

CPC COOPERATIVE PATENT CLASSIFICATION

F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING (NOTE omitted)

ENGINEERING IN GENERAL

F16 ENGINEERING ELEMENTS AND UNITS; GENERAL MEASURES FOR PRODUCING AND MAINTAINING EFFECTIVE FUNCTIONING OF MACHINES OR INSTALLATIONS; THERMAL INSULATION IN GENERAL

F16C SHAFTS; FLEXIBLE SHAFTS; ELEMENTS OR CRANKSHAFT MECHANISMS; ROTARY BODIES OTHER THAN GEARING ELEMENTS; BEARINGS

NOTES

- In this subclass the following expression is used with the meaning indicated:
 - "rotary bodies other than gearing elements" covers any element which rotates so far as its features are affected only by the fact that it rotates.
- Attention is drawn to the following places:

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| A01B 71/04 | Bearings for agricultural machines |
| B21B 31/07 | Adaptation of roll bearings for metal-rolling mills |
| B61C 17/10 | Connecting-rods, bearings for driving wheels of railway locomotives |
| B61F 15/00 | Axle-boxes for railway vehicles |
| B62K 21/06 | Bearings for steering heads |
| E06B 9/174 , E06B 9/50 | Bearings specially adapted for roller shutters or for roller blinds |
| E21B 10/22 | Bearings for drill bits |
| F01C 21/02 | Arrangement of bearings in rotary-piston machines or engines |
| F01D 25/16 | Arrangement of bearings in non-positive displacement machines or engines |
| F02C 7/06 | Arrangement of bearings in gas-turbine plants |
| G01C 19/16 | Bearings for gyroscopes |
| G01D 11/02 | Bearings or suspensions for moving parts of measuring instruments |
| G01G 21/02 | Arrangements of bearings in weighing apparatus |
| G01R 1/10 | Arrangements of bearings in instruments for measuring electric variables |
| G01R 11/12 | Arrangements of bearings for apparatus for measuring time integral of electric power or current |
| G02C 5/22 | Hinges for spectacles |
| G04B 31/00 | Bearings for clockwork |
| H02N 15/00 | Magnetic levitation devices. |

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

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| 1/00 | Flexible shafts (flexible shafts in dental machines for boring or cutting A61C 1/18); Mechanical means for transmitting movement in a flexible sheathing | 1/106 | . . {Plurality of transmitting means, e.g. two or more parallel "Bowden cables"} |
| 1/02 | . for conveying rotary movements | 1/107 | . . {Sealing details} |
| 1/04 | . . Articulated shafts | 1/108 | . . {Reducing or controlling of vibrations, e.g. by resilient damping of noise} |
| 1/06 | . . with guiding sheathing, tube or box (F16C 1/04 takes precedence; guiding sheathings F16C 1/26) | 1/12 | . . Arrangements for transmitting movement to or from the flexible member |
| 1/08 | . . End connections | 1/14 | . . . Construction of the end-piece of the flexible member; Attachment thereof to the flexible member |
| 1/10 | . Means for transmitting linear movement in a flexible sheathing, e.g. "Bowden-mechanisms" (guiding-sheathings F16C 1/26) | 1/145 | {Attachment of the end-piece to the flexible member} |
| 1/101 | . . {Intermediate connectors for joining portions of split flexible shafts and/or sheathings} | 1/16 | . . . in which the end-piece is guided rectilinearly |
| 1/102 | . . {Arrangements to mount end fittings of the sheathings to support walls or brackets} | 1/18 | . . . in which the end portion of the flexible member is laid along a curved surface of a pivoted member |
| 1/103 | . . . {to a hole in the wall or bracket} | | |
| 1/105 | . . . {to a slot in the bracket} | | |

- 1/20 . . Construction of flexible members moved to and fro in the sheathing
- 1/205 . . . {Details of the outer surface of the flexible member, e.g. coatings}
- 1/22 . . Adjusting; Compensating length
- 1/223 . . . {by adjusting the effective length of the flexible member}
- 1/226 . . . {by adjusting the effective length of the sheathing}
- 1/24 . Lubrication; Lubricating equipment
- 1/26 . Construction of guiding-sheathings or guiding-tubes
- 1/262 . . {End fittings; Attachment thereof to the sheathing or tube}
- 1/265 . . . {with a swivel tube connected to the end-fitting of a sheathing, e.g. with a spherical joint}
- 1/267 . . {Details of the inner surface of the sheathing or tube, e.g. coatings}
- 1/28 . . with built in bearings { , e.g. sheathing with rolling elements between the sheathing and the core element}

- 3/00 Shafts (flexible shafts [F16C 1/00](#); marine propeller shafts, paddle wheel shafts [B63H 23/34](#)); Axles; Cranks; Eccentrics**
- 3/02 . Shafts; Axles
- 3/023 . . {made of several parts, e.g. by welding}
- 3/026 . . {Shafts made of fibre reinforced resin}
- 3/03 . . telescopic (axially displaceable couplings [F16D 3/06](#))
- 3/035 . . . with built-in bearings
- 3/04 . Crankshafts, eccentric-shafts; Cranks, eccentrics
- 3/06 . . Crankshafts
- 3/08 . . . made in one piece (features relating to lubrication [F16C 3/14](#), to cooling [F16C 3/16](#))
- 3/10 . . . assembled of several parts, e.g. by welding {by crimping}
- 3/12 releasably connected
- 3/14 . . . Features relating to lubrication
- 3/16 . . . Features relating to cooling
- 3/18 . . Eccentric-shafts
- 3/20 . . Shape of crankshafts or eccentric-shafts having regard to balancing
- 3/22 . . Cranks; Eccentrics (constructional features of crank-pins [F16C 11/02](#))
- 3/24 . . . with return cranks, i.e. a second crank carried by the crank-pin
- 3/26 . . . Elastic crank-webs; Resiliently-mounted crank-pins
- 3/28 . . . Adjustable cranks or eccentrics
- 3/30 . . . with arrangements for overcoming dead-centres

- 5/00 Crossheads; Constructions of connecting-rod heads or piston-rod connections rigid with crossheads (piston-rods, i.e. rods rigidly connected to the piston, [F16J 7/00](#))**

- 7/00 Connecting-rods or like links pivoted at both ends (coupling-rods for locomotive driving-wheels [B61C 17/10](#)); Construction of connecting-rod heads (heads rigid with crossheads [F16C 5/00](#))**
- 7/02 . Constructions of connecting-rods with constant length
- 7/023 . . {for piston engines, pumps or the like}
- 7/026 . . {made of fibre reinforced resin}
- 7/04 . with elastic intermediate part of fluid cushion

- 7/06 . Adjustable connecting-rods
- 7/08 . made from sheet metal

- 9/00 Bearings for crankshafts or connecting-rods; Attachment of connecting-rods (lubrication of connecting-rods in connection with crankshafts [F16C 3/14](#); connections to crossheads [F16C 5/00](#); to pistons [F16J 1/14](#))**
- 9/02 . Crankshaft bearings
- 9/03 . . Arrangements for adjusting play
- 9/04 . Connecting-rod bearings; Attachments thereof
- 9/045 . . {the bearing cap of the connecting rod being split by fracturing}
- 9/06 . . Arrangements for adjusting play in bearings, operating either automatically or not

- 11/00 Pivots; Pivotal connections (arrangements of steering linkage connections [B62D 7/16](#))**
- 11/02 . Trunnions; Crank-pins (fastening crank-pins to webs, crank-pins integral with cranks [F16C 3/06](#), [F16C 3/22](#))
- 11/04 . Pivotal connections (hinges for doors, windows or wings [E05D](#))
- 11/045 . . {with at least a pair of arms pivoting relatively to at least one other arm, all arms being mounted on one pin (crank-pins [F16C 11/02](#))}
- 11/06 . . Ball-joints; Other joints having more than one degree of angular freedom, i.e. universal joints (universal joints in which flexibility is produced by means of pivots or sliding or rolling connecting parts [F16D 3/16](#))
- 11/0604 . . . {Construction of the male part}
- 11/0609 {made from two or more parts}
- 11/0614 . . . {the female part of the joint being open on two sides}
- 11/0619 . . . {the female part comprising a blind socket receiving the male part}
- 11/0623 {Construction or details of the socket member}
- 11/0628 {with linings}
- 11/0633 {the linings being made of plastics}
- 11/0638 {characterised by geometrical details}
- 11/0642 {Special features of the plug or cover on the blind end of the socket}
- 11/0647 {Special features relating to adjustment for wear or play; Wear indicators}
- 11/0652 {combined with a damper other than elastic linings}
- 11/0657 {the socket member being mainly made of plastics}
- 11/0661 . . . {the two co-operative parts each having both convex and concave interfaces}
- 11/0666 . . . {Sealing means between the socket and the inner member shaft}
- 11/0671 {allowing operative relative movement of joint parts due to flexing of the sealing means}
- 11/0676 {allowing operational relative movement of joint parts due to sliding between parts of the sealing means}
- 11/068 . . . {Special features relating to lubrication}
- 11/0685 . . . {Manufacture of ball-joints and parts thereof, e.g. assembly of ball-joints}

