SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

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

F16C SHAFTS; FLEXIBLE SHAFTS; MECHANICAL MEANS FOR TRANSMITTING MOVEMENT IN A FLEXIBLE SHEATHING; ELEMENTS OF CRANKSHAFT MECHANISMS; PIVOTS; PIVOTAL CONNECTIONS; ROTARY ENGINEERING ELEMENTS OTHER THAN GEARING, COUPLING, CLUTCH OR BRAKE ELEMENTS; BEARINGS [5]

Note(s)

In this subclass, the following expression is used with the meaning indicated:

- "rotary engineering elements other than gearing, coupling, clutch or brake elements" covers any engineering element other than gearing, coupling, clutch or brake elements which rotates in so far as its features are affected only by the fact that it rotates.

Subclass index

FLEXIBLE TRANSMISSIONS, SHAFTS, AXLES, CRANKS, ECCENTRICS.....1/00, 3/00
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MAKING, ASSEMBLING.....33/00, 43/00
CONSTRUCTION OF ROTATABLE BODIES TO RESIST CENTRIFUGAL FORCE.....15/00

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, 2006.01]**

1/02 • for conveying rotary movements **[1, 2006.01]**

1/04 • • Articulated shafts **[1, 2006.01]**

1/06 • • with guiding-sheathing, tube, or box (F16C 1/04 takes precedence; guiding-sheathings F16C 1/26) **[1, 2006.01]**

1/08 • • End connections **[1, 2006.01]**

1/10 • Means for transmitting linear movement in a flexible sheathing, e.g. "Bowden mechanisms" (guiding-sheathings F16C 1/26) **[1, 2006.01]**

1/12 • • Arrangements for transmitting movement to or from the flexible member **[1, 2006.01]**

1/14 • • • Construction of the end-piece of the flexible member; Attachment thereof to the flexible member **[1, 2006.01]**

1/16 • • • in which the end-piece is guided rectilinearly **[1, 2006.01]**

1/18 • • • in which the end portion of the flexible member is laid along a curved surface of a pivoted member **[1, 2006.01]**

1/20 • • Construction of flexible members moved to and fro in the sheathing **[1, 2006.01]**

1/22 • • Adjusting; Compensating length **[1, 2006.01]**

1/24 • Lubrication; Lubricating equipment **[1, 2006.01]**

1/26 • Construction of guiding-sheathings or guiding-tubes **[1, 2006.01]**

1/28 • • with built-in bearings **[1, 2006.01]**

3/00 **Shafts** (flexible shafts F16C 1/00; marine propeller shafts, paddle wheel shafts B63H 23/34)**; Axles; Cranks; Eccentrics [1, 2006.01]**

3/02 • Shafts; Axles **[1, 2006.01]**

3/03 • • telescopic **[1, 2006.01]**

3/035 • • • with built-in bearings **[1, 2006.01]**

3/04 • Crankshafts, eccentric-shafts; Cranks, eccentrics **[1, 2006.01]**

3/06 • • Crankshafts **[1, 2006.01]**

3/08 • • • made in one piece (features relating to lubrication F16C 3/14, to cooling F16C 3/16) **[1, 2006.01]**

3/10 • • • assembled of several parts, e.g. by welding **[1, 2006.01]**

3/12 • • • • releasably connected **[1, 2006.01]**

3/14 • • • Features relating to lubrication **[1, 2006.01]**
3/16 • • • Features relating to cooling **[1, 2006.01]**
3/18 • • Eccentric-shafts **[1, 2006.01]**
3/20 • • Shape of crankshafts or eccentric-shafts having regard to balancing **[1, 2006.01]**
3/22 • • Cranks; Eccentrics (constructional features of crank-pins F16C 11/02) **[1, 2006.01]**
3/24 • • • with return cranks, i.e. a second crank carried by the crank-pin **[1, 2006.01]**
3/26 • • • Elastic crank-webs; Resiliently-mounted crank-pins **[1, 2006.01]**
3/28 • • • Adjustable cranks or eccentrics **[1, 2006.01]**
3/30 • • • with arrangements for overcoming dead-centres **[1, 2006.01]**

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) **[1, 2006.01]**

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) **[1, 2006.01]**
7/02 • Constructions of connecting-rods with constant length **[1, 2006.01]**
7/04 • with elastic intermediate part or fluid cushion **[1, 2006.01]**
7/06 • Adjustable connecting-rods **[1, 2006.01]**
7/08 • made from sheet metal **[1, 2006.01]**

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) **[1, 2006.01]**
9/02 • Crankshaft bearings **[1, 2006.01]**
9/03 • • Arrangements for adjusting play **[1, 2006.01]**
9/04 • Connecting-rod bearings; Attachment thereof **[1, 2006.01]**
9/06 • • Arrangements for adjusting play in bearings, operating either automatically or not **[1, 2006.01]**

