47 Machine elements, insulating bodies, brakes, lubricating devices, control devices for fluent materials, drives, compound elements of precision mechanics

47a	**Rigid mating and positive joints, permanently locked or detachable; machine frames, base plates, foundations, shock absorbers, heat-insulating bodies, structural designs as elements only, energy storage by means of springs, general accident prevention, control of undesirable foundation vibrations**
47a1	**(IPC: F16B) Devices for fastening and securing machine parts together**
47a2	**(IPC: F16M) Frames, casings, or beds of engines or other machines, not specific to an engine or machine provided for elsewhere; Stands or supports**
47a3	**(IPC: F16F) Springs; Shock-absorbers; Means for dampening vibrations**
47a4	**(IPC: F16P) Safety devices in general**
47a5	**(IPC: F16S) Constructional elements in general; Structures built-up from such elements, in general**
47b	**Elements for generation of reciprocating, rotating and gyratory movements: bearings, journals, joints, lead screws, levers, gears, pulleys, etc.**
47b	**(IPC: F16C) Shafts; Flexible shafts; Elements of crankshaft mechanisms; Rotary bodies other than gearing elements; Bearings**
47c	**Shaft couplings and brakes for rotary movements**
47c	**(IPC: F16D) Couplings; Clutches; Brakes**
47d	**Driving belts, ropes, cords, chains; connectors and joints for same; fastening devices for ropes and chains; hooks for load-carrying chains, etc; auxiliary devices for connecting driving belts and ropes; belt shippers; shifters**
47d	**(IPC: F16G) Belts, cables or ropes, predominantly used for driving purposes; Chains; Fittings predominantly used therefor**
47e	**Lubricating devices**
47e	**(IPC: F16N) Lubricating**
47f	**Machine elements used in conveying and containing gaseous, liquid and granular materials; tubing, cylinders and casings, pistons and floats, wrist pins, vessels, pipe and vessel closures, seals, pipe protection and pipe insulation against temperature variations**
47f1	**(IPC: F16L) Pipes; Joints or fittings for pipes; Supports for pipes or cables; Means for thermal insulation in general**

47f2	**(IPC: F16J) Pistons; Cylinders; Packing**
47g	**Machine elements for operationally blocking pipes and chambers containing gaseous, liquid and granular materials for general use**
47g1	**(IPC: F16K) Valves; Taps; Cocks; Actuating floats**
47g2	**(IPC: F16T) Steam traps or the like**
47h	**Drives**
47h	**(IPC: F16H) Gearing**
47i	**Compound precision-mechanical structural elements, if not classified in special classes**
47i	**(IPC: G12B) Details of instruments, or comparable details of other apparatus, not otherwise provided for**
47k	**(IPC: D02F?) Feeding, guiding and storage, e.g. winding, of material in form of filaments, threads, wires, hoses, tapes or webs**

47a	**Rigid mating and positive joints, permanently locked or detachable; machine frames, base plates, foundations, shock absorbers, heat-insulating bodies, structural designs as elements only, energy storage by means of springs, general accident prevention, control of undesirable foundation vibrations**
47a-1	Wedges and keys, wedge [key] and clamp fasteners, bayonet joints, shrink-fit and expansion-fit joints in general (19a-8; 19a-10; 19a-11; 19a-14; 19a-9/00; 19a-13/00; 19a-21/00; 19a-23/00; 20h-6; 21c-21; 35a-13; 47d-12; 58b-8; 63a-44; 63c-85)
47a-2	Joining of plates by riveting, welding, screwing, folding, flanging, in general (19d-3; 19d-6; 19d-19/00; 62b-24; 65a1-15)
47a-3	Turnbuckles and rod joints, rigid and resilient couplings for hollow and solid rods, structural steel joints in general (37d-26; 47d-12; 47a-1; 47f-7 – 47f-11)
47a-4	Nails, screw nails, barbed nails, staples, nail securing devices, drive screws, wood screws and wood-screw securing devices of metal for general purposes (19a-10; 19a-9/06; 34c-18; 34f-3; 45i-14; 71a-33; 81c-3; production 7e-7 – 7e-20; 38k-4/01)
47a-5	Expansion bolts, solid shank and hollow shank rivets, dowel pins and grooved pins, bolt securing devices with cotters or pins, split pins, split pin retainers for general purposes (37b-5; production 7f-9; 49g-16; 49i-4; 49i-6)
47a-6	Stay bolts, clamping bolts, stud bolts, expansion bolts, screw-bolt securing devices with cotters, thread forms, bolt-head and nut-holding devices, stone bolts, anchor bolts, set screws, prevention of jamming of screw threads (7c-20; 13a-23; lead screws 47b-29; production 7f-9, 49c, 49i-4)
47a-7	Nuts, simple and compound, nuts made of wire, threadless nuts, wing nuts, cap nuts for general use (47b-29; production 49e)
47a-8	Washers, simple and compound, spring and rigid for general use (47a-11)
47a-9	Locking devices for nuts, bolts, washers and elements, with conjugate or progressive locking action
47a-10	Keys, split pins, pins, balls, etc. driven into axial or radial holes or grooves in nut or bolt, in conjunction with washer and element
47a-11	Securing by means of washers in the form of springs, tab washers, toothlock washers, inclined planes, etc. (47a-8)
47a-12	Securing through special shape of nut or bolt, jam nuts, tapered nuts, left-and right-handed thread, slotted nuts
47a-13	Securing by means of spring inserts, wire or sheet metal clamps, sleeves, compression nuts or caps

47a-14 Securing by means of locking plates

47a-15 Locking and other retainers

47a-16/01 Base plates, clamping plates and frames as machine elements, foundation-less machines bases (20b-14; 20d-1; 21d1-47; 46c1; 65f1)

47a-16/10 Shock absorbers for general use (20d-22; 20e; 21b-1/02; 35a-17; 63a-16; 63b-13; 63b-24; 63c-42)

47a-16/20 Heat-insulating bodies, structural design as elements for general purpose only (34l-11/02; 37a-7/01; 37b-6; 39a; 39b; 46c1-16/04; 47f-27/30; 80b-9)

47a-17 Springs, pneumatic and hydraulic; helical springs; flexible springs: bar, laminated and leaf springs; elliptic springs, torsion springs, spiral springs, rubber springs, compound springs, annular springs, plate springs, bumper springs, diaphragms, friction springs (20d-21, 20d-22; 63b-13; 63c-40; 83a-61; 34g-17; production 7d-7; 49h-12 – 49h-24; 20e-25)

47a-18 General accident prevention, such as additional casings, machinery guards whose presence is not essential for operation of machine or apparatus

47a-19 Shrunk-on rings, catches and various machine elements for general use (35c-3; 47g-46; 47h-4; 83a-11)

47a-20 Control of undesirable vibration, such as sonic or shock vibrations in stationary plants, if not eliminated in drive mechanisms or through proper balancing (14c-22; 14f-9; 14g-10; 15g-45; 19a-1, 19a-9/00, 19a-21/00; 20d-21, 20d-22; 21a4-14 – 21a4-17; 21c-6; 27b-17; 27c-11/04; 30d-29; 37a-7/01; 37b-6; 42c-42; 46a11; 47h-26; 60-1; 63a-16; 63b-13; 63c-42/01; 65a1-15; 65a2-53 – 65a2-59; 72a-28; 85d-2, 85d-6)

47a1 (IPC: F16B) Devices for fastening and securing machine parts together, e.g. nails, bolts, circlips, clamps, wedges, joints or jointing (buckles, slide fasteners 44a1; ornamental heads for nails, screws, etc. 34f-3/00; joints for building structures in general 37a-1/38; scaffolding couplings 37e-7/00; pipe joints 47f1; magnetic holding devices 21g; electrostatic holding devices 21d1)

47a1-1/00 Devices for securing together, or preventing relative movement between, constructional elements or machine parts (the following groups in this subclass take precedence)

47a1-1/02 . Means for securing elements of mechanisms after operation (means for bringing members to rest 47c)

47a1-1/04 . . disengaged by movement of the actuating member of the element

Fastenings for constructional elements or machine parts in general (fixed shaft couplings 47c-1/00)

47a1-2/00 Friction-grip releasable fastenings (for cables or ropes, e.g. cleats, 47d-11/00)

47a1-2/02 . Clamps, i.e. with gripping action effected by positive means other than the inherent resistance to deformation of the material of the fastening

47a1-2/04 . . internal, i.e. with spreading action (47a1-2/14 to 47a1-2/18 take precedence)

47a1-2/06 . . external, i.e. with contracting action (47a1-2/14 to 47a1-2/18 take precedence)

47a1-2/08 . . . using bands

47a1-2/10 . . . using pivoting jaws

47a1-2/12 . . . using sliding jaws

47a1-2/14 . . using wedges

47a1-2/16 . . using rollers or balls

47a1-2/18 . . using cams, levers, eccentrics, or toggles

47a1-2/20 . Clips, i.e. with gripping action effected solely by the inherent resistance to deformation of the material of the fastening

47a1-2/22 . . of resilient material, e.g. rubbery material

47a1-2/24 . . . of metal

47a1-2/26 . . of pliable non-resilient material, e.g. plant tie

47a1-3/00 **Key-type connections; Keys** (47a1-2/00 takes precedence; for rods or tubes mutually 47a1-7/00)
47a1-3/04 . using keys formed of wire or other flexible material, to be inserted through an opening giving access to grooves in the adjacent surfaces of the parts to be connected
47a1-3/06 . using taper sleeves

47a1-4/00 **Shrinkage connection, e.g. assembled with the parts at different temperature; Force fits** (restricted to metal parts or objects 49l-9/02)**; Non-releasable friction-grip fastenings** (47a1-2/00 takes precedence)

47a1-5/00 **Joining sheets or plates to one another or to strips or bars parallel to them** (by sticking together 47a1-11/00; dowel connections 47a1-13/00; pins, including deformable elements 47a1-19/00; welding of seams 49h; covering of walls 37d-13/00; fastening signs, plates, panels, or boards to a supporting structure, fastening readily-detachable elements, e.g. letters to signs, plates, panels, or boards, 54h)
47a1-5/01 . by means of fastening elements specially adapted for honeycomb panels
47a1-5/02 . by means of fastening members using screw-thread (construction of screw-threaded connections 47a1-25/00 to 47a1-39/00)
47a1-5/04 . by means of riveting (rivets 47a1-19/04)
47a1-5/06 . by means of clamps or clips (friction-grip releasable fastenings in general 47a1-2/00)
47a1-5/07 . by means of multiple interengaging protrusions on the surfaces, e.g. hooks, coils
47a1-5/08 . by means of welds or the like
47a1-5/10 . by means of bayonet connections (fastening devices locking by rotation 47a1-21/02)
47a1-5/12 . Fastening strips or bars to sheets or plates, e.g. rubber strips, decorative strips for motor vehicles, by means of clips (friction-grip releasable fastenings in general 47a1-2/00; fastening rods or tubular parts to flat surfaces 47a1-9/00)

47a1-7/00 **Connections of rods or tubes, e.g. of non-circular section, mutually, including resilient connections** (umbrella frames 33a-1/01; welding or soldering of connections 49h; vehicle connections in general 63a; railway couplings 20e; bicycle frames 63h; shaft couplings 47c; couplings for tubes conveying fluid 47f1)
47a1-7/02 . with conical parts
47a1-7/04 . Clamping or clipping connections (friction-grip releasable fastenings in general 47a1-2/00)
47a1-7/06 . Turnbuckles (for cables, ropes, or wire 47d-11/12)
47a1-7/08 . Pipe saddles (friction-grip releasable fastenings in general 47a1-2/00)
47a1-7/10 . Telescoping systems (for scaffolding 37e-25/04; telescope props for mining 5c-15/14 to 5c-15/46; stands or trestles as supports for apparatus or articles placed thereon 47a2-11/00)
47a1-7/12 . . locking only in extreme extended position
47a1-7/14 . . locking in intermediate positions
47a1-7/16 . . . locking only against movement in one direction
47a1-7/18 . using screw-thread elements
47a1-7/20 . using bayonet connections
47a1-7/22 . using hooks or like elements

47a1-9/00 **Connections of rods or tubular parts to flat surfaces at an angle** (friction-grip releasable fastenings in general 47a1-2/00; making press-fit connections 49l-11/00, 49l-19/00; fluid-tight connecting of pipes to reservoirs, sheets, or the like 47f1; hangers or supports for pipes 47f1-3/00)
47a1-9/02 . Detachable connections

47a1-11/00 **Connecting constructional elements or machine parts by sticking or pressing them together, e.g. cold pressure welding** (non-electric welding in general 49h; methods of using adhesives independently of the form of the surfaces joined 22i1, 22i2)

47a1-12/00 **Jointing of furniture or the like, e.g. hidden from exterior** (47a1-2/00 to 47a1-11/00 take precedence; fastening means per se 47a1-13/00 to 47a1-47/00; wood-working 38)

47a1-12/02 . Joints between panels and corner posts
47a1-12/04 . Non-loosenable joints for non-metal furniture parts, e.g. glued
47a1-12/06 . Non-loosenable joints for metal furniture parts
47a1-12/08 . . without use of separate connecting elements
47a1-12/10 . using pegs, bolts, tenons, clamps, clips, or the like (glued 47a1-12/04; fastening means per se 47a1-15/00 to 47a1-47/00)
47a1-12/12 . . for non-metal furniture parts, e.g. made of wood, of plastics
47a1-12/14 . . . using threaded bolts or screws
47a1-12/16 . . . . using self-tapping screws
47a1-12/18 . . . . using drawing bars
47a1-12/20 . . . using clamps, clips, wedges, sliding bolts, or the like
47a1-12/22 . . . using keyhole-shaped slots and pins
47a1-12/24 . . . using separate pins, dowels, or the like
47a1-12/26 . . . using snap-action elements
47a1-12/28 . . for metal furniture parts
47a1-12/30 . . . using threaded bolts
47a1-12/32 . . . using clamps, clips, wedges, sliding bolts, or the like
47a1-12/34 . . . using keyhole-shaped slots and pins
47a1-12/36 . . . using separate pins, dowels, or the like
47a1-12/38 . . . using snap-action elements
47a1-12/40 . Joints for furniture tubing
47a1-12/42 . . connecting furniture tubing to non-tubular parts
47a1-12/44 . Leg joints; Corner joints
47a1-12/46 . . Non-metal corner connections
47a1-12/48 . . Non-metal leg connections (47a1-12/46 takes precedence)
47a1-12/50 . . Metal corner connections
47a1-12/52 . . Metal leg connections (47a1-12/50 takes precedence)
47a1-12/54 . Fittings for bedsteads or the like
47a1-12/56 . . Brackets for bedsteads; Coupling joints consisting of bolts or the like; Latches therefor
47a1-12/58 . . Tapered connectors for bed rails
47a1-12/60 . . Fittings for detachable side panels

47a1-13/00 **Dowels or other devices fastened in walls or the like by inserting them in holes made therein for that purpose** (nails 47a1-15/00; self-locking pins or bolts in general, stud-and-socket releasable fastenings 47a1-21/00; dowels or bolts for railroad sleepers 19a-9/00; bolts or dowels used while laying bricks or casting concrete 37a-1/38)

47a1-13/02 . in one piece with protrusions or ridges on the shaft
47a1-13/04 . with parts gripping in the hole or behind the reverse side of the wall after inserting from the front (friction-grip releasable fastenings in general 47a1-2/00)
47a1-13/06 . . combined with expanding sleeve
47a1-13/08 . . with separate gripping parts moved into their final position in relation to the body of the device without further manual operation
47a1-13/10 . . with separate gripping parts moved into their final position in relation to the body of the device by a separate operation (47a1-13/06 takes precedence)
47a1-13/12 . Separate metal dowel sleeves fastened by inserting the screw, nail, or the like
47a1-13/14 . Non-metallic plugs or sleeves; Use of loose material therefor

Fastening means without screw-thread (horseshoe nails 45i-7/10; nails for footwear 71a-23/20; thumb-tacks 70e-7; for building constructions 37a-1/38; for hand railings 37d-11/18; for fencing 37f-17/00)

47a1-15/00 **Nails; Staples** (manufacture thereof 7e)