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| 11/069 | {with at least one separate part to retain the ball member in the socket; Quick-release systems} | 17/03 | . . with tiltably-supported segments, e.g. Michell bearings { (hydrostatic bearings with tiltably supported bearing pads F16C 32/0666; made from a plurality of rods F16C 33/26; with flexible leaves F16C 17/024; hydrodynamic bearings with chambers F16C 33/1075) } |
| 11/0695 | . . . {Mounting of ball-joints, e.g. fixing them to a connecting rod} | 17/035 | . . . {the segments being integrally formed with, or rigidly fixed to, a support-element} |
| 11/08 | . . . with resilient bearings | 17/04 | . for axial load only |
| 11/083 | {by means of parts of rubber or like materials} | 17/042 | . . {with flexible leaves to create hydrodynamic wedge, e.g. axial foil bearings} |
| 11/086 | {with an elastomeric member in the blind end of a socket} | 17/045 | . . {with grooves in the bearing surface to generate hydrodynamic pressure, e.g. spiral groove thrust bearings} |
| 11/10 | . . Arrangements for locking | 17/047 | . . {with fixed wedges to generate hydrodynamic pressure} |
| 11/103 | . . . {frictionally clamped} | 17/06 | . . with tiltably-supported segments, e.g. Michell bearings { (with flexible leaves F16C 17/042; hydrostatic F16C 32/0666) } |
| 11/106 | {for ball joints} | 17/065 | . . . {the segments being integrally formed with, or rigidly fixed to, a support-element} |
| 11/12 | . . incorporating flexible connections, e.g. leaf springs | 17/08 | . . for supporting the end face of a shaft or other member, e.g. footstep bearings |
| 13/00 | Rolls, drums, discs, or the like (guide rollers in feeding webs B65H 27/00 ; calender rolls, bearings therefor D21G 1/02 ; rotary drums or rollers for heat-exchange or heat-transfer apparatus F28F 5/02 ; special adaptations, see the relevant classes); Bearings or mountings therefor | 17/10 | . for both radial and axial load |
| 13/003 | . {Bowed or curved rolls (rollers with a bowed axis as tentering devices for tensioning, smoothing or guiding webs B65H 23/0258)} | 17/102 | . . {with grooves in the bearing surface to generate hydrodynamic pressure} |
| 13/006 | . {Guiding rollers, wheels or the like, formed by or on the outer element of a single bearing or bearing unit, e.g. two adjacent bearings, whose ratio of length to diameter is generally less than one} | 17/105 | . . . {with at least one bearing surface providing angular contact, e.g. conical or spherical bearing surfaces} |
| 13/02 | . Bearings | 17/107 | . . . {with at least one surface for radial load and at least one surface for axial load} |
| 13/022 | . . {supporting a hollow roll mantle rotating with respect to a yoke or axle} | 17/12 | . characterised by features not related to the direction of the load |
| 13/024 | . . . {adjustable for positioning, e.g. radial movable bearings for controlling the deflection along the length of the roll mantle} | 17/14 | . . specially adapted for operating in water |
| 13/026 | {by fluid pressure} | 17/18 | . . with floating brasses or brushing, rotatable at a reduced speed { (F16C 17/03, F16C 17/06 take precedence) } |
| 13/028 | {with a plurality of supports along the length of the roll mantle, e.g. hydraulic jacks} | 17/20 | . . with emergency supports or bearings |
| 13/04 | . . Bearings with only partial enclosure of the member to be borne; Bearings with local support at two or more points | 17/22 | . . with arrangements compensating for thermal expansion |
| 13/06 | . . self-adjusting | 17/24 | . . with devices affected by abnormal or undesired positions, e.g. for preventing overheating, for safety |
| 15/00 | Construction of rotary bodies to resist centrifugal force (flywheels, correction weights F16F 15/30 , F16F 15/32) | 17/243 | . . . {related to temperature and heat, e.g. for preventing overheating} |
| <u>Bearings for rotary parts</u> | | 17/246 | . . . {related to wear, e.g. sensors for measuring wear} |
| 17/00 | Sliding-contact bearings for exclusively rotary movement (F16C 32/06 takes precedence ; adjustable bearings F16C 23/00 , F16C 25/00) | 17/26 | . Systems consisting of a plurality of sliding-contact bearings |
| 17/02 | . for radial load only | 19/00 | Bearings with rolling contact, for exclusively rotary movement (adjustable bearings F16C 23/00 , F16C 25/00 {; electrically insulating bearings H02K 5/173 }) |
| 17/022 | . . {with a pair of essentially semicircular bearing sleeves} | 19/02 | . with bearing balls essentially of the same size in one or more circular rows |
| 17/024 | . . {with flexible leaves to create hydrodynamic wedge, e.g. radial foil bearings} | 19/04 | . . for radial load mainly |
| 17/026 | . . {with helical grooves in the bearing surface to generate hydrodynamic pressure, e.g. herringbone grooves} | 19/06 | . . . with a single row or balls |
| 17/028 | . . {with fixed wedges to generate hydrodynamic pressure, e.g. multi-lobe bearings} | 19/08 | . . . with two or more rows of balls |
| | | 19/10 | . . for axial load mainly |
| | | 19/12 | . . . for supporting the end face of a shaft or other member, e.g. footstep bearings |
| | | 19/14 | . . for both radial and axial load |
| | | 19/16 | . . . with a single row of balls |

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| 19/163 | {with angular contact} | 19/502 | . . {with rolling elements in rows not forming a full circle} |
| 19/166 | {Four-point-contact ball bearings} | 19/505 | . . {with the diameter of the rolling elements of one row differing from the diameter of those of another row} |
| 19/18 | . . . with two or more rows of balls | 19/507 | . . {with rolling elements journaled in one of the moving parts, e.g. stationary rollers to support a rotating part} |
| 19/181 | {with angular contact} | 19/52 | . with devices affected by abnormal or undesired conditions |
| 19/182 | {in tandem arrangement} | 19/522 | . . {related to load on the bearing, e.g. bearings with load sensors or means to protect the bearing against overload} |
| 19/183 | {with two rows at opposite angles} | 19/525 | . . {related to temperature and heat, e.g. insulation} |
| 19/184 | {in O-arrangement} | 19/527 | . . {related to vibration and noise} |
| 19/185 | {with two raceways provided integrally on a part other than a race ring, e.g. a shaft or housing} | 19/54 | . Systems consisting of a plurality of bearings with rolling friction (spindle bearings F16C 35/08) |
| 19/186 | {with three raceways provided integrally on parts other than race rings, e.g. third generation hubs} | 19/541 | . . {Systems consisting of juxtaposed rolling bearings including at least one angular contact bearing} |
| 19/187 | {with all four raceways integrated on parts other than race rings, e.g. fourth generation hubs} | 19/542 | . . . {with two rolling bearings with angular contact} |
| 19/188 | {with at least one row for radial load in combination with at least one row for axial load} | 19/543 | {in O-arrangement} |
| 19/20 | . . with loose spacing bodies, e.g. balls, between the bearing balls | 19/545 | . . {Systems comprising at least one rolling bearing for radial load in combination with at least one rolling bearing for axial load} |
| 19/22 | . with bearing rollers essentially of the same size in one or more circular rows, e.g. needle bearings | 19/546 | . . {Systems with spaced apart rolling bearings including at least one angular contact bearing} |
| 19/225 | . . {Details of the ribs supporting the end of the rollers} | 19/547 | . . . {with two angular contact rolling bearings} |
| 19/24 | . . for radial load mainly | 19/548 | {in O-arrangement} |
| 19/26 | . . . with a single row of rollers | 19/55 | . . with intermediate floating {or independently-driven} rings rotating at reduced speed {or with other differential ball or roller bearings} |
| 19/28 | . . . with two or more rows of rollers | 19/56 | . . in which the rolling bodies of one bearing differ in diameter from those of another |
| 19/30 | . . for axial load mainly | | |
| 19/305 | . . . {consisting of rollers held in a cage} | 21/00 | Combinations of sliding-contact bearings with ball or roller bearings, for exclusively rotary movement (F16C 17/24, F16C 19/52 take precedence) |
| 19/32 | . . . for supporting the end face of a shaft or other member, e.g. footstep bearings | 21/005 | . {the external zone of a bearing with rolling members, e.g. needles, being cup-shaped, with or without a separate thrust-bearing disc or ring, e.g. for universal joints (seals F16C 33/72 , F16D 3/38)} |
| 19/34 | . . for both radial and axial load | | |
| 19/36 | . . . with a single row of rollers | 23/00 | Bearings for exclusively rotary movement adjustable for aligning or positioning (F16C 27/00 takes precedence ; hydrostatic bearings F16C 32/067) |
| 19/361 | {with cylindrical rollers} | 23/02 | . Sliding-contact bearings |
| 19/362 | {the rollers being crossed within the single row} | 23/04 | . . self-adjusting |
| 19/364 | {with tapered rollers, i.e. rollers having essentially the shape of a truncated cone} | 23/041 | . . . {with edge relief} |
| 19/38 | . . . with two or more rows of rollers | 23/043 | . . . {with spherical surfaces, e.g. spherical plain bearings} |
| 19/381 | {with at least one row for radial load in combination with at least one row for axial load} | 23/045 | {for radial load mainly, e.g. radial spherical plain bearings} |
| 19/383 | {with tapered rollers, i.e. rollers having essentially the shape of a truncated cone} | 23/046 | {with split outer rings} |
| 19/385 | {with two rows, i.e. double-row tapered roller bearings} | 23/048 | {for axial load mainly} |
| 19/386 | {in O-arrangement} | 23/06 | . Ball or roller bearings |
| 19/388 | {with four rows, i.e. four row tapered roller bearings} | 23/08 | . . self-adjusting |
| 19/40 | . . with loose spacing bodies between the rollers | 23/082 | . . . {by means of at least one substantially spherical surface} |
| 19/44 | . . Needle bearings | 23/084 | {sliding on a complementary spherical surface} |
| 19/46 | . . . with one row or needles | 23/086 | {forming a track for rolling elements} |
| 19/463 | {consisting of needle rollers held in a cage, i.e. subunit without race rings} | 23/088 | {by means of crowning} |
| 19/466 | {comprising needle rollers and an outer ring, i.e. subunit without inner ring} | | |
| 19/48 | . . . with two or more rows of needles | | |
| 19/49 | . Bearings with both balls and rollers | | |
| 19/492 | . . {with two or more rows with angular contact} | | |
| 19/495 | . . . {with two rows} | | |
| 19/497 | {in O-arrangement} | | |
| 19/50 | . Other types of ball or roller bearings | | |