11/00 Pivots; Pivotal connections (arrangements of steering linkage connections B62D 7/16) **[1, 2006.01]**
11/02 • Trunnions; Crank-pins (fastening crank-pins to webs, crank-pins integral with cranks F16C 3/06, F16C 3/22) **[1, 2006.01]**
11/04 • Pivotal connections (hinges for doors, windows or wings E05D) **[1, 2006.01]**
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) **[1, 2006.01]**
11/08 • • • with resilient bearings **[1, 2006.01]**
11/10 • • Arrangements for locking **[1, 2006.01]**
11/12 • • incorporating flexible connections, e.g. leaf springs **[1, 2006.01]**

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 [1, 2006.01]**
13/02 • Bearings **[1, 2006.01]**
13/04 • • Bearings with only partial enclosure of the member to be borne; Bearings with local support at two or more points **[1, 2006.01]**
13/06 • • self-adjusting **[1, 2006.01]**

15/00 Construction of rotary bodies to resist centrifugal force (flywheels, correction weights F16F 15/30, F16F 15/32) **[1, 2006.01]**

Bearings for rotary parts (F16C 9/00, F16C 13/02 take precedence; allowing for linear movement also F16C 31/00)

17/00 Sliding-contact bearings for exclusively rotary movement (F16C 32/06 takes precedence; adjustable bearings F16C 23/00, F16C 25/00) **[1, 2, 2006.01]**
17/02 • for radial load only **[1, 2006.01]**
17/03 • • with tiltably-supported segments, e.g. Michell bearings **[1, 2006.01]**
17/04 • for axial load only **[1, 2006.01]**
17/06 • • with tiltably-supported segments, e.g. Michell bearings **[1, 2006.01]**
17/08 • • for supporting the end face of a shaft or other member, e.g. footstep bearings **[1, 2006.01]**
17/10 • for both radial and axial load **[1, 2006.01]**
17/12 • characterised by features not related to the direction of the load **[1, 2006.01]**
17/14 • • specially adapted for operating in water **[1, 2006.01]**
17/18 • • with floating brasses or bushes, rotatable at a reduced speed **[1, 2006.01]**
17/20 • • with emergency supports or bearings **[1, 2006.01]**
17/22 • • with arrangements compensating for thermal expansion **[1, 2006.01]**
17/24 • • with devices affected by abnormal or undesired conditions, e.g. for preventing overheating, for safety **[1, 2006.01]**
17/26 • Systems consisting of a plurality of sliding-contact bearings **[1, 2006.01]**

19/00 Bearings with rolling contact, for exclusively rotary movement (adjustable bearings F16C 23/00, F16C 25/00) **[1, 2006.01]**
19/02 • with bearing balls essentially of the same size in one or more circular rows **[1, 2006.01]**
19/04 • • for radial load mainly **[1, 2006.01]**
19/06 • • • with a single row of balls **[1, 2006.01]**
19/08 • • • with two or more rows of balls **[1, 2006.01]**
19/10 • • for axial load mainly **[1, 2006.01]**
19/12 • • • for supporting the end face of a shaft or other member, e.g. footstep bearings **[1, 2006.01]**
19/14 • • for both radial and axial load **[1, 2006.01]**
19/16 • • • with a single row of balls **[1, 2006.01]**
19/18 • • • with two or more rows of balls **[1, 2006.01]**
19/20 • • with loose spacing bodies, e.g. balls, between the bearing balls **[1, 2006.01]**
19/22 • with bearing rollers essentially of the same size in one or more circular rows, e.g. needle bearings **[1, 2006.01]**
19/24 • • for radial load mainly **[1, 2006.01]**
19/26 • • • with a single row of rollers **[1, 2006.01]**
19/28 • • • with two or more rows of rollers **[1, 2006.01]**
19/30 • • for axial load mainly **[1, 2006.01]**
19/32 • • • for supporting the end face of a shaft or other member, e.g. footstep bearings **[1, 2006.01]**
19/34 • • for both radial and axial load **[1, 2006.01]**
19/36 • • • with a single row of rollers **[1, 2006.01]**

19/38 • • • with two or more rows of rollers **[1, 2006.01]**
19/40 • • with loose spacing bodies between the rollers **[1, 2006.01]**
19/44 • • Needle bearings **[1, 2006.01]**
19/46 • • • with one row of needles **[1, 2006.01]**
19/48 • • • with two or more rows of needles **[1, 2006.01]**
19/49 • Bearings with both balls and rollers **[1, 2006.01]**
19/50 • Other types of ball or roller bearings **[1, 2006.01]**
19/52 • with devices affected by abnormal or undesired conditions **[1, 2006.01]**
19/54 • Systems consisting of a plurality of bearings with rolling friction (spindle bearings F16C 35/08) **[1, 2006.01]**
19/55 • • with intermediate floating rings rotating at reduced speed **[1, 2006.01]**
19/56 • • in which the rolling bodies of one bearing differ in diameter from those of another **[1, 2006.01]**