47a1-15/02 . with specially-shaped heads, e.g. with enlarged surfaces (ornaments for furniture 34i-95/04; removable ornamental heads for nails 34f-3/00)
47a1-15/04 . with spreading shaft
47a1-15/06 . with barbs, e.g. for metal parts; Drive screws

47a1-15/08 . formed in integral series but easily separable

47a1-17/00 Connecting constructional elements or machine parts by a part of or on one member entering a hole in the other (construction of bolts, pins, or rivets 47a1-19/00; riveting 47a1-19/04; means for preventing withdrawal of a pin, spigot, or the like from its operative position, stud-and-socket releasable fastenings 47a1-21/00)

47a1-19/00 Bolts without screw-thread; Pins, including deformable elements (in screwed connections 47a1-29/00)**; Rivets** (means for preventing withdrawal 47a1-21/00)

47a1-19/02 . Bolts or sleeves for positioning of machine parts, e.g. notched taper pins, fitting pins, sleeves, eccentric positioning rings
47a1-19/04 . Rivets; Spigots or the like fastened by riveting (lead seals 81c)
47a1-19/05 . . Bolts fastening by swaged-on collars (47a1-19/08 takes precedence)
47a1-19/06 . . Solid rivets made in one piece
47a1-19/08 . . Hollow rivets; Multi-part rivets
47a1-19/10 . . . fastened by expanding mechanically
47a1-19/12 . . . fastened by fluid pressure, including by explosion (bolts shot by means of detonation-operated nailing tools into concrete constructions, metal walls, or the like 47a1-19/14)
47a1-19/14 . Bolts or the like for shooting into concrete constructions, metal walls, or the like by means of detonation-operated nailing tools (tools therefor 87a)

47a1-21/00 Means for preventing relative axial movement of a pin, spigot, shaft, or the like and a member surrounding it (riveted or deformable spigots 47a1-19/04; for gudgeon pins 47f2-1/18)**; Stud-and-socket releasable fastenings**

47a1-21/02 . Releasable fastening devices locking by rotation (with snap action 47a1-21/06; studs or coupling-pins with resilient protrusions 47a1-21/08)
47a1-21/04 . . with bayonet catch
47a1-21/06 . Releasable fastening devices with snap action
47a1-21/07 . . in which the socket has a resilient part
47a1-21/08 . . in which the stud, pin, or spigot has a resilient part (wall-dowels 47a1-13/00)
47a1-21/09 . Releasable fastening devices with a stud engaging a keyhole slot
47a1-21/10 . by separate parts (key-type connection 47a1-3/00; locking screws or nuts against rotation by such means 47a1-39/04)
47a1-21/12 . . with locking-pins or split-pins thrust into holes
47a1-21/14 . . . Details of locking-pins or split-pins
47a1-21/16 . . with grooves or notches in the pin or shaft
47a1-21/18 . . . with circlips or like resilient retaining devices; Details (spring-washers for locking nuts 47a1-39/24; adjusting-rings 47a1-43/00)
47a1-21/20 . . for bolts or shafts without holes, grooves, or notches for locking members

Fastening means using screw-thread (wall-dowels 47a1-13/00; manufacture of threaded fastening means 7f, 7h 49g; screw mechanisms 47h)

47a1-23/00 Specially-shaped heads of bolts or screws for rotations by a tool

47a1-25/00 Screws that cut thread in the body into which they are screwed, e.g. wood-screws

47a1-27/00 Bolts, screws, or nuts formed in integral series but easily separable, particularly for use in automatic machines

47a1-29/00 Screwed connection with deformation of nut or auxiliary member while fastening (members deformed for locking screws, bolts or nuts 47a1-39/22)

47a1-31/00 Screwed connections specially modified in view of tensile load; Break-bolts (shape of thread 47a1-33/04)

47a1-31/02 . for indicating or limiting tensile load
47a1-31/04 . for maintaining constant tensile load

47a1-31/06 . having regard to possibility of fatigue rupture

47a1-33/00 Features common to bolt and nut

47a1-33/02 . Shape of thread; Special thread-forms (used as screw-locking device 47a1-39/30)
47a1-33/04 . . in view of tensile load
47a1-33/06 . Surface treatment of parts furnished with screw-thread, e.g. for preventing seizure

47a1-35/00 Screw-bolts; Stay bolts; Screw-threaded studs; Screws; Set screws (thread-cutting screws 47a1-25/00)

47a1-35/02 . divided longitudinally
47a1-35/04 . with specially-shaped head or shaft in order to fix the bolt on or in an object (locking the bolt against turning in the object by the use of accessory parts 47a1-39/00)
47a1-35/06 . . Specially-shaped heads (special shape in order to rotate the bolt 47a1-23/00)

47a1-37/00 Nuts or like thread-engaging members

47a1-37/02 . made of thin sheet material (fastening to surfaces 47a1-37/04)
47a1-37/04 . Devices for fastening nuts to surfaces
47a1-37/06 . . by means of welding or riveting
47a1-37/08 . Quickly-detachable nuts, e.g. consisting of two or more parts; Nuts movable along the bolt after tilting the nut
47a1-37/10 . . divided parallel or about parallel to the bolt axis
47a1-37/12 . with thread-engaging surfaces formed by inserted coil-springs, discs, or the like; Independent pieces of wound wire used as nuts; Threaded inserts for holes
47a1-37/14 . Cap nuts; Nut caps or bolt caps
47a1-37/16 . Wing nuts (47a1-37/14 takes precedence)

47a1-39/00 Locking of screws, bolts, or nuts (locking of bottle closures 64a; locking devices for valves or cocks 47g1)

Note:
Heads of screws or bolts are put on a par with nuts as far as pertains to locking; an object into which a screw is threaded is put on a par with a nut.

47a1-39/01 . specially adapted to prevent loosening at extreme temperatures
47a1-39/02 . in which the locking takes place after screwing down (47a1-39/01 takes precedence; split-pins, circlips, or the like for preventing relative axial movement only 47a1-21/10; fastening nuts by welding or riveting 47a1-37/06)
47a1-39/04 . . with a member penetrating the screw-threaded surface of at least one part, e.g. a pin, wedge, cotter-pin, screw
47a1-39/06 . . . with a pin or staple parallel to the bolt axis
47a1-39/08 . . with a cap interacting with the nut, connected to the bolt by a pin or cotter-pin
47a1-39/10 . . by a plate or ring immovable with regard to the bolt or object (47a1-39/08 takes precedence)
47a1-39/12 . . by means of locknuts
47a1-39/14 . . . made of thin sheet material or formed as spring washers (locknuts per se made of thin sheet material 47a1-37/02)
47a1-39/16 . . . in which the screw-thread of the locknut differs from that of the nut
47a1-39/18 . . . . in which the locknut grips with screw-thread in the nuts as well as on the bolt
47a1-39/20 . . by means of steel wire or the like (47a1-39/10 takes precedence)
47a1-39/22 . in which the locking takes place during screwing down or tightening (47a1-39/01 takes precedence)
47a1-39/24 . . by means of washers, spring washers, or resilient plates that lock against the object (locking to the screw-thread 47a1-39/14, 47a1-39/36)
47a1-39/26 . . . with spring washers fastened to the nut or bolt-head
47a1-39/28 . . by special members on, or shape of, the nut or bolt (47a1-39/26 takes precedence; locknuts 47a1-39/12)
47a1-39/282 . . . Locking by means of special shape of work-engaging surfaces, e.g. notched or toothed nuts
47a1-39/284 . . . Locking by means of elastic deformation (47a1-39/38 takes precedence)
47a1-39/286 . . . . caused by saw cuts
47a1-39/30 . . . Locking exclusively by special shape of the screw-thread
47a1-39/32 . . . Locking by means of a pawl or pawl-like tongue

47a1-39/34 . . . Locking by deformable inserts or like parts
47a1-39/36 . . . with conical locking parts, which may be split, including use of separate rings co-operating therewith
47a1-39/38 . . . with a second part of the screw-thread which may be resiliently mounted (47a1-39/30 takes precedence)

47a1-41/00 Measures against loss of bolts, nuts, or pins; Measures against unauthorised operation of bolts, nuts, or pins (seals 81c-16)

47a1-43/00 Washers or equivalent devices; Other devices for supporting bolt-heads or nuts (circlips 47a1-21/18; with special means for locking bolts or nuts 47a1-39/10, 47a1-39/24)
47a1-43/02 . with special provisions for engaging surfaces which are not perpendicular to a bolt axis or do not surround the bolt

47a1-45/00 Hooks; Eyes (if the attaching parts or means are concerned, groups 47a1-13/00, 47a1-15/00, 47a1-19/00, 47a1-25/00, 35/00, 47a1-47/00 take precedence; for hanging pictures or the like 34f-1/16; for hoisting or hauling purposes 35b)
47a1-45/02 . Hooks with pivoting closing member
47a1-45/04 . Hooks with sliding closing member
47a1-45/06 . Hooks with two symmetrically-pivoting hook parts

47a1-47/00 Suction cups for attaching purposes; Equivalent means using adhesives

47a2 (IPC: F16M) Frames, casings, or beds of engines or other machines, not specific to an engine or machine provided for elsewhere; Stands or supports

47a2-1/00 Frames or casings of engines or machines, Frames serving as machinery beds
47a2-1/02 . for reciprocating engines or similar machines
47a2-1/021 . . for housing crankshafts
47a2-1/022 . . . of tunnel type, i.e. wherein the crankshaft can only be introduced axially (for engines or machines with star-shaped cylinder arrangement 47a2-1/023)
47a2-1/023 . . . specially adapted for engines or machines with star-shaped cylinder arrangement
47a2-1/024 . . . facilitating assembly of power-transmitting parts of engines or machines, e.g. of connecting-rods
47a2-1/025 . . . Assembling bearings in casings, e.g. having anchor bolts
47a2-1/026 . . for housing movable engine or machine parts other than crankshafts, e.g. valve-gear housings
47a2-1/04 . for rotary engines or similar machines
47a2-1/08 . characterised by being built-up of sheet material or welded parts

47a2-3/00 Portable or wheeled frames or beds, e.g. for emergency power-supply aggregates, compressor sets (construction of vehicles in general 20, 63)

47a2-5/00 Engine beds, i.e. means for supporting engines or machines on foundations

47a2-7/00 Details of attaching or adjusting engine beds, frames, or supporting-legs on foundation or base; Attaching non-moving engine parts, e.g. cylinder blocks (elastic or equivalent mounting for absorbing vibrations 47a3, especially 47a3-15/04)

47a2-9/00 Special layout of foundations with respect to machinery to be supported (foundations for machinery 84c-27/44)

47a2-11/00 Stands or trestles as supports for apparatus or articles placed thereon (without heads 47a2-13/00; stands for drawing-boards 34i-27/00; show-stands

34l-7/00; for workmen 37e-1/32; special modifications for particular apparatus or articles, see the appropriate subclasses)

47a2-11/02 . Heads
47a2-11/04 . . Means for attachment of apparatus; Means allowing adjustment of the apparatus relatively to the stand
47a2-11/06 . . . allowing pivoting
47a2-11/08 . . . . around a vertical axis
47a2-11/10 . . . . around a horizontal axis
47a2-11/12 . . . . in more than one direction
47a2-11/14 . . . . . with ball-joint (ball-jointed hinges 47b-11/06)
47a2-11/16 . . Details concerning attachment of head-supporting legs, with or without actuation of locking members therefor
47a2-11/18 . . with mechanism for moving the apparatus relatively to the stand
47a2-11/20 . Undercarriages with or without wheels
47a2-11/22 . . with approximately constant height, e.g. with constant length of column or of legs (47a2-11/42 takes precedence)
47a2-11/24 . . changeable in height or length of legs, also for transport only (47a2-11/42 takes precedence)
47a2-11/26 . . . by telescoping, with or without folding (details concerning the constructional features of telescoping parts only 47a1-7/10)
47a2-11/28 . . . . Undercarriages for supports with one single telescoping pillar
47a2-11/30 . . . . . with co-moving side-struts
47a2-11/32 . . . . Undercarriages for supports with three or more telescoping legs
47a2-11/34 . . . . . Members limiting spreading of legs
47a2-11/36 . . . . . Members preventing slipping of the feet
47a2-11/38 . . . by folding
47a2-11/40 . . . by means of coilable or bendable legs
47a2-11/42 . with arrangement for propelling the support

47a2-13/00 **Other supports for positioning apparatus or articles** (heads thereof 47a2-11/02)**; Means for steadying hand-held apparatus or articles**

47a2-13/02 . for supporting on, or attaching to, an object, e.g. tree, gate, window-frame, cycle
47a2-13/04 . for supporting on, or holding steady relative to, a person, e.g. by chains
47a2-13/06 . also serviceable for other purposes, e.g. to be used as spade, chair, ski-stick
47a2-13/08 . . for use as a walking-cane

47a3 (IPC: F16F) Springs; Shock-absorbers; Means for dampening vibrations

47a3-1/00 **Springs** (working with fluid 47a3-5/00, 47a3-9/00; clockwork springs 83a-1)

47a3-1/02 . made of steel or other material having low internal friction
47a3-1/04 . . Wound springs
47a3-1/06 . . . with turns lying in cylindrical surfaces
47a3-1/08 . . . with turns lying in mainly conical surfaces
47a3-1/10 . . . Spiral springs with turns lying substantially in plane surfaces
47a3-1/12 . . . Attachments or mountings
47a3-1/14 . . Torsion springs consisting of bars or tubes
47a3-1/16 . . . Attachments or mountings
47a3-1/18 . . Leaf springs
47a3-1/20 . . . with layers, e.g. anti-friction layers, or with rollers between the leaves
47a3-1/22 . . . with means for modifying the spring characteristic
47a3-1/24 . . . Lubrication; Covers, e.g. for retaining lubricant
47a3-1/26 . . . Attachments or mountings
47a3-1/28 . . . . comprising cylindrical metal pins pivoted in close-fitting sleeves
47a3-1/30 . . . . comprising intermediate pieces made of rubber or similar elastic material
47a3-1/32 . . Cup springs; Dished disc springs (diaphragms 47f2-3/00)
47a3-1/34 . . Ring springs, i.e. annular bodies deformed radially due to axial load
47a3-1/36 . made of a material having high internal friction, e.g. rubber, plastic, cork, steel wool, compressed hair
47a3-1/37 . . of foam-like material, e.g. sponge rubber

47a3-1/38 . . with a sleeve of elastic material between a rigid outer sleeve and a rigid inner sleeve or pin
47a3-1/40 . . consisting of a stack of similar elements separated by non-elastic intermediate layers
47a3-1/42 . . characterised by the mode of stressing
47a3-1/44 . . . loaded mainly in compression
47a3-1/46 . . . loaded mainly in tension
47a3-1/48 . . . loaded mainly in torsion
47a3-1/50 . . . loaded mainly in shear
47a3-1/52 . . . loaded in combined stresses
47a3-1/54 . . . . loaded in compression and shear

47a3-3/00 Spring units consisting of several springs, e.g. for obtaining a desired spring characteristic (if including fluid springs 47a3-5/00, 47a3-13/00)
47a3-3/02 . with springs made of steel or of other material having low internal friction
47a3-3/04 . . composed only of wound springs
47a3-3/06 . . . of which some are placed around others in such a way that they damp each other by mutual friction
47a3-3/07 . . combined with chambers filled with gas or liquid
47a3-3/08 . with springs made of a material having high internal friction, e.g. rubber
47a3-3/10 . . combined with springs made of steel or other material having low internal friction

47a3-5/00 Liquid springs in which the liquid works as a spring by compression, e.g. combined with throttling action; Combinations of devices including liquid springs

47a3-6/00 Magnetic springs; Fluid magnetic springs

47a3-7/00 Vibration-dampers; Shock-absorbers (using fluid 47a3-5/00, 47a3-9/00; specific for rotary systems 47a3-15/10)
47a3-7/02 . with relatively-rotatable friction surfaces that are pressed together (if one of the members being a spring 47a3-13/02)
47a3-7/04 . . in the direction of the axis of rotation
47a3-7/06 . . in a direction perpendicular or inclined to the axis of rotation
47a3-7/08 . with friction surfaces rectilinearly movable along each other
47a3-7/10 . using inertia effect
47a3-7/12 . using plastic deformation of members
47a3-7/14 . of cable-support type, i.e. frictionally-engaged loop-forming cables