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| 23/10 | • Bearings, parts of which are eccentrically adjustable with respect to each other | 29/0602 | • • • {Details of the bearing body or carriage or parts thereof, e.g. methods for manufacturing or assembly} |
| 25/00 | Bearings for exclusively rotary movement adjustable for wear or play (F16C 27/00 takes precedence) | 29/0604 | • • • • {of the load bearing section} |
| 25/02 | • Sliding-contact bearings | 29/0607 | • • • • • {of parts or members for retaining the rolling elements, i.e. members to prevent the rolling elements from falling out of the bearing body or carriage} |
| 25/04 | • • self-adjusting | 29/0609 | • • • • • {of the ends of the bearing body or carriage where the rolling elements change direction, e.g. end caps} |
| 25/045 | • • • {with magnetic means to preload the bearing} | 29/0611 | • • • • • {of the return passages, i.e. the passages where the rolling elements do not carry load} |
| 25/06 | • Ball or roller bearings | 29/0614 | • • • • {with a shoe type bearing body, e.g. a body facing one side of the guide rail or track only} |
| 25/08 | • • self-adjusting | 29/0616 | • • • • • {for supporting load essentially in a single direction} |
| 25/083 | • • • {with resilient means acting axially on a race ring to preload the bearing} | 29/0619 | • • • • • {with rollers or needles} |
| 25/086 | • • • {with magnetic means to preload the bearing} | 29/0621 | • • • • • {for supporting load in essentially two directions, e.g. by multiple points of contact or two rows of rolling elements} |
| 27/00 | Elastic or yielding bearings or bearing supports, for exclusively rotary movement (shock-damping bearings for watches or clocks G04B 31/02) | 29/0623 | • • • • • {with balls} |
| 27/02 | • Sliding-contact bearings | 29/0626 | • • • • • {with rollers} |
| 27/04 | • Ball or roller bearings, e.g. with resilient rolling bodies | 29/0628 | • • • • • {crossed within a row} |
| 27/045 | • • {with a fluid film, e.g. squeeze film damping} | 29/063 | • • • {with a bearing body, e.g. a carriage or part thereof, provided between the legs of a U-shaped guide rail or track} |
| 27/06 | • by means of parts of rubber or like materials (F16C 27/08 takes precedence; with sliding surfaces of rubber or synthetic rubber F16C 33/22) | 29/0633 | • • • {with a bearing body defining a U-shaped carriage, i.e. surrounding a guide rail or track on three sides} |
| 27/063 | • • {Sliding contact bearings} | 29/0635 | • • • • • {whereby the return paths are provided as bores in a main body of the U-shaped carriage, e.g. the main body of the U-shaped carriage is a single part with end caps provided at each end} |
| 27/066 | • • {Ball or roller bearings} | 29/0638 | • • • • • {with balls} |
| 27/08 | • primarily for axial load, e.g. for vertically-arranged shafts | 29/064 | • • • • • {with two rows of balls, one on each side of the rail} |
| {Other bearings} | | 29/0642 | • • • • • {with four rows of balls} |
| 29/00 | Bearings for parts moving only linearly (F16C 32/06 takes precedence; incorporated in flexible shafts F16C 1/28 {; parts of bearings in general and special methods for making bearings or parts thereof in general F16C 33/00}) | 29/0645 | • • • • • {with load directions in O-arrangement} |
| 29/001 | • {adjustable for alignment or positioning} | 29/0647 | • • • • • {with load directions in X-arrangement} |
| 29/002 | • {Elastic or yielding linear bearings or bearing supports} | 29/065 | • • • • • {with rollers} |
| 29/004 | • {Fixing of a carriage or rail, e.g. rigid mounting to a support structure or a movable part} | 29/0652 | • • • • • {whereby the return paths are at least partly defined by separate parts, e.g. covers attached to the legs of the main body of the U-shaped carriage} |
| 29/005 | • {Guide rails or tracks for a linear bearing, i.e. adapted for movement of a carriage or bearing body there along} | 29/0654 | • • • • • {with balls} |
| 29/007 | • {Hybrid linear bearings, i.e. including more than one bearing type, e.g. sliding contact bearings as well as rolling contact bearings} | 29/0657 | • • • • • {with two rows of balls, one on each side of the rail} |
| 29/008 | • {Systems with a plurality of bearings, e.g. four carriages supporting a slide on two parallel rails} | 29/0659 | • • • • • {with four rows of balls} |
| 29/02 | • Sliding-contact bearings | 29/0661 | • • • • • {with load directions in O-arrangement} |
| 29/025 | • • {Hydrostatic or aerostatic (this type of bearing for rotary parts F16C 32/06)} | 29/0664 | • • • • • {with load directions in X-arrangement} |
| 29/04 | • Ball or roller bearings | 29/0666 | • • • • • {with rollers} |
| 29/041 | • • {having rollers crossed within a row} | 29/0669 | • • • • • {whereby the main body of the U-shaped carriage is an assembly of at least three major parts, e.g. an assembly of a top plate with two separate legs attached thereto in the form of bearing shoes (bearing shoes per se F16C 29/0614)} |
| 29/043 | • • {with two massive rectangular rails having facing grooves} | 29/0671 | • • • • • {with balls} |
| 29/045 | • • {having rolling elements journaled in one of the moving parts} | | |
| 29/046 | • • • {with balls journaled in pockets} | | |
| 29/048 | • • {with thin walled races, e.g. tracks of sheet metal} | | |
| 29/06 | • • in which the rolling bodies circulate partly without carrying load | | |

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| 29/0673 | {with rollers} | 32/0408 | {Passive magnetic bearings} |
| 29/0676 | . . . {with a bearing body or carriage almost fully embracing the guide rail or track, e.g. a circular sleeve with a longitudinal slot for the support posts of the rail} | 32/041 | {with permanent magnets on one part attracting the other part} |
| 29/0678 | . . . {with a bearing body, i.e. the body carrying the circulating rolling elements, provided in the interior of a sleeve-like guide member defining the opposing raceways, e.g. in a telescopic shaft (telescopic shafts with built-in bearings F16C 3/035 ; yielding coupling allowing axial displacement by rolling elements F16D 3/065)} | 32/0412 | {for radial load mainly} |
| 29/068 | . . . {with the bearing body fully encircling the guide rail or track} | 32/0414 | {with facing axial projections} |
| 29/0683 | {the bearing body encircles a rail or rod of circular cross-section, i.e. the linear bearing is not suited to transmit torque} | 32/0417 | {for axial load mainly} |
| 29/0685 | {with balls} | 32/0419 | {with facing radial projections} |
| 29/0688 | {whereby a sleeve surrounds the circulating balls and thicker part of the sleeve form the load bearing tracks} | 32/0421 | {for both radial and axial load} |
| 29/069 | {whereby discrete load bearing elements, e.g. discrete load bearing plates or discrete rods, are provided in a retainer and form the load bearing tracks} | 32/0423 | {with permanent magnets on both parts repelling each other} |
| 29/0692 | {the bearing body encircles a guide rail or track of non-circular cross-section, e.g. with grooves or protrusions, i.e. the linear bearing is suited to transmit torque (telescopic shafts with built-in bearings F16C 3/035 ; yielding coupling allowing axial displacement by rolling elements F16D 3/065)} | 32/0425 | {for radial load mainly} |
| 29/0695 | {with balls} | 32/0427 | {for axial load mainly} |
| 29/0697 | {with polygonal guide rail or track} | 32/0429 | {for both radial and axial load, e.g. conical magnets} |
| 29/08 | . Arrangements for covering or protecting the ways {(protective coverings for parts of machine tools B23Q 11/08)} | 32/0431 | {with bearings for axial load combined with bearings for radial load} |
| 29/082 | . . {fixed to the way} | 32/0434 | {for parts moving linearly} |
| 29/084 | . . {fixed to the carriage or bearing body movable along the guide rail or track} | 32/0436 | {with a conductor on one part movable with respect to a magnetic field, e.g. a body of copper on one part and a permanent magnet on the other part} |
| 29/086 | . . . {Seals being essentially U-shaped, e.g. for a U-shaped carriage} | 32/0438 | {with a superconducting body, e.g. a body made of high temperature superconducting material such as YBaCuO} |
| 29/088 | . . . {Seals extending in the longitudinal direction of the carriage or bearing body} | 32/044 | . . . {Active magnetic bearings} |
| 29/10 | . Arrangements for locking the bearings | 32/0442 | {with devices affected by abnormal, undesired or non-standard conditions such as shock-load, power outage, start-up or touchdown} |
| 29/12 | . Arrangements for adjusting play | 32/0444 | {Details of devices to control the actuation of the electromagnets} |
| 29/123 | . . {using elastic means} | 32/0446 | {Determination of the actual position of the moving member, e.g. details of sensors} |
| 29/126 | . . {using tapered surfaces or wedges} | 32/0448 | {by using the electromagnet itself as sensor, e.g. sensorless magnetic bearings} |
| 31/00 | Bearings for parts which both rotate and move linearly | 32/0451 | {Details of controllers, i.e. the units determining the power to be supplied, e.g. comparing elements, feedback arrangements with P.I.D. control} |
| 31/02 | . Sliding-contact bearings | 32/0453 | {for controlling two axes, i.e. combined control of x-axis and y-axis} |
| 31/04 | . Ball or roller bearings | 32/0455 | {including digital signal processing [DSP] and analog/digital conversion [A/D, D/A]} |
| 31/06 | . . in which the rolling bodies circulate partly without carrying load | 32/0457 | {Details of the power supply to the electromagnets} |
| 32/00 | Bearings not otherwise provided for | 32/0459 | {Details of the magnetic circuit} |
| 32/02 | . Knife-edge bearings | 32/0461 | {of stationary parts of the magnetic circuit} |
| 32/04 | . using magnetic or electric supporting means | 32/0463 | {with electromagnetic bias, e.g. by extra bias windings} |
| 32/0402 | . . {combined with other supporting means, e.g. hybrid bearings with both magnetic and fluid supporting means} | 32/0465 | {with permanent magnets provided in the magnetic circuit of the electromagnets} |
| 32/0404 | . . {Electrostatic bearings} | 32/0468 | {of moving parts of the magnetic circuit, e.g. of the rotor} |
| 32/0406 | . . {Magnetic bearings} | 32/047 | {Details of housings; Mounting of active magnetic bearings} |
| | | 32/0472 | {for linear movement} |
| | | 32/0474 | {for rotary movement} |
| | | 32/0476 | {with active support of one degree of freedom, e.g. axial magnetic bearings} |

