

**CPC****COOPERATIVE PATENT CLASSIFICATION****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.

**Guidance heading:** Types of centrifuges; Centrifuges characterised by discharging means

**B04B 1/00**

**Centrifuges with rotary bowls provided with solid jackets for separating predominantly liquid mixtures with or without solid particles**

- B04B 1/02 . without inserted separating walls
- B04B 1/04 . with inserted separating walls
- B04B 1/06 . . of cylindrical shape
- B04B 1/08 . . of conical shape
- B04B 1/10 . with discharging outlets in the plane of the maximum diameter of the bowl { ( [cleaning B04B 15/06](#) ) }
- B04B 1/12 . . with continuous discharge
- B04B 1/14 . . with periodical discharge
- B04B 1/16 . . . with discharging outlets controlled by the rotational speed of the bowl
- B04B 1/18 . . . . controlled by the centrifugal force of an auxiliary liquid
- B04B 1/20 . discharging solid particles from the bowl by a conveying screw coaxial with the bowl axis and rotating relatively to the bowl
- B04B 1/2008 . . { with an abrasion-resistant conveyer or drum }
- B04B 1/2016 . . { Driving control or mechanisms; Arrangement of transmission gearing }

**B04B 3/00**

**Centrifuges with rotary bowls in which solid particles or bodies become separated by centrifugal force and simultaneous sifting or filtering**

- B04B 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
- B04B 3/025 . . { with a reversible filtering device }
- B04B 3/04 . discharging solid particles from the bowl by a conveying screw coaxial with the bowl axis and rotating relatively to the bowl
- B04B 3/06 . discharging solid particles by vibrating the bowl

- B04B 3/08 . discharging solid particles by bowl walls in the form of endless bands
- B04B 5/00 Other centrifuges**
- B04B 5/005 . { Centrifugal separators or filters for fluid circulation systems, e.g. for lubricant oil circulation systems }
- B04B 5/02 . Centrifuges consisting of a plurality of separate bowls rotating round an axis situated between the bowls
- B04B 5/04 . Radial chamber apparatus for separating predominantly liquid mixtures, e.g. butyrometers
- B04B 5/0407 . . { for liquids contained in receptacles ( [B04B 5/0442](#) takes precedence ) }
- B04B 5/0414 . . . { comprising test tubes }
- B04B 5/0421 . . . . { pivotably mounted }
- B04B 5/0428 . . . { with flexible receptacles }
- B04B 5/0442 . . { with means for adding or withdrawing liquid substances during the centrifugation, e.g. continuous centrifugation }
- B04B 5/06 . Centrifugal counter-current apparatus
- B04B 5/08 . Centrifuges for separating predominantly gaseous mixtures
- B04B 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](#) } )
- B04B 5/12 . Centrifuges in which rotors other than bowls generate centrifugal effects in stationary containers

**Guidance heading: Elements; Accessories**

- B04B 7/00 Elements of centrifuges** ( drives [B04B 9/00](#); feeding, charging, or discharging appurtenances or devices [B04B 11/00](#) )
- B04B 7/02 . Casings; Lids ( [shock absorbers, vibration dampers F16F](#) )
- B04B 7/04 . . Casings facilitating discharge
- B04B 7/06 . . Safety devices; { [Regulating](#) }
- B04B 7/08 . Rotary bowls ( [centrifugal casting machines B22D](#) )
- B04B 7/085 . . { [fibre- or metal-reinforced](#) }
- B04B 7/10 . . Bowls for shaping solids
- B04B 7/12 . . Inserts, e.g. armouring plates
- B04B 7/14 . . . for separating walls of conical shape
- B04B 7/16 . . . Sieves or filters ( [filters in general B01D](#) ; [sieves in general B07B](#) )
- B04B 7/18 . . formed or coated with sieving or filtering elements ( [filters in general B01D](#) ; [sieves](#) )

in general [B07B](#) )

## **B04B 9/00**

**Drives specially designed for centrifuges; Arrangement or disposition of transmission gearing; Suspending or balancing rotary bowls**

- B04B 9/02 . Electric motor drives { ( [dynamo-electric machines associated with centrifuges H02K 7/16](#) ) }
- B04B 9/04 . . Direct drive
- B04B 9/06 . Fluid drive
- B04B 9/08 . Arrangement or disposition of transmission gearing { ( [for solid bowl screw centrifuges B04B 1/2016](#) ); [Couplings](#); [Brakes](#) }
- B04B 9/10 . Control of the drive; Speed regulating { ( [for solid bowl screw centrifuges B04B 1/2016](#) ) }
- B04B 9/12 . Suspending rotary bowls; { [Bearings](#); [Packings for bearings](#) }
- B04B 9/14 . Balancing rotary bowls ( [balancing per se G01M](#) ); { [Schrappers](#) }
- B04B 9/146 . . { [Unbalance detection devices](#) }

## **B04B 11/00**

**Feeding, charging, or discharging bowls ( [B04B 1/00](#), [B04B 3/00](#), [B04B 7/04](#) take precedence )**

- B04B 11/02 . Continuous feeding or discharging; Control arrangements therefor
- B04B 11/04 . Periodical feeding or discharging; Control arrangements therefor
- B04B 11/043 . . { [Load indication with or without control arrangements](#) }
- B04B 11/05 . . Base discharge
- B04B 11/06 . Arrangement of distributors or collectors in centrifuges
- B04B 11/08 . Skimmers or scrapers for discharging; { [Regulating thereof](#) }
- B04B 11/082 . . { [Skimmers for discharging liquid](#) }