47a3-9/00 Springs, vibration-dampers, shock-absorbers, or similarly-constructed movement-dampers using a fluid or the equivalent as damping medium (47a3-5/00 takes precedence; door-operating appliances with fluid braking systems 68d)
47a3-9/02 . using gas only
47a3-9/04 . . in a chamber with a flexible wall
47a3-9/06 . using both gas and liquid
47a3-9/08 . . in a chamber with a flexible wall
47a3-9/10 . using liquid only; using a fluid of which the nature is immaterial
47a3-9/12 . . Devices with one or more rotary vanes turning in the fluid, any throttling effect being immaterial
47a3-9/14 . . Devices with one or more members, e.g. pistons, vanes, moving to and fro in chambers and using throttling effect
47a3-9/16 . . . involving only straight-line movement of the effective parts
47a3-9/18 . . . . with a closed cylinder and a piston separating two or more working spaces therein
47a3-9/19 . . . . . with a single cylinder
47a3-9/20 . . . . . with the piston-rod extending through both ends of the cylinder
47a3-9/22 . . . . with one or more cylinders, each having a single working space closed by a piston or plunger
47a3-9/24 . . . . . with a single cylinder and a single piston or plunger
47a3-9/26 . . . . . with two cylinders in line and with the two pistons or plungers connected together

47a3-9/28 . . . . . with two parallel cylinders and with the two pistons or plungers connected together
47a3-9/30 . with solid or semi-solid material, e.g. pasty masses, as damping medium
47a3-9/32 . Details
47a3-9/34 . . Special valve constructions (valves in general 47g1); Shape or construction of throttling passages
47a3-9/342 . . . Throttling passages operating with metering pins
47a3-9/346 . . . Throttling passages in the form of slots arranged in cylinder walls
47a3-9/348 . . . Throttling passages in the form of annular discs operating in opposite directions
47a3-9/36 . . Special sealings, including sealings or guides for piston-rods (sealing of moving parts in general 47f2-15/16 to 47f2-15/56)
47a3-9/38 . . Covers for protection or appearance
47a3-9/40 . . Arrangements for preventing froth
47a3-9/42 . . Cooling arrangements
47a3-9/43 . . Filling arrangements, e.g. for supply of gas
47a3-9/44 . . Means on or in the damper for manual or non-automatic adjustment; Such means combined with temperature correction (temperature correction only 47a3-9/52)
47a3-9/46 . . . allowing control from a distance
47a3-9/48 . . Arrangements for providing different damping effects at different parts of the stroke
47a3-9/49 . . . Stops limiting fluid passage, e.g. hydraulic stops
47a3-9/50 . . Special means providing automatic adjustment
47a3-9/52 . . . in case of change of temperature (combined with external adjustment 47a3-9/44)
47a3-9/54 . . Arrangements for attachment

47a3-11/00 Vibration-dampers or shock-absorbers working with both friction and a damping fluid

47a3-13/00 Units comprising springs of the non-fluid type as well as vibration-dampers, shock-absorbers, or fluid springs (47a3-5/00 takes precedence)
47a3-13/02 . damping by frictional contact between the spring and braking means (frictionally coacting wound springs 47a3-3/06)

47a3-15/00 Suppression of vibrations in systems; Means or arrangements for avoiding or reducing out-of-balance forces, e.g. due to motion
47a3-15/02 . Suppression of vibrations of non-rotating, e.g. reciprocating, systems; Suppression of vibrations of rotating systems by use of members not moving with the rotating system
47a3-15/03 . . using electromagnetic means
47a3-15/04 . . Elastic or equivalent mounting of engines, instruments, or other stationary objects, insofar as the relative disposition of the objects and the elastic members is shown
47a3-15/06 . . . with metal springs (with rubber springs also 47a3-15/08)
47a3-15/08 . . . with rubber springs
47a3-15/10 . Suppression of vibrations in rotating systems by making use of members moving with the system (by balancing 47a3-15/22; with flywheels acting variably or intermittently 47h)
47a3-15/12 . . using elastic members or friction-damping members
47a3-15/14 . . using freely-swinging masses rotating with the system
47a3-15/16 . . using a fluid (devices connecting input and output members 47c)
47a3-15/18 . . using dynamo-electric means
47a3-15/20 . Suppression of vibrations of rotating systems by favourable grouping or relative arrangement of the moving members of the system or systems
47a3-15/22 . Compensation of inertia forces
47a3-15/24 . . of crankshaft systems by particular disposition of cranks, pistons, etc.
47a3-15/26 . . of crankshaft systems using solid masses, other than the ordinary pistons, moving with the system
47a3-15/28 . Counterweights; Attaching or mounting same
47a3-15/30 . Flywheels (rotary-body aspects in general 47b-13/00, 47b-15/00)
47a3-15/32 . Correcting-weights or equivalent means for balancing rotating bodies (machines for balancing 42k)

47a4 **(IPC: F16P) Safety devices in general** (safety devices adapted to machines or apparatus for special purposes, see the relevant classes for the machines or apparatus)

Devices protecting or preventing injuries to people

47a4-1/00 **Safety devices independent of the control and operation of any machine** (protective devices for the eyes or ears, worn on the body or carried in the hand, 30d-27, 30d-29)

47a4-1/02 . Fixed screens or hoods
47a4-1/04 . Screens or hoods rotating with rotary shafts
47a4-1/06 . specially designed for welding

47a4-3/00 **Safety devices acting in conjunction with the control or operation of a machine; Control arrangements requiring the simultaneous use of two or more parts of the body** (47a4-5/00 takes precedence)

47a4-3/02 . Screens or other safety members moving in synchronism with members which move to and fro
47a4-3/04 . . for machines with parts which approach one another during operation, e.g. for stamping presses
47a4-3/06 . . . in which body parts of the operator are removed from the danger zone on approach of the machine parts
47a4-3/08 . in connection with the locking of doors, covers, guards, or like members giving access to moving machine parts
47a4-3/10 . . in which the operation of locking the door or other member causes the machine to start
47a4-3/12 . with means, e.g. feelers, which in case of the presence of a body part of a person in or near the danger zone influence the control or operation of the machine (47a4-3/08 takes precedence)
47a4-3/14 . . the means being photocells or other devices sensitive without mechanical contact
47a4-3/16 . . with feeling members moved by the machine
47a4-3/18 . Control arrangements requiring the use of both hands
47a4-3/20 . . for electric control systems
47a4-3/22 . . for hydraulic or pneumatic control systems
47a4-3/24 . . for mechanical controls

47a4-5/00 **Emergency means for rendering ineffective a coupling conveying reciprocating movement if the motion of the driven part is prematurely resisted**

47a4-7/00 **Emergency devices preventing damage to a machine or apparatus** (47a4-1/00, 47a4-3/00, 47a4-5/00 take precedence; indicating means, see the appropriate classes)

47a4-7/02 . by causing the machine to stop on the occurrence of dangerous conditions therein (devices in bearings affected by abnormal conditions 47b)

47a5	**(IPC: F16S) Constructional elements in general; Structures built-up from such elements, in general**
	Note: **Attention is drawn to subclass 37b, in which similar elements and structures, restricted to use in the building art, are to be found.**
47a5-1/00	**Sheets, panels, or other members of similar proportions; Constructions comprising assemblies of such members** (built-up gratings 47a5-3/00)
	Note: **In general shape the members may be flat or curved, but they may depart from such shape in detail over part or all of their area, e.g. they may be corrugated, ribbed, flanged; ribs, flanges, or the like may be separately formed.**
47a5-1/02	. designed for being secured together edge to edge, e.g. at an angle; Assemblies thereof
47a5-1/04	. produced by deforming or otherwise working a flat sheet
47a5-1/06	. . by deforming only
47a5-1/08	. . by cutting or perforating, with or without deformation
47a5-1/10	. Composite members, e.g. with ribs or flanges attached (47a5-1/02 takes precedence)
47a5-1/12	. of substantial thickness, e.g. with varying thickness, with channels
47a5-1/14	. Assemblies of such members with members of forms covered by group 47a5-3/00 or 47a5-5/00 (such other members being for jointing only 47a5-1/02)
47a5-3/00	**Elongated members, e.g. profiled members; Assemblies thereof; Gratings or grilles** (gratings or grilles formed from a sheet or the like 47a5-1/00, particularly 47a5-1/08)
47a5-3/02	. composed of two or more elongated members secured together side by side
47a5-3/04	. designed for being joined to similar members in various relative positions
47a5-3/06	. Assemblies of elongated members (47a5-3/02, 47a5-3/04 take precedence)
47a5-3/08	. . forming frameworks, e.g. gratings
47a5-5/00	**Other constructional members not restricted to an application fully provided for in a single class**
47b	**Elements for generation of reciprocating, rotating and gyratory movements: bearings, journals, joints, lead screws, levers, gears, pulleys, etc.**
	Spindles, shafts, rollers and journals
47b-1	Spindles, rigid shafts, elastic shafts, rollers as machine elements, crankshafts (46c1-12)
47b-2	Flexible and articulated shafts as machine elements (47c-4, 47c-5; 63c-18)
47b-3	Journals as machine elements
	Bearings (bearings for precision drives 47i-1)
47b-4	Bearings in general
47b-5	Self-aligning bearings
47b-6	Adjustable bearings
47b-7	Elastic bearings (82b-10)
47b-8	Load-relief devices for bearings
47b-9	Bushings and linings for bearings (31c; 40b)
47b-10	Cooling arrangements for bearings
47b-11	Bearings for rollers and drums (7a-18; 40a-5)
47b-12	Rolling contact bearings, ball bearings and roller bearings, races (20d-15; 63d-20; 63d-21)

Swivel joints and rod-shaped machine elements

47b-13 Swivel joints as machine elements (47c-4, 47c-5)
47b-14 Levers as machine elements, hand wheels
47b-15 Crossheads as machine elements
47b-16 Cranks as machine elements, adjustable cranks, safety cranks, general (46c5; 47h-1)
47b-17 Eccentrics and cams (47h-2)
47b-18 Connecting and coupling rods (46c1-12)
47b-19 Piston rods (46c1-12)

Drive gears and pulleys

47b-20 Drive gears and pulleys in general
47b-21 Rigid pulleys as machine elements
47b-22 Adjustable pulleys (47h-15; 63c-12)
47b-23 Pinions and racks (47h-6; 49d)
47b-24 Chain sprockets as machine elements
47b-25 Friction gears (47h-8; 63c-9; 63k-24)
47b-26 Rope pulleys (20a-12; 35a-10)

Miscellaneous elements for generation of movements in machines
(guides and guideways for moving precision-mechanical parts 47i-3)

47b-27 Guide, tension, pressure and slide rollers (47d-17; 47h-9; 47h-10)
47b-28 Flywheels, balancing devices (14a-15; 14c-22; 42c-42; 47h-20; 47h-25; 47h-26; 65f2-6)
47b-29 Lead screws and nuts therefor (47a-6; 47h-3)
47b-31 V-guideways, also with rollers
47b-32 Traction and thrust mechanisms with guide casings (47h-20; 47h-22; 47h-27; 57a-32; 63c-60; 63i)
47b-33 Bearing protection against penetration of dirt (20d-17; 46c1-16; 47f-22 – 47f-26; 63d-20; 63d-21)

47b (IPC: F16C) Shafts; Flexible shafts; Elements of crankshaft mechanisms; Rotary bodies other than gearing elements; Bearings

Note:
The phrase "Rotary bodies other than gearing elements" in the subclass title, and the relevant groups 47b-13/00 and 47b-15/00, cover any element which rotates so far as its features are affected only by the fact that it rotates.

47b-1/00 Flexible shafts; Mechanical means for transmitting movement in a flexible sheathing

47b-1/02 . for conveying rotary movements
47b-1/04 . . Articulated shafts
47b-1/06 . . with guiding-sheathing, tube, or box (47b-1/04 takes precedence; guiding-sheathings 47b-1/26)
47b-1/08 . . End connections
47b-1/10 . Means for transmitting linear movement in a flexible sheathing, e.g. "Bowden mechanisms" (guiding-sheathings 47b-1/26)
47b-1/12 . . Arrangements for transmitting movement to or from the flexible member
47b-1/14 . . . Construction of the end-piece of the flexible member; Attachment thereof to the flexible member
47b-1/16 . . . in which the end-piece is guided rectilinearly
47b-1/18 . . . in which the end portion of the flexible member is laid along a curved surface of a pivoted member
47b-1/20 . . Construction of flexible members moved to and fro in the sheathing
47b-1/22 . . Adjusting; Compensating length
47b-1/24 . Lubrication; Lubricating equipment

47b-1/26 . Construction of guiding-sheathings or guiding-tubes
47b-1/28 . . with built-in bearings

47b-3/00 Shafts (flexible shafts 47b-1/00)**; Axles; Cranks; Eccentrics**
47b-3/02 . Shafts; Axles
47b-3/03 . . telescopic
47b-3/035 . . . with built-in bearings
47b-3/04 . Crankshafts, eccentric-shafts; Cranks, eccentrics
47b-3/06 . . Crankshafts
47b-3/08 . . . made in one piece (features relating to lubrication 47b-3/14, to cooling 47b-3/16)
47b-3/10 . . . assembled of several parts, e.g. by welding
47b-3/12 . . . . releasably connected
47b-3/14 . . . Features relating to lubrication
47b-3/16 . . . Features relating to cooling
47b-3/18 . . Eccentric-shafts
47b-3/20 . . Shape of crankshafts or eccentric-shafts having regard to balancing
47b-3/22 . . Cranks; Eccentrics (constructional features of crank-pins per se 47b-11/02)
47b-3/24 . . . with return cranks, i.e. a second crank carried by the crank-pin
47b-3/26 . . . Elastic crank-webs; Resiliently-mounted crank-pins (elastic connecting-rods 47b-7/04)
47b-3/28 . . . Adjustable cranks or eccentrics (adjustable crank mechanisms 47h-21/20)
47b-3/30 . . . with arrangements for overcoming dead-centres

47b-5/00 Crossheads; Constructions of connecting-rod heads or piston-rod connections rigid with crossheads (piston-rods 47f2-7/00)

47b-7/00 Connecting-rods or like links pivoted at both ends (coupling-rods for locomotive driving-wheels 20b; with clutch or overload release 47h-57/06 to 47h-57/10)**; Construction of connecting-rod heads** (heads rigid with crossheads 47h-5/00)
47b-7/02 . Constructions of connecting-rods with constant length
47b-7/04 . with elastic intermediate part or fluid cushion
47b-7/06 . Adjustable connecting-rods
47b-7/08 . made from sheet metal

47b-9/00 Bearings for crankshafts or connecting-rods; Attachment of connecting-rods (lubrication of connecting-rods in connection with crankshafts 47b-3/14; connections to crossheads 47b-5/00, to pistons 47f2-1/14)
47b-9/02 . Crankshaft bearings
47b-9/03 . . Arrangements for adjusting play
47b-9/04 . Connecting-rod bearings; Attachment thereof
47b-9/06 . . Arrangements for adjusting play in bearings, operating either automatically or not (adjustable bearings in general 47b-25/00; adjusting arrangements in general 47h-57/00)

47b-11/00 Pivots; Pivotal connections
47b-11/02 . Trunnions; Crank-pins (fastening crank-pins to webs, crank-pins integral with cranks 47b-3/06, 47b-3/22)
47b-11/04 . Pivotal connections (for windows or doors 68c; rubber springs with stiff outer sleeve and inner sleeve or pin 47a3-1/38)
47b-11/06 . . Ball-joints; Other joints having more than one degree of angular freedom, i.e. universal joints (for transmitting rotary motion 47c-3/00)
47b-11/08 . . . with resilient bearings
47b-11/10 . . Arrangements for locking
47b-11/12 . . incorporating flexible connections, e.g. leaf springs

47b-13/00 Rolls, drums, discs, or the like (pulleys 47h-55/00; special adaptations, see the relevant classes)**; Bearings or mountings therefor**
47b-13/02 . Bearings
47b-13/04 . . Bearings with only partial enclosure of the member to be borne; Bearings with local support at two or more points
47b-13/06 . . self-adjusting