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| 32/0478 | {with permanent magnets to support radial load} |
| 32/048 | {with active support of two degrees of freedom, e.g. radial magnetic bearings} |
| 32/0482 | {with three electromagnets to control the two degrees of freedom} |
| 32/0485 | {with active support of three degrees of freedom} |
| 32/0487 | {with active support of four degrees of freedom} |
| 32/0489 | {with active support of five degrees of freedom, e.g. two radial magnetic bearings combined with an axial bearing} |
| 32/0491 | {with electromagnets acting in axial and radial direction, e.g. with conical magnets} |
| 32/0493 | {integrated in an electrodynamic machine, e.g. self-bearing motor} |
| 32/0495 | {generating torque and axial force} |
| 32/0497 | {generating torque and radial force} |
| 32/06 | . with moving member supported by a fluid cushion formed, at least to a large extent, otherwise than by movement of the shaft, e.g. hydrostatic air-cushion bearings |
| 32/0603 | . . {supported by a gas cushion, e.g. an air cushion} |
| 32/0607 | . . {the gas being retained in a gap, e.g. squeeze film bearings} |
| 32/0611 | {by means of vibrations} |
| 32/0614 | . . . {the gas being supplied under pressure, e.g. aerostatic bearings} |
| 32/0618 | {via porous material} |
| 32/0622 | {via nozzles, restrictors} |
| 32/0625 | {via supply slits} |
| 32/0629 | . . {supported by a liquid cushion, e.g. oil cushion} |
| 32/0633 | . . . {the liquid being retained in a gap} |
| 32/0637 | {by a magnetic field, e.g. ferrofluid bearings} |
| 32/064 | . . . {the liquid being supplied under pressure} |
| 32/0644 | {Details of devices to control the supply of liquids to the bearings} |
| 32/0648 | {by sensors or pressure-responsive control devices in or near the bearings} |
| 32/0651 | {Details of the bearing area <u>per se</u> } |
| 32/0655 | {of supply openings} |
| 32/0659 | {of pockets or grooves} |
| 32/0662 | . . {Details of hydrostatic bearings independent of fluid supply or direction of load} |
| 32/0666 | . . . {of bearing pads} |
| 32/067 | . . . {of bearings adjustable for aligning, positioning, wear or play} |
| 32/0674 | {by means of pre-load on the fluid bearings} |
| 32/0677 | . . . {of elastic or yielding bearings or bearing supports} |
| 32/0681 | . . {Construction or mounting aspects of hydrostatic bearings, for exclusively rotary movement, related to the direction of load} |
| 32/0685 | . . . {for radial load only} |
| 32/0688 | {with floating bearing elements} |
| 32/0692 | . . . {for axial load only} |
| 32/0696 | . . . {for both radial and axial load} |

Details or accessories of bearings

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| 33/00 | Parts of bearings; Special methods for making bearings or parts thereof (metal-working or like operations, see the relevant classes) |
| 33/02 | . Parts of sliding-contact bearings |
| 33/04 | . . Brasses; Bushes; Linings |
| 33/043 | . . . {Sliding surface consisting mainly of ceramics, cermets or hard carbon, e.g. diamond like carbon [DLC]} |
| 33/046 | . . . {divided or split, e.g. half-bearings or rolled sleeves} |
| 33/06 | . . . Sliding surface mainly made of metal (F16C 33/24 - F16C 33/28 take precedence; {casting metal bearing surfaces B22D 15/02, B22D 19/08}) |
| 33/08 | Attachment of brasses, bushes or linings to the bearing housing |
| 33/10 | Construction relative to lubrication (lubrication in general F16N) |
| 33/1005 | {with gas, e.g. air, as lubricant} |
| 33/101 | {Details of the bearing surface, e.g. means to generate pressure such as lobes or wedges} |
| 33/1015 | {Pressure generating grooves} |
| 33/102 | {with grease as lubricant} |
| 33/1025 | {with liquid, e.g. oil, as lubricant} |
| 33/103 | {retained in or near the bearing} |
| 33/1035 | {by a magnetic field acting on a magnetic liquid} |
| 33/104 | {in a porous body, e.g. oil impregnated sintered sleeve} |
| 33/1045 | {Details of supply of the liquid to the bearing} |
| 33/105 | {Conditioning, e.g. metering, cooling, filtering} |
| 33/1055 | {from radial inside, e.g. via a passage through the shaft and/or inner sleeve} |
| 33/106 | {Details of distribution or circulation inside the bearings, e.g. details of the bearing surfaces to affect flow or pressure of the liquid} |
| 33/1065 | {Grooves on a bearing surface for distributing or collecting the liquid} |
| 33/107 | {Grooves for generating pressure} |
| 33/1075 | {Wedges, e.g. ramps or lobes, for generating pressure} |
| 33/108 | {with a plurality of elements forming the bearing surfaces, e.g. bearing pads} |
| 33/1085 | {Channels or passages to recirculate the liquid in the bearing} |
| 33/109 | {Lubricant compositions or properties, e.g. viscosity} |
| 33/1095 | {with solids as lubricant, e.g. dry coatings, powder} |
| 33/12 | Structural composition; Use of special materials or surface treatments, e.g. for rust-proofing |
| 33/121 | {Use of special materials} |
| 33/122 | {Multilayer structures of sleeves, washers or liners} |
| 33/124 | {Details of overlays} |

