally wound separation channels}
2005/0464	. . . {with hollow or massive core in centrifuge bowl}
2005/0471	. . . {with additional elutriation separation of different particles}
2005/0478	. . . {with filters in the separation chamber}

- 2005/0485 . . . {with a displaceable piston in the centrifuge chamber}
- 2005/0492 . . . {with fluid conveying umbilicus between stationary and rotary centrifuge parts}
- 5/06 . Centrifugal counter-current apparatus
- 5/08 . Centrifuges for separating predominantly gaseous mixtures
- 5/10 . Centrifuges combined with other apparatus, e.g. electrostatic separators; Sets or systems of several centrifuges (B04B 5/12 takes precedence; magnetic or electrostatic separators B03C; {amassing particles by electric fields, e.g. by agglomeration B03C 3/0175})
- 2005/105 . . {being a grinding mill}
- 5/12 . Centrifuges in which rotors other than bowls generate centrifugal effects in stationary containers
- 2005/125 . . {the rotors comprising separating walls}

**Elements; Accessories**

- 7/00 **Elements of centrifuges (drives B04B 9/00; feeding, charging, or discharging appurtenances or devices B04B 11/00)**
- 2007/005 . {Retaining arms for gripping the stationary part of a centrifuge bowl or hold the bowl itself}
- 7/02 . Casings; Lids (shock absorbers, vibration dampers F16F)
- 2007/025 . . {Lids for laboratory centrifuge rotors}
- 7/04 . . Casings facilitating discharge
- 7/06 . . Safety devices {; Regulating}
- 2007/065 . . . {Devices and measures in the event of rotor fracturing, e.g. lines of weakness, stress regions}
- 7/08 . Rotary bowls (centrifugal casting machines B22D)
- 7/085 . . {fibre- or metal-reinforced}
- 7/10 . . Bowls for shaping solids
- 7/12 . . Inserts, e.g. armouring plates
- 7/14 . . . for separating walls of conical shape
- 7/16 . . . Sieves or filters (filters in general B01D; sieves in general B07B)
- 7/18 . . formed or coated with sieving or filtering elements (filters in general B01D; sieves in general B07B)
- 9/00 **Drives specially designed for centrifuges; Arrangement or disposition of transmission gearing; Suspending or balancing rotary bowls**
- 9/02 . Electric motor drives {(dynamo-electric machines associated with centrifuges H02K 7/16)}
- 9/04 . . Direct drive
- 9/06 . Fluid drive
- 9/08 . Arrangement or disposition of transmission gearing {(for solid bowl screw centrifuges B04B 1/2016); Couplings; Brakes}
- 2009/085 . . {Locking means between drive shaft and rotor}
- 9/10 . Control of the drive; Speed regulating {(for solid bowl screw centrifuges B04B 1/2016)}
- 9/12 . Suspending rotary bowls {; Bearings; Packings for bearings}
- 9/14 . Balancing rotary bowls (balancing per se G01M); {Schrappers}
- 2009/143 . . {by weight compensation with liquids}
- 9/146 . . {Unbalance detection devices}

- 11/00 **Feeding, charging, or discharging bowls (B04B 1/00, B04B 3/00, B04B 7/04 take precedence)**
- 11/02 . Continuous feeding or discharging; Control arrangements therefor
- 11/04 . Periodical feeding or discharging; Control arrangements therefor
- 11/043 . . {Load indication with or without control arrangements}
- 2011/046 . . {Loading, unloading, manipulating sample containers}
- 11/05 . . Base discharge
- 11/06 . Arrangement of distributors or collectors in centrifuges
- 11/08 . Skimmers or scrapers for discharging {; Regulating thereof}
- 11/082 . . {Skimmers for discharging liquid}
- 2011/084 . . {with cables for cake removal}
- 2011/086 . . {with a plurality of scraper blades}
- 2011/088 . . {with angularly and axially offset scrapers}
- 13/00 **Control arrangements specially designed for centrifuges; Programme control of centrifuges (control arrangements for feed, charge, or discharge B04B 11/00)**
- 13/003 . {Rotor identification systems}
- 2013/006 . {Interface detection or monitoring of separated components}
- 15/00 **Other accessories for centrifuges**
- 15/02 . for cooling, heating, or heat insulating
- 15/04 . for suppressing the formation of foam
- 15/06 . for cleaning bowls, filters, sieves, inserts, or the like
- 15/08 . for ventilating or producing a vacuum in the centrifuge
- 15/10 . for forming a filtering layer in the rotary bowl
- 15/12 . for drying or washing the separated solid particles