47b-15/00 Construction of rotary bodies to resist centrifugal force (flywheels, correction weights 47a3-15/30, 47a3-15/32)

Bearings for rotary parts (47b-9/00, 47b-13/02 take precedence; allowing for linear movement also 47b-31/00)

47b-17/00 Sliding-contact bearings
47b-17/02 . for radial load only
47b-17/03 . . with tiltably-supported segments, e.g. Michell bearings
47b-17/04 . for axial load only
47b-17/06 . . with tiltably-supported segments, e.g. Michell bearings
47b-17/08 . . for supporting the end face of a shaft or other member, e.g. footstep bearings
47b-17/10 . for both radial and axial load
47b-17/12 . characterised by features not related to the direction of the load
47b-17/14 . . specially adapted for operating in water
47b-17/16 . . (with rotating member supported by a fluid cushion formed, at least to a large extent, otherwise than by rotation of the shaft, e.g. hydrostatic air-cushion bearings
47b-17/18 . . with floating brasses or bushings, rotatable at a reduced speed
47b-17/20 . . with emergency supports or bearings
47b-17/22 . . with arrangements compensating for thermal expansion
47b-17/24 . . with devices affected by abnormal or undesired conditions, e.g. for preventing overheating, for safety
47b-17/26 . Systems consisting of a plurality of sliding-contact bearings

47b-19/00 Bearings with rolling contact
47b-19/02 . with bearing balls essentially of the same size in one or more circular rows
47b-19/04 . . for radial load mainly
47b-19/06 . . . with a single row of balls
47b-19/08 . . . with two or more rows of balls
47b-19/10 . . for axial load mainly
47b-19/12 . . . for supporting the end face of a shaft or other member, e.g. footstep bearings
47b-19/14 . . for both radial and axial load
47b-19/16 . . . with a single row of balls
47b-19/18 . . . with two or more rows of balls
47b-19/20 . . with loose spacing bodies, e.g. balls, between the bearing balls
47b-19/22 . with bearing rollers essentially of the same size in one or more circular rows, e.g. needle bearings
47b-19/24 . . for radial load mainly
47b-19/26 . . . with a single row of rollers
47b-19/28 . . . with two or more rows of rollers
47b-19/30 . . for axial load mainly
47b-19/32 . . . for supporting the end face of a shaft or other member, e.g. footstep bearings
47b-19/34 . . for both radial and axial load
47b-19/36 . . . with a single row of rollers
47b-19/38 . . . with two or more rows of rollers
47b-19/40 . . with loose spacing bodies between the rollers
47b-19/44 . . Needle bearings
47b-19/46 . . . with one row of needles
47b-19/48 . . . with two or more rows of needles
47b-19/49 . Bearings with both balls and rollers
47b-19/50 . Other types of ball or roller bearings
47b-19/52 . with devices affected by abnormal or undesired conditions
47b-19/54 . Systems consisting of a plurality of bearings with rolling friction (spindle bearings 47b-35/08)
47b-19/55 . . with intermediate floating rings rotating at reduced speed
47b-19/56 . . in which the rolling bodies of one bearing differ in diameter from those of another

47b-21/00 Combinations of sliding-contact bearings with ball or roller bearings

47b-23/00 **Bearings adjustable for aligning or positioning** (47b-27/00 takes precedence)
47b-23/02 . Sliding-contact bearings
47b-23/04 . . self-adjusting
47b-23/06 . Ball or roller bearings
47b-23/08 . . self-adjusting
47b-23/10 . Bearings, parts of which are eccentrically adjustable with respect to each other

47b-25/00 **Bearings adjustable for wear or play** (47b-27/00 takes precedence)
47b-25/02 . Sliding-contact bearings
47b-25/04 . . self-adjusting
47b-25/06 . Ball or roller bearings
47b-25/08 . . self-adjusting

47b-27/00 **Elastic or yielding bearings**
47b-27/02 . Sliding-contact bearings
47b-27/04 . Ball or roller bearings, e.g. with resilient rolling bodies
47b-27/06 . by means of parts of rubber or like materials (47b-27/08 takes precedence; with sliding surfaces of rubber or synthetic rubber 47b-33/22; construction of units comprising rigid inner and outer members with rubber or the like between them 47a3-1/38)
47b-27/08 . primarily for axial load, e.g. for vertically-arranged shafts

Other bearings

47b-29/00 **Bearings for parts moving only linearly** (incorporated in flexible shafts 47b-1/28)
47b-29/02 . Sliding-contact bearings, e.g. hydrostatic
47b-29/04 . Ball or roller bearings
47b-29/06 . . in which the rolling bodies circulate partly without carrying load
47b-29/08 . Arrangements for covering or protecting the ways
47b-29/10 . Arrangements for locking the bearings (preventing relative movement between machine parts in general 47a1, e.g. 47a1-1/00)
47b-29/12 . Arrangements for adjusting play

47b-31/00 **Bearings for parts which both rotate and move linearly**
47b-31/02 . Sliding-contact bearings
47b-31/04 . Ball or roller bearings
47b-31/06 . . in which the rolling bodies circulate partly without carrying load

47b-32/00 **Bearings not otherwise provided for**
47b-32/02 . Knife-edge bearings
47b-32/04 . Bearings for contact-free coaction with a movable part by the action of a magnetic field (arrangement of bearings in special classes, e.g. 21e-11/12, 21e-11/14; arrangement of magnetic bearings for relieving bearings 47b-39/06)
47b-32/06 . Bearings for contact-free coaction with a movable part by the action of an electric field (arrangement of bearings in special classes, e.g. 21e-11/12, 21e-11/14)
47b-32/08 . Bearings for contact-free coaction with a movable part by the action of an acoustic pressure field (arrangement of bearings in special classes, e.g. 21e-11/12, 21e-11/14, 47i-3/06)

Details or accessories of bearings

47b-33/00 **Parts of bearings; Special methods for making bearings or parts thereof** (metal-working or like operations, see the relevant classes)
47b-33/02 . Parts of sliding-contact bearings
47b-33/04 . . Brasses; Bushes; Linings
47b-33/06 . . . Sliding surface mainly made of metal (47b-33/24 to 47b-33/28 take precedence)
47b-33/08 . . . . Attachment of brasses, bushes, or linings to the bearing housing
47b-33/10 . . . . Construction relative to lubrication
47b-33/12 . . . . Structural composition; Use of special materials or surface treatments, e.g. for rust-proofing (the materials or treatments themselves, see the relevant classes, e.g. 40b, 39a3-31/02)

47b-33/14 . . . . Special methods of manufacture; Running-in
47b-33/16 . . . Sliding surface consisting mainly of graphite
47b-33/18 . . . Sliding surface consisting mainly of wood or fibrous material
47b-33/20 . . . Sliding surface consisting mainly of plastics (47b-33/22 to 47b-33/28 take precedence)
47b-33/22 . . . Sliding surface consisting mainly of rubber or synthetic rubber (47b-33/24 to 47b-33/28 take precedence; of interest apart from the surface itself 47b-27/06)
47b-33/24 . . . with different areas of the sliding surface consisting of different materials
47b-33/26 . . . made from wire coils; made from a number of discs, rings, rods, or other members
47b-33/28 . . . with embedded reinforcements shaped as frames or meshed materials
47b-33/30 . Parts of ball or roller bearings
47b-33/32 . . Balls
47b-33/34 . . Rollers; Needles
47b-33/36 . . . with bearing-surfaces other than cylindrical, e.g. tapered; with grooves in the bearing surfaces
47b-33/37 . . Loose spacing bodies
47b-33/372 . . . solid
47b-33/374 . . . resilient
47b-33/38 . . Ball cages
47b-33/40 . . . for multiple rows of balls
47b-33/41 . . . comb-shaped
47b-33/42 . . . made from wire or sheet-metal strips (47b-33/40, 47b-33/41 take precedence)
47b-33/44 . . . Selection of substances (47b-33/40, 47b-33/41 take precedence)
47b-33/46 . . Cages for rollers or needles
47b-33/48 . . . for multiple rows of rollers or needles
47b-33/49 . . . comb-shaped
47b-33/50 . . . formed of interconnected members, e.g. chains
47b-33/51 . . . formed of unconnected members
47b-33/52 . . . with no part entering between, or touching, the bearing surfaces of the rollers (47b-33/50 takes precedence)
47b-33/54 . . . made from wire, strips, or sheet metal (47b-33/48, 47b-33/49 take precedence)
47b-33/56 . . . Selection of substances (47b-33/48, 47b-33/49 take precedence)
47b-33/58 . . Raceways, Race rings
47b-33/60 . . . divided
47b-33/61 . . . . formed by wires
47b-33/62 . . . Selection of substances
47b-33/64 . . . Special methods of manufacture
47b-33/66 . . Special parts or details in view of lubrication
47b-33/72 . Sealings (sealings in general 47f2)
47b-33/74 . . of sliding-contact bearings
47b-33/76 . . of ball or roller bearings
47b-33/78 . . . with a diaphragm, disc, or ring, with or without resilient members
47b-33/80 . . . Labyrinth sealings
47b-33/82 . . . Arrangements for electrostatic or magnetic action against dust or other particles

47b-35/00 Support of bearing units; Housings, e.g. caps, covers (47b-23/00 takes precedence)
47b-35/02 . in the case of sliding-contact bearings
47b-35/04 . in the case of ball or roller bearings
47b-35/06 . . Mounting of ball or roller bearings; Fixing them on the shaft or in the housing
47b-35/08 . for spindles
47b-35/10 . . with sliding-contact bearings
47b-35/12 . . with ball or roller bearings

47b-37/00 Cooling of bearings

47b-39/00 Relieving load on bearings
47b-39/02 . using mechanical means
47b-39/04 . using hydraulic or pneumatic means
47b-39/06 . using magnetic means

47b-41/00	**Other accessories**
47b-41/02	. Arrangements for equalising the load on a plurality of bearings or their elements
47b-41/04	. Preventing damage to bearings during storage or transport thereof or when otherwise out of use
47b-43/00	**Assembling bearings**
47b-43/02	. Assembling sliding-contact bearings
47b-43/04	. Assembling rolling contact bearings
47b-43/06	. . Placing rolling bodies in cages or bearings
47b-43/08	. . . by deforming the cages or the races

47c **Shaft couplings and brakes for rotary movements** (rolling mill couplings 7a-20; couplings for presses, shears and punching presses 7e-18, 49c-17/08; couplings for rail vehicles 20e; couplings for hoisting equipment 35c-1/22; couplings for reapers 45c-33/06, 45c-69/08; rod couplings 47a-3; rope couplings 47d-11, 47d-12; pipe couplings 47f-7 – 47f-14; couplings for lathes 49a-21/01; couplings for sewing machines 52a-56/01 – 52a-56/03, couplings for aircraft transmission shafts 62c-12/04, 63c-12/05; couplings for draft-animal vehicles 63a-40; couplings for motor vehicles 63c-13 – 63c-18, 63c-24; couplings for bicycles and motorcycles 63k-34 – 63k-37; couplings for transmission shafts aboard ships 65f3-21; couplings for double windows 68b-14; couplings for sliding windows 68b-27/80; couplings for centrifuges 82b-11/50; brakes for steam engines 14g- 5/01; brakes for printing presses 15d-11/03; 15d-26/30; brakes for rail vehicles 20f; track brakes 20h-3 – 20h-5; brakes for electric motors 21c-59/55 – 21c-59/59, 21d2-23/02; brakes for roller curtains 34e-7, 34e-8; brakes for elevators, hoisting equipment, pulley blocks, conveyors, cranes 35c-3; brake regulators for phonographs 42g-19/01; brake dynamometers 42k-2; brakes for reapers 45c-33/06, 45c-69/10; brakes for threshing machines 45e-3/01, 45e-7/58; brakes for straw cutters 45e-34/01, 45e-29/14; brakes for internal-combustion engines 46b1-23; brakes for valves, locks and slide valves 47g-6, 47g-35/02; brakes for movement transmitting devices in precision mechanics 47i-5; brakes for sewing machines 52a-56/01; brakes for camera shutters 57a-32/02; brake governors for engines 60-9; brakes for life-saving equipment 61a-8/01, 61a-8/02; brakes for aircraft 62b-47; stationary braking devices for aircraft 62e-27/01; brakes for hand-and animal-drawn vehicles 63a-45 – 63a-54, 63b-7, 63b-15, 63b-26; brakes for motor vehicles 63c-51 – 63c-57; for bicycles and motorcycles 63i; brakes aboard ships 65a2-8; brakes on doors and windows 68d-9 – 68d-15, 68d-17; brakes for recoiling gun barrels 72c-8, 72c-9/02; brake regulators for automatic firearms 72h-1/03; brakes for centrifuges 82b-12; brakes for looms 86c-18/10; brakes for wind motors 88c-3/16; brakes for rectilinear motion in special classes)

Non-disengageable shaft couplings

47c-1	Fixed shaft couplings as machine elements
47c-2	Hub connections as machine elements
47c-3	Set collars as machine elements
47c-4	Movable shaft couplings; knuckle, universal, ball and socket, Oldham joints, flexible couplings
47c-5	Elastic shaft couplings

Engageable and disengageable shaft couplings [clutches] and devices for engagement and disengagement

47c-6 Claw and dog clutches as machine elements, also spring and brush couplings for shafts
47c-7 Cylinder friction clutches for shafts
47c-8 Overload and safety clutches for shafts
47c-9 Cone and disk friction clutches for shafts
47c-10 Brake band and brake ring couplings, also screw-adjusted band friction clutches for shafts
47c-11 Multiple disk clutches for shafts
47c-12 Compound shaft couplings
47c-13 Centrifugal friction clutches for shafts
47c-14 Hydraulic clutches, also air and hydraulic pressure controlled clutches for shafts
47c-15 Electromagnetically operated friction and claw couplings for shafts (21d1-40; 21d1-41)
47c-16 Mechanically engaged and disengaged devices for shaft couplings (47d-20; 47d-21)

Brakes and friction linings for rotary movements in general

47c-17/01 Brakes for rotary movements in general (shock absorbers 47a-16/10; brake power regulators 20f, 49; 63c, 53; spring brakes 20f, 14; 63c, 51; 72c, 803; buffer brakes 20f, 19)
47c-17/02 Band and shoe friction brakes for rotary movements
47c-17/03 Disk friction brakes for rotary movements
47c-17/04 Centrifugal friction brakes for rotary movements
47c-17/05 Brakes with liquids as power transfer medium for rotary movements (compressed-air and hydraulic controls for brakes 20f-26/43, 63c-53, 63c-54, 63a-53; compressed-air and hydraulic linkages 47h-22; brake fluid dynamometer 42k-2/02; air or hydraulic brakes as buffers or shock absorbers 47a-16/10, 20e-25, 68d-10 – 68d-13; as gun barrel recoil brakes 72c-8/01, 72c-8/04; chemical composition of brake fluids 23c-5)
47c-17/06 Electromagnetically controlled friction brakes for rotary movements (electric braking devices for railroad cars 20l-28, 20l-29; purely electromagnetic and electromechanic braking of electrical machines 21d1-42, 21d2-19, 21d2-23; eddy current brakes 21d1-42, 20f-44; brake magnets 21g-2)
47c-18 Friction linings and friction elements therefor (20f-1, 63c-51/05; mechanical production of friction elements with organic binders 39a, with inorganic binders 80a; preparation of material with organic binders 39b, with inorganic binders 80b; alloy composition of friction and brake elements 18d, 40b)

47c (IPC: F16D) Couplings; Clutches; Brakes

Couplings (fluid couplings 47c-31/00 to 47c-39/00; couplings or joints specially adapted for deep-drilling rods or sucker rods 5a; for transmitting motion through a wall without relatively-moving surfaces 47f2-15/50)

47c-1/00 Couplings for rigidly connecting two coaxial shafts or other movable machine elements (attachment of wheels to axles for railway carriages 20b; for attachment of cranks to their shafts 47b-3/10)
47c-1/02 . for connecting two abutting shafts or the like
47c-1/04 . . with clamping hub; with hub and longitudinal key
47c-1/06 . for attachment of a member on a shaft or on a shaft-end
47c-1/08 . . with clamping hub; with hub and longitudinal key
47c-1/10 . Quick-acting couplings in which the parts are connected by simply bringing them together axially
47c-1/12 . allowing adjustment of the parts about the axis (during motion 47c-3/10)