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| 33/125 | {Details of bearing layers, i.e. the lining} | 33/3843 | {formed as one-piece cages, i.e. monoblock cages} |
| 33/127 | {Details of intermediate layers, e.g. nickel dams} | 33/385 | {made from metal, e.g. cast or machined window cages} |
| 33/128 | {Porous bearings, e.g. bushes of sintered alloy} | 33/3856 | {made from plastic, e.g. injection moulded window cages} |
| 33/14 | Special methods of manufacture; Running-in | 33/3862 | {comprising two annular parts joined together} |
| 33/145 | {of sintered porous bearings} | 33/3868 | {made from metal, e.g. two cast parts joined by rivets} |
| 33/16 | . . . Sliding surface consisting mainly of graphite | 33/3875 | {made from plastic, e.g. two injection moulded parts joined by a snap fit} |
| 33/18 | . . . Sliding surface consisting mainly of wood or fibrous material | 33/3881 | {with more than three parts, e.g. two end rings connected by individual stays} |
| 33/20 | . . . Sliding surface consisting mainly of plastics (F16C 33/22 - F16C 33/28 take precedence) | 33/3887 | . . . {Details of individual pockets, e.g. shape or ball retaining means} |
| 33/201 | {Composition of the plastic} | 33/3893 | . . . {with rolling elements with smaller diameter than the load carrying balls, e.g. cages with counter-rotating spacers} |
| 33/203 | {Multilayer structures, e.g. sleeves comprising a plastic lining} | 33/40 | . . . for multiple rows of balls |
| 33/205 | {with two layers} | 33/405 | {with two or more juxtaposed cages joined together or interacting with each other} |
| 33/206 | {with three layers} | 33/41 | . . . comb-shaped |
| 33/208 | {Methods of manufacture, e.g. shaping, applying coatings} | 33/412 | {Massive or moulded comb cages, e.g. snap ball cages} |
| 33/22 | . . . Sliding surface consisting mainly of rubber or synthetic rubber (F16C 33/24 - F16C 33/28 take precedence) | 33/414 | {formed as one-piece cages, i.e. monoblock comb cages} |
| 33/24 | . . . with different areas of the sliding surface consisting of different materials | 33/416 | {made from plastic, e.g. injection moulded comb cages} |
| 33/26 | . . . made from wire coils; made from a number of discs, rings, rods, or other members | 33/418 | {Details of individual pockets, e.g. shape or ball retaining means} |
| 33/28 | . . . with embedded reinforcements shaped as frames or meshed materials | 33/42 | . . . made from wire or sheet metal strips (F16C 33/40, F16C 33/41 take precedence) |
| 33/30 | . Parts of ball or roller bearings | 33/422 | {made from sheet metal} |
| 33/303 | . . {of hybrid bearings, e.g. rolling bearings with steel races and ceramic rolling elements} | 33/425 | {from a single part, e.g. ribbon cages with one corrugated annular part} |
| 33/306 | . . {Means to synchronise movements} | 33/427 | {from two parts, e.g. ribbon cages with two corrugated annular parts} |
| 33/32 | . . Balls | 33/44 | . . . Selection of substances (F16C 33/40, F16C 33/41 take precedence) |
| 33/34 | . . Rollers; Needles | 33/445 | {Coatings} |
| 33/36 | . . . with bearing-surfaces other than cylindrical, e.g. tapered; with grooves in the bearing surfaces | 33/46 | . . Cages for rollers or needles |
| 33/363 | {with grooves in the bearing-surfaces} | 33/4605 | . . . {Details of interaction of cage and race, e.g. retention or centring} |
| 33/366 | {Tapered rollers, i.e. rollers generally shaped as truncated cones} | 33/4611 | . . . {with hybrid structure, i.e. with parts made of distinct materials} |
| 33/37 | . . Loose spacing bodies | 33/4617 | . . . {Massive or moulded cages having cage pockets surrounding the rollers, e.g. machined window cages} |
| 33/3706 | . . . {with concave surfaces conforming to the shape of the rolling elements, e.g. the spacing bodies are in sliding contact with the rolling elements} | 33/4623 | {formed as one-piece cages, i.e. monoblock cages} |
| 33/3713 | . . . {with other rolling elements serving as spacing bodies, e.g. the spacing bodies are in rolling contact with the load carrying rolling elements} | 33/4629 | {made from metal, e.g. cast or machined window cages} |
| 33/372 | . . . rigid | 33/4635 | {made from plastic, e.g. injection moulded window cages} |
| 33/374 | . . . resilient | 33/4641 | {comprising two annular parts joined together} |
| 33/38 | . . Ball cages | 33/4647 | {made from metal, e.g. two cast parts joined by rivets} |
| 33/3806 | . . . {Details of interaction of cage and race, e.g. retention, centring} | 33/4652 | {made from plastic, e.g. two injection moulded parts joined by a snap fit} |
| 33/3812 | . . . {formed of interconnected segments, e.g. chains} | 33/4658 | {comprising three annular parts, i.e. three piece roller cages} |
| 33/3818 | . . . {formed of unconnected segments} | | |
| 33/3825 | . . . {formed as a flexible belt, e.g. spacers connected by a thin film} | | |
| 33/3831 | . . . {with hybrid structure, i.e. with parts made of distinct materials} | | |
| 33/3837 | . . . {Massive or moulded cages having cage pockets surrounding the balls, e.g. machined window cages} | | |

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| 33/4664 | {with more than three parts, e.g. two end rings connected by individual stays} | 33/565 | {Coatings} |
| 33/467 | . . . {Details of individual pockets, e.g. shape or roller retaining means} | 33/58 | . . Raceways; Race rings |
| 33/4676 | {of the stays separating adjacent cage pockets, e.g. guide means for the bearing-surface of the rollers} | 33/581 | . . . {integral with other parts, e.g. with housings or machine elements such as shafts or gear wheels} |
| 33/4682 | {of the end walls, e.g. interaction with the end faces of the rollers} | 33/583 | . . . {Details of specific parts of races} |
| 33/4688 | . . . {with rolling elements with smaller diameter than the load carrying rollers, e.g. cages with counter-rotating spacers} | 33/585 | {of raceways, e.g. ribs to guide the rollers} |
| 33/4694 | . . . {Single-split roller or needle cages} | 33/586 | {outside the space between the races, e.g. end faces or bore of inner ring} |
| 33/48 | . . . for multiple rows of rollers or needles | 33/588 | . . . {Races of sheet metal} |
| 33/485 | {with two or more juxtaposed cages joined together or interacting with each other} | 33/60 | . . . divided {or split, e.g. comprising two juxtaposed rings} |
| 33/49 | . . . comb-shaped | 33/605 | {with a separate retaining member, e.g. flange, shoulder, guide ring, secured to a race ring, adjacent to the race surface, so as to abut the end of the rolling elements, e.g. rollers, or the cage} |
| 33/491 | {applied as pairs for retaining both ends of the rollers or needles} | 33/61 | formed by wires |
| 33/492 | {joined by rods} | 33/62 | . . . Selection of substances |
| 33/494 | {Massive or moulded comb cages} | 33/64 | . . . Special methods of manufacture |
| 33/495 | {formed as one piece cages, i.e. monoblock comb cages} | 33/66 | . . Special parts or details in view of lubrication |
| 33/497 | {made from metal, e.g. cast or machined comb cages} | 33/6603 | . . . {with grease as lubricant} |
| 33/498 | {made from plastic, e.g. injection moulded comb cages} | 33/6607 | {Retaining the grease in or near the bearing} |
| 33/50 | . . . formed of interconnected members, e.g. chains | 33/6611 | {in a porous or resinous body, e.g. a cage impregnated with the grease} |
| 33/502 | {formed of arcuate segments retaining one or more rollers or needles} | 33/6614 | {in recesses or cavities provided in retainers, races or rolling elements} |
| 33/504 | {with two segments, e.g. two semicircular cage parts} | 33/6618 | {in a reservoir in the sealing means} |
| 33/506 | {formed as a flexible belt} | 33/6622 | {Details of supply and/or removal of the grease, e.g. purging grease} |
| 33/508 | {formed of links having an H-shape, i.e. links with a single stay placed between two rollers and with two end portions extending along the end faces of the two rollers} | 33/6625 | {Controlling or conditioning the grease supply} |
| 33/51 | . . . formed of unconnected members | 33/6629 | {Details of distribution or circulation inside the bearing, e.g. grooves on the cage or passages in the rolling elements} |
| 33/513 | {formed of arcuate segments for carrying one or more rollers} | 33/6633 | {Grease properties or compositions, e.g. rheological properties} |
| 33/516 | {with two segments, e.g. double-split cages with two semicircular parts} | 33/6637 | . . . {with liquid lubricant} |
| 33/52 | . . . with no part entering between, or touching, the bearing surfaces of the rollers (F16C 33/50 takes precedence) | 33/664 | {Retaining the liquid in or near the bearing} |
| 33/523 | {with pins extending into holes or bores on the axis of the rollers} | 33/6644 | {by a magnetic field acting on a magnetic liquid} |
| 33/526 | {extending through the rollers and joining two lateral cage parts} | 33/6648 | {in a porous or resinous body, e.g. a cage impregnated with the liquid} |
| 33/54 | . . . made from wire, strips, or sheet metal (F16C 33/48 , F16C 33/49 take precedence) | 33/6651 | {in recesses or cavities provided in retainers, races or rolling elements} |
| 33/541 | {Details of individual pockets, e.g. shape or roller retaining means} | 33/6655 | {in a reservoir in the sealing means} |
| 33/542 | {made from sheet metal} | 33/6659 | {Details of supply of the liquid to the bearing, e.g. passages or nozzles} |
| 33/543 | {from a single part} | 33/6662 | {the liquid being carried by air or other gases, e.g. mist lubrication} |
| 33/545 | {rolled from a band} | 33/6666 | {from an oil bath in the bearing housing, e.g. by an oil ring or centrifugal disc} |
| 33/546 | {with a M- or W-shaped cross section} | 33/667 | {related to conditioning, e.g. cooling, filtering} |
| 33/547 | {from two parts, e.g. two discs or rings joined together} | 33/6674 | {related to the amount supplied, e.g. gaps to restrict flow of the liquid} |
| 33/548 | {with more than three parts, e.g. two end rings connected by a plurality of stays or pins} | 33/6677 | {from radial inside, e.g. via a passage through the shaft and/or inner ring} |
| 33/56 | . . . Selection of substances (F16C 33/48 , F16C 33/49 take precedence) | 33/6681 | {Details of distribution or circulation inside the bearing, e.g. grooves on the cage or passages in the rolling elements} |
| | | 33/6685 | {Details of collecting or draining, e.g. returning the liquid to a sump} |