21/00 Combinations of sliding-contact bearings with ball or roller bearings, for exclusively rotary movement (F16C 17/24, F16C 19/52take precedence) **[1, 2, 2006.01]**

23/00 Bearings for exclusively rotary movement adjustable for aligning or positioning (F16C 27/00 takes precedence) **[1, 2006.01]**
23/02 • Sliding-contact bearings **[1, 2006.01]**
23/04 • • self-adjusting **[1, 2006.01]**
23/06 • Ball or roller bearings **[1, 2006.01]**
23/08 • • self-adjusting **[1, 2006.01]**
23/10 • Bearings, parts of which are eccentrically adjustable with respect to each other **[1, 2006.01]**

25/00 Bearings for exclusively rotary movement adjustable for wear or play (F16C 27/00 takes precedence) **[1, 2006.01]**
25/02 • Sliding-contact bearings **[1, 2006.01]**
25/04 • • self-adjusting **[1, 2006.01]**
25/06 • Ball or roller bearings **[1, 2006.01]**
25/08 • • self-adjusting **[1, 2006.01]**

27/00 Elastic or yielding bearings or bearing supports, for exclusively rotary movement (shock-damping bearings for watches or clocks G04B 31/02) **[1, 2006.01]**
27/02 • Sliding-contact bearings **[1, 2006.01]**
27/04 • Ball or roller bearings, e.g. with resilient rolling bodies **[1, 2006.01]**
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) **[1, 2006.01]**
27/08 • primarily for axial load, e.g. for vertically-arranged shafts **[1, 2006.01]**

29/00 Bearings for parts moving only linearly (F16C 32/06 takes precedence; incorporated in flexible shafts F16C 1/28) **[1, 2, 2006.01]**
29/02 • Sliding-contact bearings **[1, 2006.01]**
29/04 • Ball or roller bearings **[1, 2006.01]**
29/06 • • in which the rolling bodies circulate partly without carrying load **[1, 2006.01]**
29/08 • Arrangements for covering or protecting the ways **[1, 2006.01]**
29/10 • Arrangements for locking the bearings **[1, 2006.01]**
29/12 • Arrangements for adjusting play **[1, 2006.01]**

31/00 Bearings for parts which both rotate and move linearly [1, 2006.01]
31/02 • Sliding-contact bearings **[1, 2006.01]**
31/04 • Ball or roller bearings **[1, 2006.01]**
31/06 • • in which the rolling bodies circulate partly without carrying load **[1, 2006.01]**

32/00 Bearings not otherwise provided for [1, 2006.01]
32/02 • Knife-edge bearings **[1, 2006.01]**
32/04 • using magnetic or electric supporting means **[2, 2006.01]**
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 **[2, 2006.01]**

Details or accessories of bearings

33/00 Parts of bearings; Special methods for making bearings or parts thereof (metal-working or like operations, see the relevant classes) **[1, 2006.01]**
33/02 • Parts of sliding-contact bearings **[1, 2006.01]**
33/04 • • Brasses; Bushes; Linings **[1, 2006.01]**
33/06 • • • Sliding surface mainly made of metal (F16C 33/24-F16C 33/28 take precedence) **[1, 2006.01]**
33/08 • • • • Attachment of brasses, bushes, or linings to the bearing housing **[1, 2006.01]**
33/10 • • • • Construction relative to lubrication **[1, 2006.01]**
33/12 • • • • Structural composition; Use of special materials or surface treatments, e.g. for rust-proofing **[1, 2006.01]**
33/14 • • • • Special methods of manufacture; Running-in **[1, 2006.01]**
33/16 • • • Sliding surface consisting mainly of graphite **[1, 2006.01]**
33/18 • • • Sliding surface consisting mainly of wood or fibrous material **[1, 2006.01]**
33/20 • • • Sliding surface consisting mainly of plastics (F16C 33/22-F16C 33/28 take precedence) **[1, 2006.01]**
33/22 • • • Sliding surface consisting mainly of rubber or synthetic rubber (F16C 33/24-F16C 33/28 take precedence) **[1, 2006.01]**
33/24 • • • with different areas of the sliding surface consisting of different materials **[1, 2006.01]**
33/26 • • • made from wire coils; made from a number of discs, rings, rods, or other members **[1, 2006.01]**
33/28 • • • with embedded reinforcements shaped as frames or meshed materials **[1, 2006.01]**
33/30 • Parts of ball or roller bearings **[1, 2006.01]**
33/32 • • Balls **[1, 2006.01]**
33/34 • • Rollers; Needles **[1, 2006.01]**
33/36 • • • with bearing-surfaces other than cylindrical, e.g. tapered; with grooves in the bearing surfaces **[1, 2006.01]**
33/37 • • Loose spacing bodies **[1, 2006.01]**
33/372 • • • rigid **[1, 2006.01]**
33/374 • • • resilient **[1, 2006.01]**
33/38 • • Ball cages **[1, 2006.01]**
33/40 • • • for multiple rows of balls **[1, 2006.01]**
33/41 • • • comb-shaped **[1, 2006.01]**
33/42 • • • made from wire or sheet-metal strips (F16C 33/40, F16C 33/41 take precedence) **[1, 2006.01]**