47c-3/00 Yielding couplings, i.e. with means permitting movement between the connected parts during the drive (couplings disconnectable simply by axial movement 47c-1/10; slip couplings 47c-7/00)
47c-3/02 . adapted to specific functions (universal joints, see the appropriate groups)

47c-3/04	. . specially adapted to allow radial displacement, e.g. Oldham couplings
47c-3/06	. . specially adapted to allow axial displacement
47c-3/08	. . Couplings for intersecting shafts, provided with intermediate bars bent in an angle corresponding with the angle of intersection
47c-3/10	. . Couplings with means for varying the angular relationship of two coaxial shafts during motion
47c-3/12	. . specially adapted for accumulation of energy to absorb shocks or vibration (by making use of fluid elements 47c-3/80)
47c-3/14	. . combined with a friction coupling for damping vibration or absorbing shock
47c-3/16	. Universal joints in which flexibility is produced by means of pivots or sliding or rolling connecting parts
47c-3/18	. . the coupling parts having slidably-interengaging teeth ("coupling parts" means the driving member and the driven member of the coupling to the mounted on, and rotate as a unit with, the shafts or their equivalents between which the coupling is placed. An intermediate member interconnecting these parts is regarded as such an equivalent.)
47c-3/19	. . . of resilient material or structure
47c-3/20	. . one coupling part entering a sleeve of the other coupling part and connected thereto by sliding or rolling members (47c-3/18, 47c-3/24 take precedence)
47c-3/22	. . . the rolling members being balls, rollers, or the like, guided in grooves
47c-3/24	. . comprising balls, rollers, or the like between overlapping driving faces, e.g. cogs, on both coupling parts
47c-3/26	. . Hooke's joints or other joints with an equivalent intermediate member to which each coupling part is pivotally or slidably connected (47c-3/18, 47c-3/20 take precedence)
47c-3/28	. . . in which the interconnecting pivots include elastic members
47c-3/30	. . . in which the coupling is specially adapted to constant velocity-ratio
47c-3/32	. . . . by the provision of two intermediate members each having two relatively-perpendicular trunnions or bearings
47c-3/33	. . . . . with ball or roller bearings
47c-3/34	. . . . parts being connected by ridges, pins, balls, or the like guided in grooves or between cogs
47c-3/36	. . . in which each pivot between the coupling parts and the intermediate member comprises a single ball
47c-3/38	. . . with a single intermediate member with trunnions or bearings arranged on two axes perpendicular to one another (47c-3/36 takes precedence)
47c-3/40	. . . . with intermediate member provided with two pairs of outwardly-directed trunnions on intersecting axes
47c-3/41	. . . . . with ball or roller bearings
47c-3/42	. . . . with ring-shaped intermediate member provided with bearings or inwardly-directed trunnions
47c-3/43	. . . . . with ball or roller bearings
47c-3/44	. . . the intermediate member being connected to the coupling parts by ridges, pins, balls, or the like guided in grooves or between cogs
47c-3/46	. . . . each coupling part embracing grooves or ridges on the intermediate member
47c-3/48	. . one coupling part having pins arranged parallel to the axis and entering holes in the other coupling part
47c-3/50	. with the coupling parts connected by one or more intermediate members (47c-3/16 takes precedence)
47c-3/52	. . comprising a continuous strip, spring, or the like engaging the coupling parts at a number of places
47c-3/54	. . Couplings comprising a chain or strip surrounding two wheels arranged side by side and provided with teeth or the equivalent
47c-3/56	. . comprising elastic metal lamellae, elastic rods, or the like, e.g. arranged radially or parallel to the axis, the members being shear-loaded collectively by the total load
47c-3/58	. . . the intermediate members being made of rubber or like material
47c-3/60	. . comprising pushing or pulling links attached to both parts (47c-3/64 takes precedence)
47c-3/62	. . . the links or their attachments being elastic

47c-3/64 . . comprising elastic elements arranged between substantially-radial walls of both coupling parts
47c-3/66 . . . the elements being metallic, e.g. in the form of coils
47c-3/68 . . . the elements being made of rubber or similar material
47c-3/70 . . comprising elastic elements arranged in holes in one coupling part and surrounding pins on the other coupling part
47c-3/72 . . with axially-spaced attachments to the coupling parts (47c-3/56 takes precedence)
47c-3/74 . . . the intermediate member or members being made of rubber or other flexible material
47c-3/76 . . shaped as an elastic ring centered on the axis, surrounding a portion of one coupling part and surrounded by a sleeve of the other coupling part
47c-3/77 . . . the ring being metallic
47c-3/78 . . shaped as an elastic disc or flat ring, arranged perpendicular to the axis of the coupling parts, different sets of spots of the disc or ring being attached to each coupling part, e.g. Hardy couplings
47c-3/79 . . . the disc or ring being metallic
47c-3/80 . in which a fluid is used (fluid couplings allowing continuous slip 47c-31/00 to 47c-35/00)
47c-3/82 . . with a coupling element in the form of a pneumatic tube (similar clutches 47c-25/04)
47c-3/84 . Shrouds, e.g. casings, covers; Sealing means specially adapted therefor

47c-5/00 Impulse couplings, i.e. couplings that alternately accelerate and decelerate the driven member

47c-7/00 Slip couplings, e.g. slipping on overload, for absorbing shock (combined with yielding shaft couplings 47c-3/14; fluid slip couplings 47c-31/00 to 47c-35/00)
47c-7/02 . of the friction type (couplings in which overload initiates a decrease of coupling pressure or a disconnection, see the relevant groups for clutches)
47c-7/04 . of the ratchet type (similar gearings based on repeated accumulation and delivery of inertia-energy 47h-33/08)
47c-7/06 . . with intermediate balls or rollers

47c-9/00 Couplings with safety member for disconnecting, e.g. breaking or melting member

Clutches with mechanically-actuated clutching members (automatic clutches 47c-41/00 to 47c-45/00)

47c-11/00 Clutches in which the members have interengaging parts (arrangements for synchronisation 47c-23/02)
47c-11/02 . disengaged by a contact of a part mounted on the clutch with a stationarily-mounted member
47c-11/04 . . with clutching members movable only axially
47c-11/06 . . with clutching members movable otherwise than only axially, e.g. rotatable keys
47c-11/08 . actuated by moving a non-rotating part axially (actuating-mechanisms in the relevant groups)
47c-11/10 . . with clutching members movable only axially
47c-11/12 . . with clutching members movable otherwise than only axially

47c-13/00 Friction clutches (arrangements for synchronisation 47c-23/02)
47c-13/02 . disengaged by the contact of a part mounted on the clutch with a stationarily-mounted member
47c-13/04 . with means for actuating or keeping engaged by a force derived at least partially from one of the shafts to be connected (automatic clutches 47c-43/00)
47c-13/06 . . with clutching members movable otherwise than only axially (47c-13/08, 47c-13/12 take precedence)
47c-13/08 . with a helical band or equivalent member, which may be built-up from linked parts, with more than one turn embracing a drum or the like, with or without an additional clutch actuating the end of the band (47c-13/02 takes precedence; similar freewheel clutches 47c-41/20; similar brakes 47c-49/02)

47c-13/10	. with clutching members co-operating with the periphery of a drum, a wheel-rim, or the like (47c-13/02 to 47c-13/08 take precedence; similar brakes 47c-49/00)
47c-13/12	. with an expansible band or coil co-operating with the inner surface of a drum or the like (47c-13/02 takes precedence; similar brakes 47c-51/02)
47c-13/14	. with outwardly-movable clutching members co-operating with the inner surface of a drum or the like (47c-13/02, 47c-13/06, 47c-13/12 take precedence; similar brakes 47c-51/00)
47c-13/16	. . shaped as radially-movable segments
47c-13/18	. . shaped as linked or separately-pivoted segments
47c-13/20	. with clutching members co-operating with both the periphery and the inner surface of a drum or wheel-rim (similar brakes 47c-53/00)
47c-13/22	. with axially-movable clutching members (similar brakes 47c-55/00)
47c-13/24	. . with conical friction surfaces
47c-13/26	. . . in which the or each axially-movable member is pressed exclusively against an axially-located member
47c-13/28	. . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
47c-13/30	. . . . . in which the clutching pressure is produced by springs only
47c-13/32	. . . in which two or more axially-movable members are pressed from one side towards an axially-located member
47c-13/34	. . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
47c-13/36	. . . . . in which the clutching pressure is produced by springs only
47c-13/38	. . with flat clutching surfaces, e.g. discs
47c-13/40	. . . in which the or each axially-movable member is pressed exclusively against an axially-located member
47c-13/42	. . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
47c-13/44	. . . . . in which the clutching pressure is produced by springs only
47c-13/46	. . . in which two axially-movable members, of which one is attached to the driving side and the other to the driven side, are pressed from one side towards an axially-located member
47c-13/48	. . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
47c-13/50	. . . . . in which the clutching pressure is produced by springs only
47c-13/52	. . . Clutches with multiple lamellae
47c-13/54	. . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
47c-13/56	. . . . . in which the clutching pressure is produced by springs only
47c-13/58	. Details
47c-13/60	. . Clutching elements (friction lining or attachment thereof 47c-69/00)
47c-13/62	. . . Clutch-bands; Clutch-shoes; Clutch-drums (brake-bands, brake-shoes, brake-drums 47c-65/00)
47c-13/64	. . . Clutch-plates; Clutch-lamellae (brake-plates, brake-lamellae 47c-65/12)
47c-13/66	. . . . of conical shape
47c-13/68	. . . . Attachments of plates or lamellae to their supports
47c-13/69	. . . . Arrangements for spreading lamellae in released state
47c-13/70	. . Pressure members, e.g. pressure plates, for clutch-plates or lamellae; Guiding arrangements for pressure members
47c-13/71	. . . in which the clutching pressure is produced by springs only
47c-13/72	. . Features relating to cooling
47c-13/74	. . Features relating to lubrication
47c-13/75	. . Features relating to adjustment, e.g. slack adjusters
47c-13/76	. specially adapted to incorporate with other transmission parts, i.e. at least one of the clutch parts also having another function, e.g. being the disc of a pulley
47c-15/00	**Clutches with wedging balls or rollers or with other wedgeable separate clutching members** (freewheels, freewheel clutches 47c-41/00)

47c-17/00 **Clutches in which the drive is transmitted solely by virtue of the eccentricity of the contacting surfaces of clutch members which fit one around the other**

47c-19/00 **Clutches with mechanically-actuated clutching members not otherwise provided for**

47c-21/00 **Systems comprising a plurality of mechanically-actuated clutches** (for synchronisation 47c-23/04)

47c-21/02 . for interconnecting three or more shafts or other transmission members in different ways (in endless-track vehicles 63a)

47c-21/04 . . with a shaft carrying a number of rotatable transmission members, e.g. gears, each of which can be connected to the shaft by a clutching member or members between the shaft and the hub of the transmission member

47c-21/06 . . at least two driving shafts or two driven shafts being concentric

47c-21/08 . Serially-arranged clutches interconnecting two shafts only when all the clutches are engaged (47c-13/08, 47c-13/12 take precedence)

47c-23/00 **Details of mechanically-actuated clutches not specific for one distinct type**

47c-23/02 . Arrangements for synchronisation, also for power-operated clutches (shape or mounting of interengaging parts of clutch members to facilitate engagement 47c-11/08)

47c-23/04 . . with an additional friction clutch

47c-23/06 . . . and a blocking mechanism preventing the engagement of the main clutch prior to synchronisation

47c-23/08 . . with a blocking mechanism that only releases the clutching member on synchronisation (in combination with an additional friction clutch 47c-23/06)

47c-23/10 . . automatically producing the engagement of the clutch when the clutch members are moving at the same speed; Indicating synchronisation

47c-23/12 . Mechanical clutch-actuating mechanisms arranged outside the clutch as such (specific for combined clutches 47c-21/00; mechanisms specific for synchronisation 47c-23/02)

47c-23/14 . . Clutch-actuating sleeves; Actuating members directly connected to clutch-actuating sleeves

Clutches actuated non-mechanically (arrangements for synchronisation 47c-23/02; fluid clutches 47c-31/00 to 47c-39/00; automatic clutches 47c-41/00 to 47c-45/00; electric clutches 21d1)

47c-25/00 **Fluid-actuated clutches**

47c-25/02 . with means for actuating or keeping engaged by a force derived at least partially from one of the shafts to be connected

47c-25/04 . in which the fluid actuates an elastic clutching member, e.g. a diaphragm or a pneumatic tube (47c-25/02 takes precedence; coupling using a pneumatic tube 47c-3/82)

47c-25/06 . in which the fluid actuates a piston incorporated in the clutch (47c-25/02 takes precedence)

47c-25/061 . . the clutch having interengaging clutch members

47c-25/062 . . the clutch having friction surfaces

47c-25/063 . . . with clutch members exclusively moving axially

47c-25/064 . . . . the friction surface being grooved

47c-25/065 . . . with clutching members having a movement which has at least a radial component

47c-25/08 . with fluid-actuated member not rotating with a clutching member (47c-25/02 takes precedence)

47c-25/10 . Clutch systems with a plurality of fluid-actuated clutches

47c-25/12 . Details not specific to one of the before-mentioned types

47c-27/00 **Magnetically-actuated clutches; Circuits therefor** (clutches with magnetisable particles 47c-37/02)

47c-27/01 . with permanent magnets

47c-27/02 . with electromagnets incorporated in the clutch, i.e. with collecting rings
47c-27/04 . . with axially-movable friction surfaces
47c-27/06 . . . with friction surfaces arranged within the flux
47c-27/07 . . . . Constructional features of clutch-plates or clutch-lamellae
47c-27/08 . . . with friction surfaces arranged externally to the flux
47c-27/09 . . and with interengaging jaws or gear-teeth
47c-27/10 . with an electromagnet not rotating with a clutching member, i. e. without collecting rings
47c-27/12 . Clutch systems with a plurality of electromagnetically-actuated clutches
47c-27/14 . Details

47c-29/00 Clutches and systems of clutches involving both fluid and magnetic actuation

Freewheels or freewheel clutches with a fluid or semi-fluid as power-transmitting means

47c-31/00 Fluid couplings or clutches with pumping sets of the volumetric type, i.e. in the case of liquid passing a predetermined volume per revolution
47c-31/02 . using pumps with pistons or plungers working in cylinders
47c-31/04 . using gear-pumps
47c-31/06 . using pumps of types differing from those before-mentioned
47c-31/08 . Control of slip

47c-33/00 Rotary fluid couplings or clutches of the hydrokinetic type
47c-33/02 . controlled by changing the flow of the liquid in the working circuit, while maintaining a completely filled working circuit
47c-33/04 . . by altering the position of blades
47c-33/06 . controlled by changing the amount of liquid in the working circuit
47c-33/08 . . by devices incorporated in the fluid coupling, with or without remote control
47c-33/10 . . . consisting of controllable supply and discharge openings
47c-33/12 . . . . controlled automatically by self-actuated valves
47c-33/14 . . . consisting of shiftable or adjustable scoops
47c-33/16 . . by means arranged externally of the coupling or clutch
47c-33/18 . Details (applicable also to fluid gearing 47h-41/24)
47c-33/20 . . Shape of wheels, blades, or channels with respect to function

47c-35/00 Fluid clutches in which the clutching is predominantly obtained by fluid adhesion (47c-37/00 takes precedence)

47c-37/00 Clutches in which the drive is transmitted through a medium consisting of small particles, e.g. centrifugally speed-responsive
47c-37/02 . the particles being magnetisable

47c-39/00 Combinations of couplings according to two or more of the groups 47c-31/00 to 47c-37/00

Freewheels or freewheel clutches; Automatic clutches (47c-31/00 to 47c-39/00 take precedence)