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| 33/6688 | {Lubricant compositions or properties, e.g. viscosity} | 33/7873 | {with a single sealing ring of generally L-shaped cross-section} |
| 33/6692 | {Liquids other than oil, e.g. water, refrigerants, liquid metal} | 33/7876 | {with sealing lips} |
| 33/6696 | . . . {with solids as lubricant, e.g. dry coatings, powder} | 33/7879 | {with a further sealing ring} |
| 33/72 | . Sealings | 33/7883 | {mounted to the inner race and of generally L-shape, the two sealing rings defining a sealing with box-shaped cross-section} |
| 33/723 | . . {Shaft end sealing means, e.g. cup-shaped caps or covers} | 33/7886 | {mounted outside the gap between the inner and outer races, e.g. sealing rings mounted to an end face or outer surface of a race} |
| 33/726 | . . {with means to vent the interior of the bearing} | 33/7889 | {mounted to an inner race and extending toward the outer race} |
| 33/74 | . . of sliding-contact bearings | 33/7893 | {mounted to a cage or integral therewith} |
| 33/741 | . . . {by means of a fluid} | 33/7896 | {with two or more discrete sealings arranged in series} |
| 33/743 | {retained in the sealing gap} | 33/80 | . . . Labyrinth sealings (F16C 33/761 takes precedence) |
| 33/745 | {by capillary action} | 33/805 | {in addition to other sealings, e.g. dirt guards to protect sealings with sealing lips} |
| 33/746 | {by a magnetic field} | 33/82 | . . . Arrangements for electrostatic or magnetic action against dust or other particles |
| 33/748 | {flowing to or from the sealing gap, e.g. vacuum seals with differential exhaust} | | |
| 33/76 | . . of ball or roller bearings | 35/00 | Rigid support of bearing units; Housings, e.g. caps, covers (F16C 23/00 takes precedence) |
| 33/761 | . . . {specifically for bearings with purely axial load} | 35/02 | . in the case of sliding-contact bearings |
| 33/762 | . . . {by means of a fluid} | 35/04 | . in the case of ball or roller bearings |
| 33/763 | {retained in the sealing gap} | 35/042 | . . {Housings for rolling element bearings for rotary movement} |
| 33/765 | {by a magnetic field} | 35/045 | . . . {with a radial flange to mount the housing} |
| 33/766 | {by pumping action} | 35/047 | . . . {with a base plate substantially parallel to the axis of rotation, e.g. horizontally mounted pillow blocks} |
| 33/767 | . . . {integral with the race} | 35/06 | . . Mounting {or dismounting} of ball or roller bearings; Fixing them onto shaft or in housing |
| 33/768 | . . . {between relatively stationary parts, i.e. static seals} | 35/061 | . . . {mounting a plurality of bearings side by side} |
| 33/78 | . . . with a diaphragm, disc, or ring, with or without resilient members (F16C 33/761 takes precedence) | 35/062 | . . . {Dismounting of ball or roller bearings} |
| 33/7803 | {suited for particular types of rolling bearings} | 35/063 | . . . Fixing them on the shaft (with interposition of an element F16C 35/07) |
| 33/7806 | {for spherical roller bearings} | 35/0635 | {the bore of the inner ring being of special non-cylindrical shape which co-operates with a complementary shape on the shaft, e.g. teeth, polygonal sections} |
| 33/7809 | {for needle roller bearings} | 35/067 | . . . Fixing them in a housing (with interposition of an element F16C 35/07) |
| 33/7813 | {for tapered roller bearings} | 35/07 | . . . Fixing them on the shaft or housing with interposition of an element |
| 33/7816 | {Details of the sealing or parts thereof, e.g. geometry, material} | 35/073 | between shaft and inner race ring |
| 33/782 | {of the sealing region} | 35/077 | between housing and outer race ring |
| 33/7823 | {of sealing lips} | 35/078 | . . . using pressure fluid as mounting aid |
| 33/7826 | {of the opposing surface cooperating with the seal, e.g. a shoulder surface of a bearing ring} | 35/08 | . for spindles |
| 33/783 | {of the mounting region} | 35/10 | . . with sliding-contact bearings |
| 33/7833 | {Special methods of manufacture} | 35/12 | . . with ball or roller bearings (adjustable bearings F16C 23/00 , F16C 25/00 ; elastic bearings F16C 27/00) |
| 33/7836 | {floating with respect to both races} | | |
| 33/784 | {mounted to a groove in the inner surface of the outer race and extending toward the inner race} | 37/00 | Cooling of bearings |
| 33/7843 | {with a single annular sealing disc} | 37/002 | . {of fluid bearings} |
| 33/7846 | {with a gap between the annular disc and the inner race} | 37/005 | . {of magnetic bearings} |
| 33/785 | {Bearing shields made of sheet metal} | 37/007 | . {of rolling bearings} |
| 33/7853 | {with one or more sealing lips to contact the inner race} | | |
| 33/7856 | {with a single sealing lip} | 39/00 | Relieving load on bearings |
| 33/7859 | {with a further sealing element} | 39/02 | . using mechanical means |
| 33/7863 | {mounted to the inner race, e.g. a flinger to use centrifugal effect} | 39/04 | . using hydraulic or pneumatic means |
| 33/7866 | {with sealing lips} | 39/06 | . using magnetic means |
| 33/7869 | {mounted with a cylindrical portion to the inner surface of the outer race and having a radial portion extending inward} | | |

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| 39/063 | . . {Permanent magnets} | 2202/70 | . Anti-bacterial, anti-microbial |
| 39/066 | . . . {with opposing permanent magnets repelling each other} | 2204/00 | Metallic materials; Alloys (alloys in general C22C; F16C 2206/00 takes precedence) |
| 41/00 | Other accessories, {e.g. devices integrated in the bearing not relating to the bearing function as such} | 2204/02 | . Noble metals |
| 41/001 | . {Integrated brakes or clutches for stopping or coupling the relatively movable parts} | 2204/04 | . . based on silver |
| 41/002 | . {Conductive elements, e.g. to prevent static electricity} | 2204/10 | . Alloys based on copper |
| 41/004 | . {Electro-dynamic machines, e.g. motors, generators, actuators} | 2204/12 | . . with tin as the next major constituent |
| 41/005 | . {Fluid passages not relating to lubrication or cooling} | 2204/14 | . . with zinc as the next major constituent |
| 41/007 | . {Encoders, e.g. parts with a plurality of alternating magnetic poles} | 2204/16 | . . with lead as the next major constituent |
| 41/008 | . {Identification means, e.g. markings, RFID-tags; Data transfer means} | 2204/18 | . . with bismuth as the next major constituent |
| 41/02 | . Arrangements for equalising the load on a plurality of bearings or their elements | 2204/20 | . Alloys based on aluminium |
| 41/04 | . Preventing damage to bearings during storage or transport thereof or when otherwise out of use | 2204/22 | . . with tin as the next major constituent |
| 41/045 | . . {Devices for provisionally retaining needles or rollers in a bearing race before mounting of the bearing on a shaft} | 2204/24 | . . with lead as the next major constituent |
| 43/00 | Assembling bearings | 2204/26 | . Alloys based on magnesium |
| 43/02 | . Assembling sliding-contact bearings | 2204/30 | . Alloys based on one of tin, lead, antimony, bismuth, indium, e.g. materials for providing sliding surfaces |
| 43/04 | . Assembling rolling-contact bearings | 2204/32 | . . Alloys based on lead |
| 43/045 | . . {Mounting or replacing seals} | 2204/34 | . . Alloys based on tin |
| 43/06 | . . Placing rolling bodies in cages or bearings | 2204/36 | . . Alloys based on bismuth |
| 43/065 | . . . {in cages} | 2204/40 | . Alloys based on refractory metals |
| 43/08 | . . . by deforming the cages or the races | 2204/42 | . . Alloys based on titanium |
| 43/083 | {by plastic deformation of the cage} | 2204/44 | . . Alloys based on chromium |
| 43/086 | {by plastic deformation of the race} | 2204/46 | . . Alloys based on molybdenum |
| 2202/00 | Solid materials defined by their properties | 2204/50 | . Alloys based on zinc |
| 2202/02 | . Mechanical properties | 2204/52 | . Alloys based on nickel, e.g. Inconel |
| 2202/04 | . . Hardness | 2204/60 | . Ferrous alloys, e.g. steel alloys |
| 2202/06 | . . Strength or rigidity | 2204/62 | . . Low carbon steel, i.e. carbon content below 0.4 wt% |
| 2202/08 | . . Resilience, elasticity, super-elasticity | 2204/64 | . . Medium carbon steel, i.e. carbon content from 0.4 to 0.8 wt% |
| 2202/10 | . . Porosity | 2204/66 | . . High carbon steel, i.e. carbon content above 0.8 wt%, e.g. through-hardenable steel |
| 2202/20 | . Thermal properties | 2204/70 | . . with chromium as the next major constituent |
| 2202/22 | . . Coefficient of expansion | 2204/72 | . . . with nickel as further constituent, e.g. stainless steel |
| 2202/24 | . . Insulating | 2204/74 | . . with manganese as the next major constituent |
| 2202/28 | . . Shape memory material | 2204/80 | . Amorphous alloys |
| 2202/30 | . Electric properties; Magnetic properties | 2206/00 | Materials with ceramics, cermets, hard carbon or similar non-metallic hard materials as main constituents |
| 2202/32 | . . Conductivity | 2206/02 | . Carbon based material |
| 2202/34 | . . . Superconductivity | 2206/04 | . . Diamond like carbon [DLC] |
| 2202/36 | . . Piezo-electric | 2206/06 | . . Composite carbon material, e.g. carbon fibre reinforced carbon (C/C) |
| 2202/40 | . . Magnetic (magnetic material in general H01F 1/00) | 2206/40 | . Ceramics, e.g. carbides, nitrides, oxides, borides of a metal |
| 2202/42 | . . . soft-magnetic, ferromagnetic | 2206/42 | . . based on ceramic oxides |
| 2202/44 | . . . hard-magnetic, permanent magnetic, e.g. samarium-cobalt | 2206/44 | . . . based on aluminium oxide (Al ₂ O ₃) |
| 2202/50 | . Lubricating properties | 2206/48 | . . . based on zirconia (ZrO ₂) |
| 2202/52 | . . Graphite | 2206/56 | . . based on ceramic carbides, e.g. silicon carbide (SiC) |
| 2202/54 | . . Molybdenum disulfide | 2206/58 | . . based on ceramic nitrides |
| 2202/60 | . Oil repelling | 2206/60 | . . . Silicon nitride (Si ₃ N ₄) |
| 2202/64 | . Water absorbing | 2206/80 | . Cermets, i.e. composites of ceramics and metal (in general C22C 29/00) |
| 2202/66 | . Water repelling | 2206/82 | . . based on tungsten carbide [WC] |
| | | 2208/00 | Plastics; Synthetic resins, e.g. rubbers |
| | | 2208/02 | . comprising fillers, fibres |
| | | 2208/04 | . . Glass fibres |
| | | 2208/10 | . Elastomers; Rubbers |
| | | 2208/12 | . . Polyurethan [PU] |