## **B04B 13/00**

**Control arrangements specially designed for centrifuges; Programme control of centrifuges ( [control arrangements for feed, charge, or discharge B04B 11/00](#) )**

- B04B 13/003 . { [Rotor identification systems](#) }

## **B04B 15/00**

**Other accessories for centrifuges**

- B04B 15/02 . for cooling, heating, or heat insulating
- B04B 15/04 . for suppressing the formation of foam
- B04B 15/06 . for cleaning bowls, filters, sieves, inserts, or the like

B04B 15/08 . for ventilating or producing a vacuum in the centrifuge

B04B 15/10 . for forming a filtering layer in the rotary bowl

B04B 15/12 . for drying or washing the separated solid particles

# **B04B 2001/00 Centrifuges with rotary bowls provided with solid jackets for separating predominantly liquid mixtures with or without solid particles**

B04B 2001/20 . discharging solid particles from the bowl by a conveying screw coaxial with the bowl axis and rotating relatively to the bowl

B04B 2001/2016 .. { Driving control or mechanisms; Arrangement of transmission gearing }

B04B 2001/2025 ... with drive comprising a planetary gear

B04B 2001/2033 .. with feed accelerator inside the conveying screw

B04B 2001/2041 .. with baffles, plates, vanes or discs attached to the conveying screw

B04B 2001/205 .. with special construction of screw thread e.g. segments, height

B04B 2001/2058 .. with ribbon-type screw conveyor

B04B 2001/2066 .. with additional disc stacks

B04B 2001/2075 .. with means for recovering the energy of the outflowing liquid

B04B 2001/2083 .. Configuration of liquid outlets

B04B 2001/2091 .. Configuration of solids outlets

# **B04B 2005/00 Other centrifuges**

B04B 2005/04 . Radial chamber apparatus for separating predominantly liquid mixtures, e.g. butyrometers

B04B 2005/0407 .. { for liquids contained in receptacles ( B04B 5/0442 takes precedence ) }

B04B 2005/0435 ... with adapters for centrifuge tubes or bags

B04B 2005/0442 .. { with means for adding or withdrawing liquid substances during the centrifugation, e.g. continuous centrifugation }

B04B 2005/045 ... having annular separation channels

B04B 2005/0457 ... having three-dimensional spirally wound separation channels

B04B 2005/0464 ... with hollow or massive core in centrifuge bowl

B04B 2005/0471 ... with additional elutriation separation of different particles

B04B 2005/0478 ... with filters in the separation chamber

B04B 2005/0485 ... with a displaceable piston in the centrifuge chamber

B04B 2005/0492 ... with fluid conveying umbilicus between stationary and rotary centrifuge parts

B04B 2005/10 . 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 } )

B04B 2005/105 .. being a grinding mill

B04B 2005/12 . Centrifuges in which rotors other than bowls generate centrifugal effects in stationary containers

- [B04B 2005/125](#) . . the rotors comprising separating walls
- B04B 2007/00** **Elements of centrifuges** ( drives [B04B 9/00](#); feeding, charging, or discharging appurtenances or devices [B04B 11/00](#) )
- [B04B 2007/005](#) . Retaining arms for gripping the stationary part of a centrifuge bowl or hold the bowl itself
- [B04B 2007/02](#) . Casings; Lids ( [shock absorbers](#), [vibration dampers](#) [F16F](#) )
- [B04B 2007/025](#) . . Lids for laboratory centrifuge rotors
- [B04B 2007/06](#) . . Safety devices; { [Regulating](#) }
- [B04B 2007/065](#) . . . Devices and measures in the event of rotor fracturing e.g. lines of weakness, stress regions
- B04B 2009/00** **Drives specially designed for centrifuges; Arrangement or disposition of transmission gearing; Suspending or balancing rotary bowls**
- [B04B 2009/08](#) . Arrangement or disposition of transmission gearing { ( [for solid bowl screw centrifuges](#) [B04B 1/2016](#) ); [Couplings](#); [Brakes](#) }
- [B04B 2009/085](#) . . Locking means between drive shaft and rotor
- [B04B 2009/14](#) . Balancing rotary bowls ( [balancing per se](#) [G01M](#) ); { [Schrappers](#) }
- [B04B 2009/143](#) . . by weight compensation with liquids
- B04B 2011/00** **Feeding, charging, or discharging bowls** ( [B04B 1/00](#), [B04B 3/00](#), [B04B 7/04](#) take precedence )
- [B04B 2011/04](#) . Periodical feeding or discharging; Control arrangements therefor
- [B04B 2011/046](#) . . Loading, unloading, manipulating sample containers
- [B04B 2011/08](#) . Skimmers or scrapers for discharging; { [Regulating thereof](#) }
- [B04B 2011/084](#) . . with cables for cake removal
- [B04B 2011/086](#) . . with a plurality of scraper blades
- [B04B 2011/088](#) . . with angularly and axially offset scrapers
- B04B 2013/00** **Control arrangements specially designed for centrifuges; Programme control of centrifuges** ( [control arrangements for feed, charge, or discharge](#) [B04B 11/00](#) )
- [B04B 2013/006](#) . Interface detection or monitoring of separated components