33/44 • • • Selection of substances (F16C 33/40, F16C 33/41 take precedence) **[1, 2006.01]**
33/46 • • Cages for rollers or needles **[1, 2006.01]**
33/48 • • • for multiple rows of rollers or needles **[1, 2006.01]**
33/49 • • • comb-shaped **[1, 2006.01]**
33/50 • • • formed of interconnected members, e.g. chains **[1, 2006.01]**
33/51 • • • formed of unconnected members **[1, 2006.01]**
33/52 • • • with no part entering between, or touching, the bearing surfaces of the rollers (F16C 33/50 takes precedence) **[1, 2006.01]**
33/54 • • • made from wire, strips, or sheet metal (F16C 33/48, F16C 33/49 take precedence) **[1, 2006.01]**
33/56 • • • Selection of substances (F16C 33/48, F16C 33/49 take precedence) **[1, 2006.01]**
33/58 • • Raceways; Race rings **[1, 2006.01]**
33/60 • • • divided **[1, 2006.01]**
33/61 • • • • formed by wires **[1, 2006.01]**
33/62 • • • Selection of substances **[1, 2006.01]**
33/64 • • • Special methods of manufacture **[1, 2006.01]**
33/66 • • Special parts or details in view of lubrication **[1, 2006.01]**
33/72 • Sealings **[1, 2006.01]**
33/74 • • of sliding-contact bearings **[1, 2006.01]**
33/76 • • of ball or roller bearings **[1, 2006.01]**
33/78 • • • with a diaphragm, disc, or ring, with or without resilient members **[1, 2006.01]**
33/80 • • • Labyrinth sealings **[1, 2006.01]**
33/82 • • • Arrangements for electrostatic or magnetic action against dust or other particles **[1, 2006.01]**

35/00 Rigid support of bearing units; Housings, e.g. caps, covers (F16C 23/00 takes precedence) **[1, 2006.01]**
35/02 • in the case of sliding-contact bearings **[1, 2006.01]**
35/04 • in the case of ball or roller bearings **[1, 2006.01]**
35/06 • • Mounting of ball or roller bearings; Fixing them onto shaft or in housing **[1, 2006.01]**
35/063 • • • Fixing them on the shaft (with interposition of an element F16C 35/07) **[3, 2006.01]**
35/067 • • • Fixing them in a housing (with interposition of an element F16C 35/07) **[3, 2006.01]**
35/07 • • • Fixing them on the shaft or housing with interposition of an element **[3, 2006.01]**
35/073 • • • • between shaft and inner race ring **[3, 2006.01]**
35/077 • • • • between housing and outer race ring **[3, 2006.01]**
35/078 • • • using pressure fluid as mounting aid **[3, 2006.01]**
35/08 • for spindles **[1, 2006.01]**
35/10 • • with sliding-contact bearings **[1, 2006.01]**
35/12 • • with ball or roller bearings **[1, 2006.01]**

37/00 Cooling of bearings [1, 2006.01]

39/00 Relieving load on bearings [1, 2006.01]
39/02 • using mechanical means **[1, 2006.01]**
39/04 • using hydraulic or pneumatic means **[1, 2006.01]**
39/06 • using magnetic means **[1, 2006.01]**

41/00 Other accessories for bearings [1, 2006.01]
41/02 • Arrangements for equalising the load on a plurality of bearings or their elements **[1, 2006.01]**
41/04 • Preventing damage to bearings during storage or transport thereof or when otherwise out of use **[1, 2006.01]**

43/00 Assembling bearings [1, 2006.01]
43/02 • Assembling sliding-contact bearings **[1, 2006.01]**
43/04 • Assembling rolling contact bearings **[1, 2006.01]**
43/06 • • Placing rolling bodies in cages or bearings **[1, 2006.01]**
43/08 • • • by deforming the cages or the races **[1, 2006.01]**