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| 2208/14 | . . Silicone rubber | 2220/24 | . by built-up welding (in general B23K 9/04) |
| 2208/20 | . Thermoplastic resins | 2220/28 | . by winding impregnated fibres (in general B29C 70/00) |
| 2208/22 | . . comprising two or more thermoplastics | 2220/40 | . by deformation without removing material |
| 2208/30 | . . Fluoropolymers (F16C 2208/58 takes precedence) | 2220/42 | . . by working of thin walled material such as sheet or tube (in general B21D) |
| 2208/32 | . . . Polytetrafluorethylene [PTFE] (F16C 2208/58 takes precedence) | 2220/44 | . . by rolling (in general B21H) |
| 2208/34 | . . . Polyvinylidene fluoride [PVDF] (F16C 2208/58 takes precedence) | 2220/46 | . . by forging (in general B21J) |
| 2208/36 | . . Polyarylene ether ketones [PAEK], e.g. PEK, PEEK (F16C 2208/58 takes precedence) | 2220/48 | . . by extrusion, e.g. of metallic profiles (in general B21C 23/00) |
| 2208/40 | . . Imides, e.g. polyimide [PI], polyetherimide [PEI] (F16C 2208/58 takes precedence) | 2220/60 | . by removing material, e.g. machining |
| 2208/42 | . . . Polyamideimide [PAI] (F16C 2208/58 takes precedence) | 2220/62 | . . by turning, boring, drilling (in general B23B) |
| 2208/44 | . . . Polybenzimidazole [PBI] (F16C 2208/58 takes precedence) | 2220/66 | . . by milling (in general B23C) |
| 2208/48 | . . Liquid crystal polymers [LCP] (F16C 2208/58 takes precedence) | 2220/68 | . . by electrical discharge or electrochemical machining (in general B23H) |
| 2208/52 | . . Polyphenylene sulphide [PPS] (F16C 2208/58 takes precedence) | 2220/70 | . . by grinding (in general B24B) |
| 2208/54 | . . Polysulphones, e.g. polysulphone [PSU], polyethersulphone [PES], polyethersulphone-block copolymer [PPSU] (F16C 2208/58 takes precedence) | 2220/80 | . by separating parts, e.g. by severing, cracking |
| 2208/58 | . . Several materials as provided for in F16C 2208/30 - F16C 2208/54 mentioned as option | 2220/82 | . . by cutting (in general B26D) |
| 2208/60 | . . Polyamides [PA] | 2220/84 | . . by perforating; by punching; by stamping-out (in general B26F) |
| 2208/62 | . . . high performance polyamides, e.g. PA12, PA46 | 2223/00 | Surface treatments; Hardening; Coating |
| 2208/66 | . . Acetals, e.g. polyoxymethylene [POM] | 2223/02 | . Mechanical treatment, e.g. finishing |
| 2208/70 | . . Polyesters, e.g. polyethylene-terephthlate [PET], polybutylene-terephthlate [PBT] | 2223/04 | . . by sizing, by shaping to final size by small plastic deformation, e.g. by calibrating or coining (in general B23P 9/00) |
| 2208/72 | . . Acrylics, e.g. polymethylmethacrylate [PMMA] | 2223/06 | . . polishing (in general B24B 29/00 , B24B 31/00) |
| 2208/76 | . . Polyolefins, e.g. polypropylene [PP] | 2223/08 | . . shot-peening, blasting (in general B24C) |
| 2208/78 | . . . Polyethylene [PE], e.g. ultra-high molecular weight polyethylene [UHMWPE] | 2223/10 | . Hardening, e.g. carburizing, carbo-nitriding (in general C21D , C23C 8/00) |
| 2208/80 | . Thermosetting resins | 2223/12 | . . with carburizing |
| 2208/82 | . . Composites, i.e. fibre reinforced thermosetting resins | 2223/14 | . . with nitriding |
| 2208/86 | . . Epoxy resins | 2223/16 | . . with carbo-nitriding |
| 2208/90 | . . Phenolic resin | 2223/18 | . . with induction hardening |
| 2210/00 | Fluids | 2223/30 | . Coating surfaces (in general B05C , C23C) |
| 2210/02 | . defined by their properties | 2223/32 | . . by attaching pre-existing layers, e.g. resin sheets or foils by adhesion to a substrate; Laminating (in general B32B) |
| 2210/04 | . . by viscosity | 2223/40 | . . by dipping in molten material (in general C23C 2/00) |
| 2210/06 | . . magnetic fluids | 2223/42 | . . by spraying the coating material, e.g. plasma spraying (in general C23C 4/00) |
| 2210/08 | . molten metals | 2223/44 | . . by casting molten material on the substrate (in general C23C 6/00) |
| 2210/10 | . water based | 2223/46 | . . by welding, e.g. by using a laser to build a layer (in general B23K 9/04) |
| 2212/00 | Natural materials, i.e. based on animal or plant products such as leather, wood or cotton or extracted therefrom, e.g. lignin | 2223/60 | . . by vapour deposition, e.g. PVD, CVD (in general C23C 14/00) |
| 2212/04 | . Wood | 2223/70 | . . by electroplating or electrolytic coating, e.g. anodising, galvanising (in general C25D) |
| 2212/08 | . Woven, unwoven fabrics, e.g. felt | 2223/80 | . . by powder coating (in general B22F 7/00) |
| 2220/00 | Shaping | 2226/00 | Joining parts; Fastening; Assembling or mounting parts (fasteners, securing, joints in general F16B) |
| 2220/02 | . by casting (in general B22D ; for plastics B29C 39/00) | 2226/10 | . Force connections, e.g. clamping (shrinkage connections, force fits, friction grips in general F16B 4/00 , for rigidly connecting coaxial parts F16D 1/00) |
| 2220/04 | . . by injection-moulding (of plastics in general B29C 45/00) | 2226/12 | . . by press-fit, e.g. plug-in |
| 2220/06 | . . in situ casting or moulding | 2226/14 | . . by shrink fit, i.e. heating and shrinking part to allow assembly (for metal parts in general B23P 11/02) |
| 2220/08 | . . by compression-moulding | 2226/16 | . . by wedge action, e.g. by tapered or conical parts |
| 2220/20 | . by sintering pulverised material, e.g. powder metallurgy (in general B22F) | | |