47c-41/00 Freewheels or freewheel clutches
47c-41/02 . disengaged by contact of a part of or on the freewheel or freewheel clutch with a stationarily-mounted member
47c-41/04 . combined with a clutch for locking the driving and driven members (47c-41/02, 47c-41/24 take precedence)
47c-41/06 . with intermediate wedging coupling members (47c-41/02, 47c-41/24 take precedence)
47c-41/07 . . between two cylindrical surfaces
47c-41/08 . . with provision for altering the freewheeling action
47c-41/10 . . . with self-actuated reversing
47c-41/12 . with hinged pawl co-operating with teeth, cogs, or the like (47c-41/02, 47c-41/24 take precedence)
47c-41/14 . . the effective stroke of the pawl being adjustable

47c-41/16 . . the action being reversible
47c-41/18 . with non-hinged detent (47c-41/02, 47c-41/24 take precedence)
47c-41/20 . with expandable or contractable clamping ring or band (47c-41/02, 47c-41/24 take precedence)
47c-41/22 . with clutching ring or disc axially shifted as a result of lost motion between actuating members (47c-41/02, 47c-41/24 take precedence)
47c-41/24 . specially adapted for cycles
47c-41/26 . . with provision for altering the action
47c-41/28 . . with intermediate wedging coupling members
47c-41/30 . . with hinged pawl co-operating with teeth, cogs, or the like
47c-41/32 . . with non-hinged detent
47c-41/34 . . with expandable or contractable clamping ring or band
47c-41/36 . . with clutching ring or disc axially shifted as a result of lost motion between actuating members

47c-43/00 Automatic clutches (varying the relationship between two coaxial shafts 47c-3/10; freewheels, freewheel clutches 47c-41/00)

47c-43/02 . actuated entirely mechanically
47c-43/04 . . controlled by angular speed (47c-43/24 takes precedence; clutches in which the drive is transmitted through a medium consisting of small particles 47c-37/00)
47c-43/06 . . . with centrifugal masses actuating axially a movable pressure ring or the like
47c-43/08 . . . . the pressure ring actuating friction plates, cones, or similar axially-movable friction surfaces
47c-43/09 . . . . . in which the carrier of the centrifugal masses can be stopped
47c-43/10 . . . . . the centrifugal masses acting directly on the pressure ring, no other actuating mechanism for the pressure ring being provided
47c-43/12 . . . . . the centrifugal masses acting on, or forming a part of, an actuating mechanism by which the pressure ring can also be actuated independently of the masses
47c-43/14 . . . with centrifugal masses actuating the clutching members directly in a direction which has at least a radial component; with centrifugal masses themselves being the clutching members
47c-43/16 . . . . with clutching members having interengaging parts
47c-43/18 . . . . with friction clutching members
47c-43/20 . . controlled by torque, e.g. overload-release clutches, slip-clutches with means by which torque varies the clutching pressure (slip couplings of the ratchet type 47c-7/04)
47c-43/21 . . . with friction members
47c-43/22 . . controlled by both speed and torque
47c-43/24 . . controlled by acceleration or deceleration of angular speed
47c-43/25 . . controlled by thermo-responsive elements
47c-43/26 . . acting at definite angular position or disengaging after a definite number of rotations (actuating by means of stationary abutment 47c-11/02, 47c-13/02, 47c-15/00; automatically-controlled reversing mechanisms for toothed gearings 47h-5/68)
47c-43/28 . actuated by fluid pressure
47c-43/284 . . controlled by angular speed
47c-43/286 . . controlled by torque
47c-43/30 . Systems of a plurality of automatic clutches

47c-45/00 Freewheels or freewheel clutches combined with automatic clutches

47c-47/00 Systems of clutches, or clutches and couplings, comprising devices of types grouped under at least two of the preceding subgroups

47c-47/02 . of which at least one is a coupling (elastic attachment of clutch parts, see the groups for the clutches)
47c-47/04 . of which at least one is a freewheel (47c-47/02, 47c-47/06 take precedence; freewheels combined with a clutch to lock the driving and driven members of the freewheel 47c-41/04, 47c-41/26)
47c-47/06 . of which at least one is a clutch with a fluid or a semifluid as power-transmitting means

Brakes (dynamo-electric brakes 21d1)

47c-49/00 **Brakes with a braking member co-operating with the periphery of a drum, wheel-rim, or the like** (similar clutches 47c-13/10)

47c-49/02 . shaped as a helical band or coil with more than one turn, with or without intensification of the braking force by the tension of the band or contracting member (similar clutches 47c-13/08)
47c-49/04 . . mechanically actuated
47c-49/06 . . fluid actuated
47c-49/08 . shaped as an encircling band extending over approximately 360°
47c-49/10 . . mechanically actuated (self-tightening 47c-49/20)
47c-49/12 . . fluid actuated
47c-49/14 . shaped as a fluid-filled flexible member actuated by variation of the fluid pressure
47c-49/16 . Brakes with two brake-blocks (self-tightening 47c-49/20)
47c-49/18 . Brakes with three or more brake-blocks (self-tightening 47c-49/20)
47c-49/20 . Self-tightening brakes (with helical band or coil with more than one turn 47c-49/02)
47c-49/22 . . with an auxiliary friction member initiating or increasing the action of the brake

47c-51/00 **Brakes with outwardly-movable braking members co-operating with the inner surface of a drum or the like** (similar clutches 47c-13/14)

47c-51/02 . shaped as one or more circumferential bands (similar clutches 47c-13/12)
47c-51/04 . . mechanically actuated
47c-51/06 . . fluid actuated
47c-51/08 . shaped as an expansible fluid-filled flexible member
47c-51/10 . shaped as exclusively radially-movable brake-shoes
47c-51/12 . . mechanically actuated
47c-51/14 . . fluid actuated
47c-51/16 . shaped as brake-shoes pivoted on a fixed or nearly-fixed axis (self-tightening 47c-51/46)
47c-51/18 . . with two brake-shoes
47c-51/20 . . . extending in opposite directions from their pivots
47c-51/22 . . . . mechanically actuated
47c-51/24 . . . . fluid actuated
47c-51/26 . . . both extending in the same direction from their pivots
47c-51/28 . . . . mechanically actuated
47c-51/30 . . . . fluid actuated
47c-51/32 . . with three or more brake-shoes
47c-51/34 . . . extending in opposite directions from their pivots
47c-51/36 . . . . mechanically actuated
47c-51/38 . . . . fluid actuated
47c-51/40 . . . all extending in the same direction from their pivots
47c-51/42 . . . . mechanically actuated
47c-51/44 . . . . fluid actuated
47c-51/46 . Self-tightening brakes with pivoted brake-shoes
47c-51/48 . . with two linked or directly-interacting brake-shoes
47c-51/50 . . . mechanically actuated
47c-51/52 . . . fluid actuated
47c-51/54 . . with three or more brake-shoes, at least two of them being linked or directly interacting
47c-51/56 . . . mechanically actuated
47c-51/58 . . . fluid actuated
47c-51/60 . . with wedging action of a brake-shoe, e.g. the shoe entering as a wedge between the brake-drum and a stationary part
47c-51/62 . . . mechanically actuated
47c-51/64 . . . fluid actuated
47c-51/66 . . an actuated brake-shoe being carried along and thereby engaging a member for actuating another brake-shoe
47c-51/68 . . . mechanically actuated
47c-51/70 . . . fluid actuated

47c-53/00 **Brakes with braking members co-operating with both the periphery and the inner surface of a drum, wheel-rim, or the like** (similar clutches 47c-13/20)

47c-55/00 **Brakes with substantially-radial braking surfaces pressed together in axial direction, e.g. disc brakes** (similar clutches 47c-13/38)

47c-55/02 . with axially-movable discs or shoes pressed against axially-located rotating members
47c-55/04 . . by moving discs or shoes away from one another against radial walls of drums or cylinders
47c-55/06 . . . without self-tightening action
47c-55/08 . . . . Mechanically-actuated brakes
47c-55/10 . . . . Brakes actuated by a fluid-pressure device arranged in or on the brake
47c-55/12 . . . . . comprising an expansible fluid-filled flexible member coaxial with the brake
47c-55/14 . . . with self-tightening action, e.g. by means of coacting helical surfaces or balls and inclined surfaces
47c-55/15 . . . . initiated by means of brake-bands or brake-shoes
47c-55/16 . . . . Mechanically-actuated brakes
47c-55/18 . . . . Brakes actuated by a fluid-pressure device arranged in or on the brake
47c-55/20 . . . . . comprising an expansible fluid-filled flexible member coaxial with the brake
47c-55/22 . . by clamping an axially-located rotating disc between two movable discs or brake-shoes
47c-55/224 . . . with common actuating member for both sides
47c-55/228 . . . with a separate actuating member for each side
47c-55/24 . with a plurality of axially-movable discs, lamellae, or shoes, pressed from one side towards an axially-located member
47c-55/26 . . without self-tightening action
47c-55/28 . . . Brakes with only one rotating disc
47c-55/30 . . . . mechanically actuated
47c-55/31 . . . . . by means of an intermediate leverage
47c-55/32 . . . . actuated by a fluid-pressure device arranged in or on the brake
47c-55/33 . . . . . by means of an intermediate leverage
47c-55/34 . . . . . comprising an expansible fluid-filled flexible member coaxial with the brake
47c-55/36 . . . Brakes with a plurality of rotating discs all lying side by side
47c-55/38 . . . . mechanically actuated
47c-55/39 . . . . . by means of an intermediate leverage
47c-55/40 . . . . actuated by a fluid-pressure device arranged in or on the brake
47c-55/41 . . . . . by means of an intermediate leverage
47c-55/42 . . . . . comprising an expansible fluid-filled flexible member coaxial with the brake
47c-55/44 . . . with the rotating part consisting of both central plates and ring-shaped plates arranged concentrically around the central plates
47c-55/46 . . with self-tightening action
47c-55/48 . . . with discs or shoes having a small free angular travel relative to their support, which produces the self-tightening action
47c-55/50 . . . with auxiliary friction members, which may be of different type, producing the self-tightening action

47c-57/00 **Liquid-resistance brakes; Air-resistance brakes**

47c-57/02 . with blades or like members braked by the fluid
47c-57/04 . with blades causing a directed flow, e.g. Föttinger type
47c-57/06 . comprising a pump circulating fluid, braking being effected by throttling of the circulation

47c-59/00 **Self-acting brakes, e.g. coming into operation at a predetermined speed**

47c-59/02 . spring-loaded and adapted to be released by mechanical, fluid, or electromagnetic means

47c-61/00 **Brakes with means for making the energy absorbed available for use** (47c-57/00 takes precedence)

47c-63/00 **Brakes not otherwise provided for; Brakes combining a plurality of the before-mentioned types** (brakes with auxiliary members for self-tightening 47c-49/22, 47c-51/66, 47c-55/50)

47c-65/00 **Parts or details** (similar members for clutches 47c-13/58)
47c-65/02 . Braking members; Mounting thereof (friction linings or attachment thereof 47c-69/00)
47c-65/04 . . Bands or shoes; Pivots or supporting members therefor
47c-65/06 . . . for externally-engaging brakes
47c-65/08 . . . for internally-engaging brakes
47c-65/10 . . Drums for externally- or internally-engaging brakes
47c-65/12 . . Discs; Drums for disc brakes
47c-65/13 . . Details of disc brakes
47c-65/14 . Actuating mechanisms for brakes; Means for initiating operation at a predetermined position
47c-65/16 . . arranged in or on the brake
47c-65/18 . . . adapted for drawing members together
47c-65/20 . . . . comprising a fluid-pressure device
47c-65/22 . . . adapted for pressing members apart
47c-65/24 . . . . comprising a fluid-pressure device
47c-65/26 . . . . . in the form of a fluid-filled flexible member
47c-65/28 . . arranged apart from the brake
47c-65/30 . . . acting mechanically
47c-65/32 . . . acting by fluid means
47c-65/34 . . . acting by electric means
47c-65/36 . . . acting by both fluid and electric means
47c-65/38 . Slack adjusters
47c-65/40 . . mechanical
47c-65/42 . . . non-automatic
47c-65/44 . . . . by means of direct linear adjustment (47c-65/46, 47c-65/48 take precedence)
47c-65/46 . . . . with screw-thread and nut
47c-65/48 . . . . with eccentric or helical body
47c-65/50 . . . . for angular adjustment of two concentric parts of the brake control system
47c-65/52 . . . self-acting in one direction for adjusting excessive play
47c-65/54 . . . . by means of direct linear adjustment (47c-65/56, 47c-65/58 take precedence)
47c-65/56 . . . . with screw-thread and nut
47c-65/58 . . . . with eccentric or helical body
47c-65/60 . . . . for angular adjustment of two concentric parts of the brake control system
47c-65/62 . . . self-acting in both directions for adjusting excessive and insufficient play
47c-65/64 . . . . by means of direct linear adjustment (47c-65/66, 47c-65/68 take precedence)
47c-65/66 . . . . with screw-thread and nut
47c-65/68 . . . . with eccentric or helical body
47c-65/70 . . . . for angular adjustment of two concentric parts of the brake control system
47c-65/72 . . hydraulic
47c-65/74 . . . self-acting in one direction
47c-65/76 . . . self-acting in both directions
47c-65/78 . Features relating to cooling
47c-65/80 . . for externally-engaging brakes
47c-65/82 . . for internally-engaging brakes
47c-65/84 . . for disc brakes

47c-66/00 **Arrangements for monitoring working conditions, e.g. wear, temperature**
47c-66/02 . Apparatus for indicating wear

47c-67/00 **Combinations devices of at least two of the following categories- couplings, clutches, brakes, other mechanical transmission devices** (47c-71/00 takes precedence; combinations of couplings and clutches 47c-47/02)
47c-67/02 . Clutch-brake combinations
47c-67/04 . . fluid actuated
47c-67/06 . . electromagnetically actuated

47c-69/00	**Friction linings; Attachment thereof; Selection of coacting friction substances or surfaces** (clutching elements 47c-13/60; braking members 47c-65/02)
47c-69/02	. Composition of linings (chemical aspects, see the relevant classes)
47c-69/04	. Attachment of linings
47c-71/00	**Mechanisms for bringing members to rest in a predetermined position** (combined with, or controlling, clutches 47c-43/26; means for initiating operation of brakes at a predetermined position 47c-65/14; means for securing members after operation 47a1-1/02)
47c-71/02	. comprising auxiliary means for producing the final movement
47c-71/04	. providing for selection between a plurality of positions (47c-71/02 takes precedence)

47d Driving belts, ropes, cords, chains; connectors and joints for same; fastening devices for ropes and chains; hooks for load-carrying chains, etc; auxiliary devices for connecting driving belts and ropes; belt shippers; shifters (belt, rope and chain drives 47h-9 – 47h-11)

Driving belts and accessories

47d-1	Driving belts in general and accessories, also belt lubricators (rope and chain lubricators 47e-35)
47d-2	Driving belts made of leather and their production in general (special production methods 28b-20 – 28b-24)
47d-3	Driving belts made of fibers and their production in general (special production methods 25a, 25b, 86c)
47d-4	Driving belts made of wire mesh (production 7d-6, 86f)
47d-5	Driving belts made of rubber (production 39a-10, 39a3-29/00, 39a6-7/22)
47d-6	Driving belts made of metal ribbons
47d-7	Link belts, also metal link belts (63k-29)
47d-8	Compound driving belts (63k-29)
47d-9	Connectors and joints for driving belts (47d-17, 47d-17/50)

Driving ropes, cords and accessories (ropes and cords in general 73; 5a-32/60; 19a-23/01; 19a-25/18; 20a)

47d-10	Driving ropes and cords
47d-11	Connectors and joints for driving ropes and cords (47d-17, 47d-17/50)
47d-12	Rope fasteners, such as rope clamps, sleeves, knots, turnbuckles for ropes and other pulling devices (21c-21; 37d-36/03; 87a-21; cable grabs 20a-18 – 29a-20; cord clamps for curtains 34e-4 – 34e-6)

Chains and accessories, hooks

47d-13	Non-separable-link chains (production 49k; for bicycles and motorcycles 63k-29; watch and ornamental chains 44a-40)
47d-14	Separable-link chains (63k-29)
47d-15	Connectors and fasteners of chains, such as toggles, swivels, shackles (44a-37, 44a-40, 44a-43; 45h-2, 45h-3; 56b-23; 63a-24)
47d-16	Hooks for load chains, etc. also snap hooks (production 7e-19; 35b-6/01; 44a-34, 44a-37, 44a-40, 44a-43; 45h-2, 45h-3; 56b-23; 63a-24)

