

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](#))

Definition statement

This place covers:

Centrifuges that are intended for separating, drying, extracting, purifying or other ways of treating mixtures composed of matter in the following physical states:

- liquid/liquid, liquid/gas or gas/gas mixtures;
- solid/liquid or solid/gas mixtures.

Such centrifuges may comprise centrifuges with rotary bowls provided with solid jackets for separating predominantly liquid mixtures with or without solid particles; centrifuges with rotary bowls in which solid particles or bodies become separated by centrifugal force and simultaneously sifted or filtered; or other centrifuges including radial chamber apparatus such as butyrometers or counter-current apparatus.

Elements or accessories of centrifuges such as casings, lids, rotary bowls, drives, gearing, suspending or balancing of rotary bowls, feeding, charging or discharging of bowls, control arrangements, heating, cooling or suppressing the formation of foam.

Relationships with other classification places

Separation of isotopes of the same chemical element is covered by [B01D 59/00](#), whatever process or apparatus is employed. Processes for separation of different isotopes of the same chemical element by centrifuging are covered by [B01D 59/20](#).

Processes in general that use centrifugal force for separating, extracting or purifying components of mixtures are covered in subclasses [B01D](#) and [B07B](#), and not in subclass [B04B](#) with the apparatus for accomplishing these processes. Examples of such processes can be found in the "Informative References" section below.

References

Limiting references

This place does not cover:

High-speed drum mills	B02C 19/11
Cyclone separators	B04C
Centrifugal casting machines	B22D
Domestic spin driers	D06F

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Centrifuges for producing filtered coffee	A47J 31/22
Dental appliances for receiving spittle, characterised by provisions for processing the collected matter, e.g. for separating solids or air	A61C 17/065
Treatment of water, waste water or sewage by centrifugal separation	C02F 1/38

Exhaust or silencing apparatus for machines or engines having means for removing solid constituents of exhaust, using inertial or centrifugal separators	F01N 3/037
Drying solid material by using centrifuges	F26B 5/08

Informative references

Attention is drawn to the following places, which may be of interest for search:

Processes for separation of non-miscible liquids by centrifugal force	B01D 17/0217
Processes for degasification of liquids in rotating vessels, vessels containing movable parts or in which centrifugal movement is caused	B01D 19/0026 , B01D 19/0052
Processes for using centrifuges for separating sediment	B01D 21/26
Processes for separating dispersed particles from gases or vapours by centrifugal forces, the centrifugal forces generated by rotating vanes, discs, drums or brushes	B01D 45/12 , B01D 45/14
Processes for separation of gases or vapours or for recovering vapours of volatile solvents from gases by centrifugal force	B01D 53/24
Magnetic or electrostatic separators	B03C
Processes using centrifugal force for selective separation of solid materials carried by, or dispersed in, gas currents	B07B 7/08
Lubrication of machines or engines in general, details of lubricant purifying means	F01M 11/03
Shock absorbers, vibration dampers	F16F
Analysing materials by determining their physical or chemical properties e.g. during centrifuging	G01N

Special rules of classification

If a document concerns embodiments which are covered by several subgroups the specific technical information is classified at inventive level in all subgroups.

B04B 1/00

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

Definition statement

This place covers:

Centrifuges with rotary bowls with or without separating walls

B04B 1/04

with inserted separating walls

Definition statement

This place covers:

Documents with claims related to the separating walls and/or the construction of the discharging outlets of the lighter fluid(s)

References

Limiting references

This place does not cover:

Documents with claims related to the discharging outlets for the solids or solids/heavier fluid mixture and the mechanism	B04B 1/10 - B04B 1/18
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Centrifuges with rotating separating walls without a rotary bowl	B04B 5/12
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B04B 1/20

discharging solid particles from the bowl by a conveying screw coaxial with the bowl axis and rotating relatively to the bowl

Definition statement

This place covers:

Liquid and solids outlets for screw centrifuges

Documents with claims related to disc stacks in a screw centrifuge

Distributers for feeding the material into the bowl of a screw centrifuges

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "screw centrifuge" "decanter" or decanting centrifuge"

In patent documents, the word/expression in the first column is often used instead of the word/expression in the second column, which is used in the classification scheme of this place:

"scroll, worm, auger, helical, spiral"	"screw"
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In patent documents, the following words/expressions are often used with the meaning indicated:

"beach"	"dewatering portion", which is the area of the bowl where the solids settle before they are discharged.
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B04B 3/00

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

Definition statement

This place covers:

Any type of centrifuge having a screen, sieve or mesh associated with the bowl for the separation of solids from the liquid, having different types of mechanism for discharging the solid particles.