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| 2226/18 | . . by magnets, i.e. magnetic attraction to hold parts together | 2240/84 | with full complement of balls or rollers, i.e. sum of clearances less than diameter of one rolling element |
| 2226/30 | . Material joints (in general B23K) | 2240/90 | . Surface areas |
| 2226/32 | . . by soldering | 2240/94 | . Volume |
| 2226/34 | . . . by brazing | | |
| 2226/36 | . . by welding | 2300/00 | Application independent of particular apparatuses |
| 2226/38 | . . . with ultrasonic welding | 2300/02 | . General use or purpose, i.e. no use, purpose, special adaptation or modification indicated or a wide variety of uses mentioned |
| 2226/40 | . . with adhesive | | |
| 2226/50 | . Positive connections | 2300/10 | . related to size |
| 2226/52 | . . with plastic deformation, e.g. caulking or staking | 2300/12 | . . Small applications, e.g. miniature bearings |
| 2226/54 | . . . with rivets (in general F16B 19/00) | 2300/14 | . . Large applications, e.g. bearings having an inner diameter exceeding 500 mm |
| 2226/60 | . . with threaded parts, e.g. bolt and nut connections (in general F16B 23/00 - F16B 43/00) | 2300/20 | . related to type of movement |
| 2226/62 | . . with pins, bolts or dowels | 2300/22 | . . High-speed rotation |
| 2226/70 | . . with complementary interlocking parts | 2300/28 | . . Reciprocating movement |
| 2226/72 | . . . with bayonet joints, i.e. parts are rotated to create positive interlock | 2300/30 | . related to direction with respect to gravity |
| 2226/74 | . . . with snap-fit, e.g. by clips | 2300/32 | . . Horizontal, e.g. bearings for supporting a horizontal shaft |
| 2226/76 | . . . with tongue and groove or key and slot | 2300/34 | . . Vertical, e.g. bearings for supporting a vertical shaft |
| 2226/78 | of jigsaw-puzzle type | 2300/40 | . related to environment, i.e. operating conditions |
| 2226/80 | . . with splines, serrations or similar profiles to prevent movement between joined parts | 2300/42 | . . corrosive, i.e. with aggressive media or harsh conditions |
| 2229/00 | Setting preload | 2300/52 | . . low temperature, e.g. cryogenic temperature |
| 2231/00 | Running-in; Initial operation | 2300/54 | . . high-temperature |
| 2233/00 | Monitoring condition, e.g. temperature, load, vibration | 2300/62 | . . low pressure, e.g. elements operating under vacuum conditions |
| 2235/00 | Cleaning | 2300/64 | . . high pressure, e.g. elements exposed to high pressure gases or fluids |
| 2237/00 | Repair or replacement | 2310/00 | Agricultural machines (in general A01) |
| 2240/00 | Specified values or numerical ranges of parameters; Relations between them (properties of materials F16C 2202/00) | 2314/00 | Personal or domestic articles, e.g. household appliances such as washing machines, dryers (in general A41 - A47) |
| 2240/02 | . Flow, e.g. volume flow or mass flow | 2314/70 | . Furniture |
| 2240/06 | . Temperature | 2314/72 | . . Drawers |
| 2240/08 | . Time | 2314/73 | . . Chairs |
| 2240/12 | . Force, load, stress, pressure | 2316/00 | Apparatus in health or amusement (in general A61 - A63) |
| 2240/14 | . . Preload | 2316/10 | . in medical appliances, e.g. in diagnosis, dentistry, instruments, prostheses, medical imaging appliances |
| 2240/18 | . . Stress | 2316/13 | . . Dental machines |
| 2240/22 | . . Fluid pressure | 2316/18 | . . Pumps for pumping blood |
| 2240/26 | . Speed, e.g. rotational speed | 2316/30 | . Articles for sports, games and amusement, e.g. roller skates, toys |
| 2240/30 | . Angles, e.g. inclinations | 2320/00 | Apparatus used in separating or mixing (in general B01 - B09) |
| 2240/34 | . . Contact angles | 2320/16 | . Mixing apparatus |
| 2240/40 | . Linear dimensions, e.g. length, radius, thickness, gap | 2320/23 | . Milling apparatus (in general B02C) |
| 2240/42 | . . Groove sizes | 2320/42 | . Centrifuges (in general B04B) |
| 2240/44 | . . Hole or pocket sizes | 2322/00 | Apparatus used in shaping articles (in general B21 - B32) |
| 2240/46 | . . Gap sizes or clearances | 2322/12 | . Rolling apparatus, e.g. rolling stands, rolls |
| 2240/48 | . . Particle sizes | 2322/14 | . Stamping, deep-drawing or punching, e.g. die sets |
| 2240/50 | . . Crowning, e.g. crowning height or crowning radius | 2322/34 | . Sawing machines (in general B23D) |
| 2240/54 | . . Surface roughness | 2322/39 | . General build up of machine tools, e.g. spindles, slides, actuators (in general B23Q) |
| 2240/56 | . . Tolerances; Accuracy of linear dimensions | 2322/50 | . Hand tools, workshop equipment or manipulators (in general B25) |
| 2240/60 | . . Thickness, e.g. thickness of coatings | | |
| 2240/64 | . . . in the nanometer range | | |
| 2240/70 | . . Diameters; Radii | | |
| 2240/76 | . . . Osculation, i.e. relation between radii of balls and raceway groove | | |
| 2240/80 | . . . Pitch circle diameters [PCD] | | |
| 2240/82 | Degree of filling, i.e. sum of diameters of rolling elements in relation to PCD | | |

- 2322/59 . . Manipulators, e.g. robot arms ([in general B25J](#))
- 2324/00 Apparatus used in printing ([in general B41 - B44](#))**
- 2324/16 . Printing machines ([in general B41F](#))
- 2326/00 Articles relating to transporting ([in general B60 - B68](#))**
- 2326/01 . Parts of vehicles in general ([engines F16C 2360/00](#))
- 2326/02 . . Wheel hubs or castors ([in general B60B](#))
- 2326/05 . . Vehicle suspensions, e.g. bearings, pivots or connecting rods used therein ([in general B60G](#))
- 2326/06 . . Drive shafts ([in general B60K](#))
- 2326/08 . . Vehicle seats, e.g. in linear movable seats ([in general B60N](#))
- 2326/09 . . Windscreen wipers, e.g. pivots therefore ([in general B60S](#))
- 2326/10 . Railway vehicles ([in general B61](#))
- 2326/20 . Land vehicles ([in general B62](#))
- 2326/24 . . Steering systems, e.g. steering rods or columns ([in general B62D](#))
- 2326/26 . . Bicycle steering or suspension ([in general B62K](#))
- 2326/28 . . Bicycle propulsion, e.g. crankshaft and its support ([in general B62M](#))
- 2326/30 . Ships, e.g. propelling shafts and bearings therefor ([in general B63H](#))
- 2326/43 . Aeroplanes; Helicopters ([in general B64C](#))
- 2326/47 . Cosmonautic vehicles, i.e. bearings adapted for use in outer-space ([in general B64G](#))
- 2326/58 . Conveyor systems, e.g. rollers or bearings therefor ([in general B65G](#))
- 2340/00 Apparatus for treating textiles ([in general D01 - D07](#))**
- 2340/18 . Apparatus for spinning or twisting ([in general D01H](#))
- 2340/24 . Godet rolls ([in general D02](#))
- 2350/00 Machines or articles related to building ([in general E01 - E06](#))**
- 2350/26 . Excavators ([in general E02F](#))
- 2350/52 . Locks, e.g. cables to actuate door locks ([in general E05B](#))
- 2350/54 . Hinges, e.g. sliding bearings for hinges ([in general E05D](#))
- 2352/00 Apparatus for drilling ([in general E21](#))**
- 2360/00 Engines or pumps ([in general F01 - F04](#))**
- 2360/18 . Camshafts ([in general F01L](#))
- 2360/22 . Internal combustion engines ([in general F02B](#))
- 2360/23 . Gas turbine engines ([in general F02C](#))
- 2360/24 . . Turbochargers ([in general F02C 6/12](#))
- 2360/31 . Wind motors ([in general F03D](#))
- 2360/42 . Pumps with cylinders or pistons ([in general F04B](#))
- 2360/43 . Screw compressors ([in general F04C](#))
- 2360/44 . Centrifugal pumps ([in general F04D](#))
- 2360/45 . . Turbo-molecular pumps ([in general F04D 19/04](#))
- 2360/46 . Fans, e.g. ventilators
- 2361/00 Apparatus or articles in engineering in general ([F15 - F17](#))**
- 2361/31 . Axle
- 2361/41 . Couplings ([in general F16D 3/00](#))
- 2361/43 . Clutches, e.g. disengaging bearing ([in general F16D 11/00 - F16D 47/00](#))
- 2361/45 . Brakes ([in general B60T, F16D 49/00 - F16D 65/00](#))
- 2361/53 . Spring-damper, e.g. gas springs ([in general F16F 9/00](#))
- 2361/55 . Flywheel systems ([in general F16F 15/00](#))
- 2361/61 . Toothed gear systems, e.g. support of pinion shafts ([in general F16H 57/02](#))
- 2361/63 . Gears with belts and pulleys
- 2361/65 . Gear shifting, change speed gear, gear box
- 2361/71 . Chains ([in general F16G](#))
- 2361/91 . Valves
- 2362/00 Apparatus for lighting or heating ([in general F21 - F28](#))**
- 2362/40 . Ovens or other heatings ([in general F24](#))
- 2362/52 . Compressors of refrigerators, e.g. air-conditioners ([in general F25](#))
- 2370/00 Apparatus relating to physics, e.g. instruments ([in general G01 - G12](#))**
- 2370/12 . Hard disk drives or the like
- 2370/20 . Optical, e.g. movable lenses or mirrors; Spectacles ([in general G02](#))
- 2370/22 . . Polygon mirror
- 2370/38 . Electrographic apparatus ([in general G03G](#))
- 2380/00 Electrical apparatus ([in general H01 - H05](#))**
- 2380/16 . X-ray tubes ([in general H01J 35/00](#))
- 2380/18 . Handling tools for semiconductor devices
- 2380/26 . Dynamo-electric machines or combinations therewith, e.g. electro-motors and generators ([in general H02K](#))
- 2380/27 . . Motor coupled with a gear, e.g. worm gears
- 2380/28 . . Motor, generator coupled with a flywheel