Auxiliary devices for connecting driving belts and ropes, belt and rope shippers and shifters

47d-17	Tightening devices for connecting driving belts and ropes
47d-17/50	Other auxiliary devices for connecting driving belts and ropes
47d-18	Manual devices for shipping belts and ropes
47d-19	Mechanical devices for shipping belts and ropes
47d-20	Shifters for driving belts and ropes

47d-21 Shifters, other than in 47d-20, especially for remote stopping any drive type (47g-45; safety devices 47a-18)

47d (IPC: F16G) Belts, cables or ropes, predominantly used for driving purposes; Chains; Fittings predominantly used therefor (conveyer belts 81e; traction chains for conveyer chains 81e; gearings using flexible members 47h)

47d-1/00 Driving-belts (V-belts 47d-5/00; conveyer belts 81e)
47d-1/02 . made of leather (47d-1/28 takes precedence; making thereof 28b)
47d-1/04 . made of fibrous material, e.g. textiles, whether rubber-covered or not (47d-1/28 takes precedence; making thereof 86c)
47d-1/06 . made of rubber (47d-1/28 takes precedence; making thereof 39a6-7/22)
47d-1/08 . . with reinforcement bonded by the rubber
47d-1/10 . . . with textile reinforcement
47d-1/12 . . . with metal reinforcement
47d-1/14 . made of plastics (47d-1/28 takes precedence; making thereof 39a3-29/00)
47d-1/16 . . with reinforcement bonded by the plastic material
47d-1/18 . made of wire (making thereof 7d-43/00)
47d-1/20 . made of a single metal strip (making thereof 7c-53/14)
47d-1/21 . built-up from superimposed layers, e.g. zig-zag folded
47d-1/22 . consisting of several parts
47d-1/24 . . in the form of links (in the shape of chain links 47d-13/08)
47d-1/26 . . in the form of strips or lamellae
47d-1/28 . with a contact surface of special shape, e.g. toothed

47d-3/00 Belt fastenings, e.g. for conveyer belts (for V-belts 47d-7/00)
47d-3/02 . with series of eyes or the like, interposed and linked by a pin to form a hinge (47d-3/09 takes precedence)
47d-3/04 . . in which the ends of separate U-shaped or like eyes are attached to the belt by parts penetrating into it
47d-3/06 . with outwardly-bent, mutually-connected belt ends
47d-3/07 . Friction clamps, e.g. of grommet-thimble type
47d-3/08 . consisting of plates and screw-bolts or rivets (47d-3/06 takes precedence)
47d-3/09 . . the plates forming a hinge
47d-3/10 . Joining belts by sewing, sticking, vulcanising, or the like; Constructional adaptations of the belt ends for this purpose
47d-3/12 . Joining belts by lacing
47d-3/14 . with extensible parts; with resilient parts
47d-3/16 . Devices or machines for connecting driving-belts or the like

47d-5/00 V-belts, i.e. belts of tapered cross-section
47d-5/02 . made of leather (47d-5/20 takes precedence)
47d-5/04 . made of rubber (47d-5/20 takes precedence)
47d-5/06 . . with reinforcement bonded by the rubber
47d-5/08 . . . with textile reinforcement
47d-5/10 . . . with metal reinforcement
47d-5/12 . made of plastics (47d-5/20 takes precedence)
47d-5/14 . . with reinforcement bonded by the plastic material
47d-5/16 . consisting of several parts
47d-5/18 . . in the form of links
47d-5/20 . with a contact surface of special shape, e.g. toothed
47d-5/22 . built-up from superimposed layers
47d-5/24 . . zig-zag folded

47d-7/00 V-belt fastenings
47d-7/02 . locked, e.g. riveted
47d-7/04 . quickly detachable
47d-7/06 . adjustable, e.g. for tension

47d-9/00	**Ropes or cables specially adapted for driving, or for being driven by, pulleys or other gearing elements** (ropes or cables in general 73)
47d-9/02	. made of leather; having enveloping sheathings made of leather
47d-9/04	. made of rubber or plastics (47d-9/02 takes precedence)
47d-11/00	**Means for fastening cables or ropes to one another or to other objects; Caps or sleeves for fixing on cables or ropes** (attaching ropes or cables to lift cars or cages 35a-9, to winch drums or barrels 35c-1; ground anchors 37b-5/00; anchoring devices for prestressed members 37b-5/00)
47d-11/02	. with parts deformable to grip the cable or cables; Fastening means which engage a sleeve or the like fixed on the cable
47d-11/03	. incorporating resiliently-mounted members for attachment of the cable end
47d-11/04	. with wedging action, e.g. friction clamps of grommet-thimble type (47d-11/02 takes precedence)
47d-11/05	. . by using conical plugs insertable between the strands
47d-11/06	. with laterally-arranged screws (47d-11/02, 47d-11/04 take precedence)
47d-11/08	. Fastenings for securing ends of driving-cables to one another, the fastenings having approximately the same diameter as the cables
47d-11/09	. . incorporating hinge joints or pivots for the attachment of the cable ends
47d-11/10	. Quick-acting fastenings; Clamps holding in one direction only
47d-11/12	. Connections or attachments, e.g. turnbuckles, adapted for straining of cables, ropes, or wire (straining wire in general 7d-9/00)
47d-11/14	. Devices or coupling-pieces designed for easy formation of adjustable loops, e.g. choker hooks; Hooks or eyes with integral parts designed to facilitate quick attachment to cables or ropes at any point, e.g. by forming loops (crane hooks 35b-1/34; hooks or eyes in general 47a1-45/00)
47d-13/00	**Chains** (making thereof 7i)
47d-13/02	. Driving-chains (specially adapted to gearings with variable gear-ratio 47h-9/00)
47d-13/04	. . Toothed chains
47d-13/06	. . with links connected by parallel driving-pins with or without rollers
47d-13/07	. . . the links being of identical shape, e.g. cranked
47d-13/08	. . with links closely interposed on the joint pins (47d-13/04 takes precedence)
47d-13/10	. . with universal joints
47d-13/12	. Hauling- or hoisting-chains
47d-13/14	. . without separate joint pins; built-up from readily-separable links
47d-13/16	. . with arrangements for holding electric cables, hoses, or the like
47d-13/18	. Chains having special overall characteristics
47d-13/20	. . stiff; Push-pull chains
47d-13/22	. . extensible
47d-13/24	. . . resilient
47d-15/00	**Chain couplings; Shackles; Chain joints; Chain links; Chain bushes** (making chain elements 7i)
47d-15/02	. for fastening more or less permanently
47d-15/04	. Quickly-detachable chain couplings; Shackles
47d-15/06	. . Shackles designed for attachment by joint pins to chain elements, e.g. D-shackles
47d-15/08	. Swivels
47d-15/10	. Emergency joints or links
47d-15/12	. Chain links
47d-15/14	. . made of sheet metal, e.g. profiled
47d-17/00	**Hooks as integral parts of chains** (hooks for cranes 35b-1/34; hooks in general 47a1-45/00)

47e Lubricating devices

Lubrication devices for bearings (7a-18; 14c-19/02; 20d-18 – 20d-20; 47b; 63d-19; 76c-25; 85b-10/40)

47e-1	Lubricating devices for horizontal bearings (20d-18)

47e-2 Lubricating devices for step and journal bearings (shaft lubrication 76c-25; centrifuges 82b-10/40)

47e-3 Lubricating devices for bearings of various types, such as thrust block bearings (horseshoe bearings 47b)

Lubricator cups for pressure-free elements (47e-19, 47e-31)

47e-4 Lubricator cups without moving parts

47e-5 Lubricator cups with moving parts

47e-6 Lubricator cups with wick lubrication, and miscellaneous lubricator cups

Lubricating devices for rotating machine parts

47e-7 Lubricating devices for cranks and eccentrics

47e-8 Lubricating devices for free pulleys and idlers

Lubricating devices for reciprocating machine parts

47e-9 Lubricating devices for slide valves

47e-10 Lubricating devices for pistons

47e-11 Lubricating devices for stuffing boxes and piston rods

47e-12 Lubricating devices for crossheads and connecting rods

Lubricating devices for steam and gas engine cylinders (46c1-2)

47e-13 Lubricating devices based on water condensation effect

47e-14 Lubricating devices based on pressure fluctuations, etc.

Force-feed lubricators

47e-15 Force-feed lubricators with intermittent drive

47e-16 Force-feed lubricators actuated by steam, air or water pressure

47e-17 Force-feed lubricators with spring drive

47e-18 Force-feed lubricators actuated by weights

47e-19 Force-feed lubricators manually operated; grease cups

47e-20 Force-feed lubricators actuated by centrifugal force

47e-21 Miscellaneous force-feed lubricators

Lubrication pumps, oil-feed control valves, oil bucket pumps

47e-22 Lubrication pumps with mechanical drive

47e-23 Lubrication pumps actuated by steam

47e-24 Miscellaneous lubrication pumps (59)

47e-25 Oil feed control valves

47e-26 Oil bucket pumps (59d-1)

Central lubrication devices

47e-27 Oil distributors for central lubrication devices

47e-28 Central lubrication devices actuated by air or water pressure

47e-29 Miscellaneous central lubrication devices

47e-30 Lubrication devices for lubricants containing graphite

Lubricating-device components

47e-31 Closures and covers for lubricator cups

47e-32 Regulating spindles of lubricators

47e-33 Miscellaneous components of lubricating devices

47e-34 Oil cans for lubricating purposes

47e-35 Lubricating devices for various purposes (lubricating devices for driving belts 47d-1; for motor vehicles 63c-75/01, 63c-75/02; for conveyor chains 81e-41, etc; lubricating devices for conveyor cables 35a-26, 73)

47e **(IPC: F16N) Lubricating** (special modifications of devices or systems for use in particular machines or apparatus, see the relevant classes for the machines or apparatus)

Lubrication devices or arrangements for oil or grease

47e-1/00 **Constructional modifications of parts of machines or apparatus for the purpose of lubrication**

47e-3/00 **Devices for supplying lubricant by manual action)**
47e-3/02 . delivering oil
47e-3/04 . . Oil cans; Oil syringes
47e-3/06 . . . delivering on squeezing
47e-3/08 . . . incorporating a piston-pump
47e-3/10 . delivering grease
47e-3/12 . . Grease guns

47e-5/00 **Apparatus with hand-positioned nozzle supplied with lubricant under pressure** (47e-3/00 takes precedence)
47e-5/02 . Nozzles and nozzle-valve arrangements therefor, e.g. high-pressure grease guns

47e-7/00 **Arrangements for supplying oil or unspecified lubricant from a stationary reservoir or the equivalent in or on the machine or member to be lubricated** (axle-box lubrication for railway rolling-stock 20d)
47e-7/02 . with gravity feed or drip lubrication
47e-7/04 . . with oil flow promoted by vibration
47e-7/06 . . Arrangements in which the droplets are visible
47e-7/08 . . controlled by means of the temperature of the member to be lubricated (thermostats 42i)
47e-7/10 . . incorporating manually-operated regulating means, e.g. spindles
47e-7/12 . with feed by capillary action, e.g. by wicks
47e-7/14 . the lubricant being conveyed from the reservoir by mechanical means (by pumping devices 47e-7/36, 47e-7/38; adaptations for lubrication engines 46c)
47e-7/16 . . the oil being carried up by a lifting device (scoop devices in general 59d)
47e-7/18 . . . with one or more feed members fixed on a shaft
47e-7/20 . . . with one or more members moving around the shaft to be lubricated
47e-7/22 . . . . shaped as rings
47e-7/24 . . . with discs, rollers, belts, or the like contacting the shaft to be lubricated
47e-7/26 . . Splash lubrication (mist lubrication 47e-7/32)
47e-7/28 . . Dip lubrication
47e-7/30 . the oil being fed or carried along by another fluid (in internal-combustion engines 46c)
47e-7/32 . . Mist lubrication (splash lubrication 47e-7/26)
47e-7/34 . . . Atomising devices for oil (atomising devices in general 85g)
47e-7/36 . with feed by pumping action of the member to be lubricated or of a shaft of the machine; Centrifugal lubrication
47e-7/38 . with a separate pump; Central lubrication systems
47e-7/40 . . in a closed circulation system

47e-9/00 **Arrangements for supplying oil or unspecified lubricant from a moving reservoir or the equivalent** (also usable with a stationary reservoir 47e-7/00)
47e-9/02 . with reservoir on or in a rotary member
47e-9/04 . with reservoir on or in a reciprocating, rocking, or swinging member

47e-11/00 **Arrangements for supplying grease from a stationary reservoir or the equivalent in or on the machine or member to be lubricated; Grease cups**
47e-11/02 . Hand-actuated grease cups, e.g. Stauffer cups
47e-11/04 . Spring-loaded devices
47e-11/06 . Weight-loaded devices
47e-11/08 . with mechanical drive, other than directly by springs or weights (lubricating-pumps 47e-13/00)
47e-11/10 . by pressure of another fluid

47e-11/12 . by centrifugal action

47e-13/00 Lubricating-pumps (oil cans with pump 47e-3/08; pumps for liquids in general 59)
47e-13/02 . with reciprocating piston (pumps with distributing equipment 47e-13/22)
47e-13/04 . . Adjustable reciprocating pumps
47e-13/06 . . Actuation of lubricating-pumps
47e-13/08 . . . by hand
47e-13/10 . . . with mechanical drive (47e-13/18 takes precedence)
47e-13/12 . . . . with ratchet
47e-13/14 . . . . with cam or wobble-plate on shaft parallel to the pump cylinder or cylinders
47e-13/16 . . . with fluid drive
47e-13/18 . . . relative movement of pump parts being produced by inertia of one of the parts or of a driving member
47e-13/20 . Rotary pumps (with distributing equipment 47e-13/22)
47e-13/22 . with distributing equipment (separate distributing equipment 47e-25/00)

47e-15/00 Lubrication with substances other than oil or grease; Lubrication characterised by the use of particular lubricants in particular apparatus or conditions (47e-17/00 takes precedence; lubricating compositions, selection of particular substances as lubricants in general 23c; bearings with surfaces incorporating lubricant 47b-33/04; lubrication specially adapted to machines or apparatus provided for in a single other class, see the relevant class for the machine or apparatus)
47e-15/02 . with graphite or graphite-containing compositions
47e-15/04 . with water (bearings working in water 47b)

47e-17/00 Lubrication of machines or apparatus working under extreme conditions (additives to lubricating oil or lubricating grease 23c)
47e-17/02 . at high temperature (of turbines 14c, 46f, 88a; lubrication of internal-combustion engines 46c)
47e-17/04 . at low temperature (lubrication of refrigerating machines 17a)
47e-17/06 . in vacuum or under reduced pressure (lubrication of evacuating pumps 27b, 27c; of rotary anodes of X-ray tubes 21g)

Details of lubricators or lubrication systems

47e-19/00 Lubricant containers for use in lubricators or lubrication systems

47e-21/00 Conduits; Junctions (in general 47f1)**; Fittings for lubrication apertures**
47e-21/02 . Lubricating nipples
47e-21/04 . Nozzles for connection of lubricating equipment to nipples
47e-21/06 . Covering members for nipples, conduits, or apertures

47e-23/00 Special adaptations of check valves (check valves in general 47g1)

47e-25/00 Distributing equipment
47e-25/02 . with reciprocating distributing slide valve
47e-25/04 . with rotary distributing member (combined with oil pump 47e-13/22)

47e-27/00 Proportioning devices (liquid meters 42e)
47e-27/02 . Gating equipment (multiple-way valves 47g1; metering cocks 42e)

47e-29/00 Special means in lubricating arrangements or systems providing for the indication or detection of undesired conditions; Uses of devices responsive to conditions in lubricating arrangements or systems (in bearings 47b; constructions of apparatus outside the lubricating arrangements or systems, see the relevant classes)
47e-29/02 . for influencing the supply of lubricant
47e-29/04 . enabling a warning to be given; enabling moving parts to be stopped

47e-31/00 **Means for collecting, retaining, or draining-off lubricant in or on machines or apparatus** (oil separators for separating oil from exhaust steam 13d)