References

Limiting references

This place does not cover:

Drying solid material by using centrifuges	F26B 5/08
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Filters with rotary cylindrical filtering surfaces arranged for outward flow filtration	B01D 33/11
Separating crystals from mother liquor by centrifugal force	C13B 30/06

B04B 3/04

discharging solid particles from the bowl by a conveying screw coaxial with the bowl axis and rotating relatively to the bowl

References

Limiting references

This place does not cover:

Aspects relating to details not relating to	B04B 1/2008 , B04B 1/2016
The sifting or filtering part of the bowl	L04B1/20B - B04B 2001/2091

B04B 5/00

Other centrifuges

Definition statement

This place covers:

Centrifugal separators for fluid circulation systems. Planetary centrifuges. Centrifuges having radially arranged separation chambers with or without separate fluid receptacles, like centrifuges comprising test tubes, flexible receptacles, flat or spatial spiral chambers etc..

References

Limiting references

This place does not cover:

Centrifugal cuvette type rotors	G01N 21/07
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Suction or pumping devices for medical purposes, other treatment of blood in a by-pass of the natural circulatory system using separation based on different densities of components, e.g. centrifuging	A61M 1/3693
Combination of filters with centrifugal separation devices	B01D 36/045
Test tubes specially adapted for centrifugation purposes	B01L 3/5021
Crankcase ventilating or breathing having means for purifying air before leaving crankcase, e.g. removing oil	F01M 13/04
Arrangements for conditioning of lubricants in the lubricating system by filtration	F01N39/06
Investigating sedimentation of particle suspensions by centrifuging and investigating centrifugates	G01N 15/042
Centrifugal type cuvettes	G01N 21/07
Field flow fractionation	G01N 30/0005
Column chromatography using counter-current	G01N 30/42
Investigating or analysing blood by separating the blood components	G01N 33/491

B04B 5/0442

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

Definition statement

This place covers:

Centrifuges for blood separation and blood washing including the 2-omega type (see e.g. US4221322) and rotary sealing type (see e.g. WO8000227) centrifuges.

Aspects of elutriation, tubings, interface detection, rotary sealings in connection with these centrifuges.

B04B 5/08

Centrifuges for separating predominantly gaseous mixtures

Definition statement

This place covers:

Centrifuges for separating different gases from each other, as well as separating solid or liquid particles from gases are classified in this group, see also [B01D 45/12](#) and [B01D 45/14](#).

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Processes for separating dispersed particles from gases or vapours by centrifugal forces, the centrifugal forces generated by rotating vanes, discs, drums or brushes	B01D 45/12 , B01D 45/14
Separation of gases or vapours by centrifugal force	B01D 53/24

B04B 7/00

Elements of centrifuges (drives [B04B 9/00](#); feeding, charging, or discharging appurtenances or devices [B04B 11/00](#))

Definition statement

This place covers:

E.g. details relating to chucks (see e.g. US3785549), gripping arms (see e.g. US3837633), sealings.

References

Limiting references

This place does not cover:

Rotary seals enclosing an aperture in a bowl body through which a feeding/discharging member is inserted (see e.g. WO8000227) and rotating seals carried on the processing chamber between ports in the chamber and the non-rotating portions of the system (see e.g. US4636193)	B04B 5/0442
Seals in conjunction with bearings	B04B 9/12

B04B 7/06

Safety devices {; Regulating}

Definition statement

This place covers:

E.g. door and lid locking devices, breaking point arrangements, leak detection systems

Safety measures in case of rotor fracturing

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Domestic spin-dryers or similar; doors or covers; safety arrangements	D06F 49/003
Safety devices acting in conjunction with the control or operation of a machine; in connection with the locking of doors, covers, guards, or like members giving access to moving machine parts	F16P 3/08

B04B 9/00

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

Definition statement

This place covers:

All kind of centrifuge drives, transmission gearings, control of the drives and the suspension and balancing of the rotary bowls.

B04B 9/10

Control of the drive; Speed regulating {(for solid bowl screw centrifuges [B04B 1/2016](#))}

Definition statement

This place covers:

E.g. speed limiting arrangements

B04B 9/12

Suspending rotary bowls {; Bearings; Packings for bearings}

Definition statement

This place covers:

E.g. sealing, damping, lubricating, cooling of bearings

B04B 11/00

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

Definition statement

This place covers:

All aspects of feeding, distributing and discharging arrangements in centrifuge bowls.

B04B 11/04

Periodical feeding or discharging; Control arrangements therefor

Definition statement

This place covers:

The handling e.g. loading/unloading of sample carriers like tubes or tube racks in close relation with the centrifuge .

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Automatic analysis and the handling of sample containers and devices for transferring samples in general	G01N 35/00
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B04B 13/00

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

Definition statement

This place covers:

Control arrangements specially adapted for centrifuges.

References**Limiting references***This place does not cover:*

Control arrangements for safety devices like door and lid locking devices	B04B 7/06
Control arrangements for feed, charge or discharge	B04B 11/00

B04B 15/00**Other accessories for centrifuges****Definition statement***This place covers:*

Auxiliary equipment for centrifuges like cooling means, cleaning means, venting means and the like

B04B 15/02**for cooling, heating, or heat insulating****References****Limiting references***This place does not cover:*

Cooling of bearings:	B04B 9/12
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