47e-31/02 . Oil catchers; Oil wipers (oil-scraping rings for pistons 47f2-9/20)

47e-33/00 **Mechanical arrangements for cleaning lubricating equipment; Special racks or the like for use in draining lubricant from machine parts**

Care of lubricants

47e-35/00 **Storage of lubricants in engine-rooms or the like (storage containers 81c)**

47e-37/00 **Equipment for transferring lubricant from one container to another**

47e-37/02 . for filling grease guns

47e-39/00 **Arrangements for conditioning of lubricants in the lubricating system** (cleaning of lubricating oil, additions to lubricating oil or lubricating grease 23c)

47e-39/02 . by cooling (heat-exchangers in general 17)

47e-39/04 . by heating (heat-exchangers in general 17)

47e-39/06 . by filtration (filters in general 12d; magnetic separators 1b, 23c)

47e-39/08 . by diluting, e.g. by addition of fuel (lubrication for internal-combustion engines 46c)

47f Machine elements used in conveying and containing gaseous, liquid and granular materials, i.e. materials resisting only compression forces; tubing [pipes and hoses], cylinders and casings ["displacement chambers"], pistons and floats ["displacers"], wrist pins, vessels, pipe and vessel closures, seals, pipe protection and pipe insulation against temperature variations

Pipes in general and special devices for pipes (4c-15 – 4c-22; 5d; 13d; 21c-18 – 21c-27; 36c; 37d-39; 85d; 85e-6 – 85e-8)

47f-1/01 Pipes equipped for control of flow processes; reduction of friction, prevention of turbulence and cavitation, etc. (14g-10; 27c-11/04; 42e-4; 46c2-5/01; 47g-35/01; 59a, 59b; 72a-28; 84d-5/04, 84d-7/10; 88a)

47f-1/10 Pipes with safety devices against shock vibrations and pressure surges (47a-20; 85d-6)

47f-1/50 Devices for laying of pipes (85e-8)

47f-1/60 Devices for supervision of pipe lines during operation; inspection and cleaning, e.g. windows, covers, brushes

47f-1/70 Devices for repair of pipe damage

47f-1/80 Other devices for pipes, such as traps (13b; 13d; 14g; 17a-16; 17a-17; 17d; 46d; 85e-9)

Pipe fastenings

47f-2/01 Pipe fasteners in the form of suspension devices or supports, in general (37b-5; 37e)

47f-2/02 Pipe clamps (21c-17; 21c-18; 37c-10; 37c-11/05; 47f-17)

47f-2/03 Roller supports

47f-2/10 Mounts, covers and seals for pipes led through walls, ceilings, etc.

Pipes and hoses, structures and materials

Rigid metal pipes (13a; 13b; 17f; 36c-9)

47f-3/01 in general (production of pipes 7a, 7b, 7c, 31b, 31c, 80a)

47f-3/02 double walled (80b-13)

47f-3/03 ribbed (7b-16)

47f-3/04 corrugated

47f-3/05 reinforced

47f-3/06 telescopic

Other pipes

47f-3/20 of wood
47f-3/25 of cement and concrete
47f-3/30 of ceramic materials: clay, stoneware, porcelain
47f-3/35 of glass
47f-3/40 of hard rubber and celluloid
47f-3/45 of paper and paper-like materials (54c)
47f-3/49 of materials not mentioned above

47f-3/50 Straight pipe joints
47f-3/51 Elbows, curves, bends and U-bends
47f-3/52 T, cross and other branch elements
47f-3/53 Y-elements
47f-3/54 Reducer sections
47f-3/55 Boring clamps and accessories for branch elements (49a)
47f-3/56 Other pipe fittings
47f-4 Hoses of nonmetallic materials, especially fabric and rubber (production 25a, 25b, 39a-10, 39a-11, 39a6-7/00, 86c-1 – 86c-7)
47f-5/01 Metal hoses (7b)
47f-5/10 Flexible metal tubes (corrugated) (7b)

Non-detachable pipe and hose joints (21c-18 – 21c-27; 37b-5; 85e-8)

47f-6/01 Riveted joints for pipes
47f-6/05 Flanged joints for pipes
47f-6/10 Soldered joints for pipes (7c; 49h-25 – 49h-33)

Welded joints (7b; 7c; 21h; 37b-5; 49h-34 – 49h-37)

47f-6/20 in general
47f-6/21 with seam reinforced and elongated, for instance, through increased thickness and zigzag shape of pipe ends forming the welded seam
47f-6/22 with means for relieving and protecting welded seam from tensile, compressive and other stresses, such as double-flanged welded sleeves, groove and ring fastenings, straps, shrink fit, expanding bulge
47f-6/23 with means for alteration of pipe direction, such as welded ball sockets
47f-6/24 with means for compensation for contraction stresses and seasonal temperature stresses
47f-6/25 with means for protection of pipe material from detrimental effects of welding heat
47f-6/26 with several of the above means
47f-6/40 with testing chamber
47f-6/41 Other special devices for welded pipe joints
47f-6/50 Other non-detachable joints for pipes and hoses

Detachable pipe and hose joints

Flange couplings

47f-7/01 with flanges integral with pipe
47f-7/02 with riveted flanges
47f-7/03 with screwed flanges
47f-7/04 with rolled-on flanges
47f-7/05 with flanges soldered or cast on to pipe
47f-7/06 with flanges welded onto pipe and flanges with welded neck
47f-7/07 Combinations of several of the above joining methods
47f-7/10 with loose flanges and cast, upset, or flanged collar
47f-7/11 with loose flanges and riveted, screwed, rolled or welded collar
47f-7/12 with loose flanges and collars fixed by several methods

47f-7/20	Other flange connections and special arrangements
	Socket joints
47f-8/01	in general
47f-8/02	Sockets reinforced by rings, by flanging, etc.
47f-8/03	for smooth pipes with sleeves
47f-8/04	with special devices preventing forcing out and destruction of packings
47f-8/20	Other socket joints and special arrangements
47f-9	Screw joints, also screwed pipes couplings
47f-10	Quick-action couplings for tubes and hoses
47f-11	Automatic couplings for tubes and hoses, e.g. with spring detent
47f-12	Pipe and hose couplings with automatic cut-off valves (4c-15; 47g; 87b)
47f-13	Hinged couplings for pipes and hoses
47f-14	Other pipe and hose couplings (4c-15; 20c-22; 45f-22 – 45f-25)
	Pipe compensators
47f-15/01	Curved section compensators
47f-15/10	Corrugated pipe compensators
47f-15/20	Gland compensators
47f-15/30	Hinge compensators
47f-15/40	Other pipe compensators
	Miscellaneous devices for hoses
47f-16	Devices for repair of hose damages, "hose bandages"
	Hose fastenings
47f-17/01	in general
47f-17/02	Collars
47f-17/03	Retaining rings (hose clamps)
	Cylinders and casings ["displacement chambers"],vessels (12f; 17g-3; 17g-4; 21b-1; 21h-3; 32a, 32b; 34k, 34l; 39a; 47e; 53b; 54f; 64a; 64c; 80a)
47f-18/01	for rectilinear movement pistons (14a)
47f-18/10	for rotary or oscillating pistons (14b; 46a4)
47f-18/20	with elastic walls
47f-18/50	Vessels as machine elements
	Pistons ["displacers"], wrist pins and tools for handling pistons
	Pistons with rectilinear movement (59a-32)
47f-19/01	in general
47f-19/02	made of light metal
47f-19/10	Rotary or oscillating pistons
47f-19/20	Diaphragm pistons, also rolling diaphragm and bag pistons
47f-19/30	Connection between piston and piston rod, in general (piston rod structures 47b-19)
47f-19/40	Wrist pins, in general
47f-19/41	Ball and socket arrangements in pistons
47f-19/49	Devices and tools for installing and removing pistons
47f-20	Floats (13c-9)
	Pipe-and vessel closures ["non-operational closures"] (13a; 12f; 17g-3; 47g-47; 53b; 64a)
47f-21/01	Screw closures
47f-21/02	Locking closures, also manhole covers
47f-21/03	Automatic closures
47f-21/04	Other closures

Seals

47f-22/01 without use of packings, e.g. ground-in seals, knife edge seals
47f-22/10 made of deformable elastic packings; packings resisting only tension forces, e.g. fibres, rubber, leather
47f-22/11 made of metal-reinforced, elastic packings, such as copper asbestos
47f-22/20 made of rigid packings, such as copper, aluminium, hard rubber
47f-22/30 Consisting of gaseous, low-viscosity liquid, plastic or granular packings, such as steam, water, oil, grease, metal grains [fluent packings]
47f-22/40 Bellows and diaphragm seals
47f-22/50 Flange seals
47f-22/60 Inflated-body seals

Spring-ring seals, i.e. piston rings

47f-22/70 with inherent spring effect
47f-22/75 with extraneously supplied spring effect
47f-22/80 Sliding ring seals, i.e. seals for rotating shafts consisting of one or more rings with radial sliding surfaces
47f-22/85 Shafts and rod seals for exclusion of dirt or prevention of lubricant leakage when the seals are not part of bearings or lubricating devices, e.g. oiling rings (details of actual sealing elements 47f-22/01 – 47f-22/75)
47f-22/90 Seals consisting of several of the above packings and other seals

Installing devices and tools

47f-22/95 for spring-ring seals, i.e. piston rings
47f-22/96 for seals made of deformable plastic packings; for packings resisting only tension forces, e.g. for socket pipe joints

Stuffing box seals

47f-23 with non-metallic, elastic packings, e.g. of fibres, rubber or leather (28a-8), with packings resisting only tension forces, devices in general
47f-24/01 with metallic packings, in general
47f-24/02 with metallic packings consisting of hollow rings filled with lubricant
47f-24/03 with metallic packings consisting of tapered rings
47f-24/04 with metallic packings consisting of spring rings arranged in angular chambers
47f-24/05 with non-metallic, rigid packings, e.g. wood, carbon
47f-25 with gaseous, low-viscosity-liquid, plastic or granular packings, e.g. steam, water, oil, grease, metal grains
47f-26 Labyrinth seals

Pipe protecting devices, pipe insulation against temperature variations (heat insulating bodies as elements for general use 47a-16/20)

Devices for protection of pipes

47f-27/01 from mechanical damage
47f-27/10 from chemical attack: acids, rust, corrosion, etc. (12f; 17d-5; 21b-1; 31c-18; 39a; 75c; 80a-57; 80b-9, 80b-13)
47f-27/20 from electrolytic attack, e.g. ground currents (20k-18)

Pipe insulation from temperature variations, material and structure (34l-11; 17c, 17g; 37a-7; 37b-6; 39a; 39b-26; 46c1-16/04; 68e-3; 80b-9)

47f-27/30 Insulating materials in general (production methods for mineral insulation materials 80b-9; for non-mineral insulating material 39b-9)
47f-27/40 Insulation with plastic moulded materials
47f-27/50 Insulation for dry stuffing, such as rock wool
47f-27/60 Air layer insulation
47f-27/70 Vacuum insulation
47f-27/80 Radiation insulation, such as metal foil

47f-27/90 Insulation consisting of several of the above types
47f-27/95 Insulation of flanges, pipe fittings, etc.

47f1 (IPC: F16L) Pipes; Joints or fittings for pipes; Supports for pipes or cables; Means for thermal insulation in general

Note:
In this subclass, the word "pipes" is understood to include all pipes and tubes not specially adapted to purposes other than that of conveying fluids, materials, or objects. A pipe may or may not be flexible; if flexibility is essential the word "hose" is used.

47f1-1/00 **Laying or reclaiming pipes** (making special pipe joints, see the relevant groups for the joints; conduits made of concrete in situ 84c-29/10; machines for digging trenches in combination with pipe-assembly 84d-5/10; laying sewer pipes 85e-4)

Supporting

47f1-3/00 **Hangers or supports for pipes or cables** (pipe or rod clamps for scaffolding 37e-7/00; staples or hooks having a part for entering a wall or other support 47a1-15/00, 47a1-45/00)
47f1-3/02 . partly surrounding the pipe
47f1-3/04 . . pressing the pipe against a wall or other support
47f1-3/06 . . with supports for wires
47f1-3/08 . Brackets substantially surrounding the pipe
47f1-3/10 . . Divided brackets, i.e. with two members engaging the pipe
47f1-3/12 . . comprising a member substantially surrounding the pipe
47f1-3/14 . Hangers in the form of bands or chains
47f1-3/16 . with special provision allowing movement of the pipe (for pipes supported in outer sleeve 47f1-7/00)
47f1-3/18 . . allowing movement in axial direction
47f1-3/20 . . allowing movement in transverse direction; Spring-systems therefor
47f1-3/22 . specially adapted to supporting a number of parallel pipes
47f1-3/24 . with special member for attachment to profiled girders

47f1-5/00 **Devices for use where pipes pass through walls or partitions**
47f1-5/02 . sealing the pipe in the wall or partition

47f1-7/00 **Supporting of pipes inside other pipes or sleeves**

Pipes

47f1-9/00 **Rigid pipes**
47f1-9/02 . of metal (47f1-9/16 to 47f1-9/22 take precedence; finned pipes 17f)
47f1-9/04 . . Reinforced pipes
47f1-9/06 . . Corrugated pipes
47f1-9/08 . of concrete, cement, or asbestos cement, with or without reinforcement (47f1-9/16 to 47f1-9/22 take precedence)
47f1-9/10 . of glass or ceramics, e.g. clay, clay tile, porcelain (47f1-9/16 to 47f1-9/22 take precedence)
47f1-9/12 . of plastics with or without reinforcement (47f1-9/16 to 47f1-9/22 take precedence)
47f1-9/14 . Compound tubes, i.e. made of materials not wholly covered by any one of the preceding groups (47f1-9/16 to 47f1-9/22 take precedence)
47f1-9/16 . wound from sheets or strips, with or without reinforcement
47f1-9/18 . Double-walled pipes; Multi-channel pipes or pipe assemblies (joints therefor 47f1-39/00)
47f1-9/20 . . Pipe assemblies
47f1-9/22 . Pipes composed of a plurality of segments

47f1-11/00 **Hoses, i.e. flexible pipes** (suction-cleaner hoses 34c-9/24)
47f1-11/02 . made of fibres or threads, e.g. of textile material
47f1-11/04 . made of rubber or flexible plastics

47f1-11/06 . . with homogeneous wall
47f1-11/08 . . with reinforcements embedded in the wall
47f1-11/10 . . with specially-shaped reinforcement not embedded in the wall
47f1-11/12 . . with arrangements for special purposes, e.g. specially profiled, with protecting layer, heated, electrically conducting
47f1-11/14 . made of metal
47f1-11/16 . . wound from profiled strips or bands
47f1-11/18 . . Articulated hoses, e.g. composed of a series of rings

Pipe joints; Hose nipples

47f1-13/00 Non-disconnectible pipe joints, e.g. soldered, adhesive, or caulked joints (joints for rigid pipes of plastics 47f1-47/00)
47f1-13/02 . Welded joints
47f1-13/04 . . with arrangements preventing overstressing
47f1-13/06 . . . with tension-relief of the weld by means of detachable members, e.g. divided tensioning rings, bolts in flanges
47f1-13/08 . Soldered joints
47f1-13/10 . Adhesive or cemented joints
47f1-13/12 . with a seal made of lead, caulked packing, or the like
47f1-13/14 . made by plastically deforming the material of the pipe, e.g. by flanging, rolling

47f1-15/00 Screw-threaded joints (joints sealed primarily by means other than engagement of screw-threads, see the relevant groups characterised by the sealing arrangements; casing joints used in deep-drilling 5a-17/08)**; Forms of screw-threads for such joints**
47f1-15/02 . allowing substantial longitudinal adjustment by the use of a long screw-threaded part

47f1-17/00 Joints with packing adapted to sealing by fluid pressure (compensating devices 47f1-51/00; sealings tightened by external pressure, inflatable packings 47f2-15/00)
47f1-17/02 . with sealing rings arranged between outer surface of pipe and inner surface of sleeve or socket
47f1-17/04 . . with longitudinally split or divided sleeve
47f1-17/06 . with sealing rings arranged between the end surfaces of the pipes or flanges or arranged in recesses in the pipe ends or flanges

47f1-19/00 Joints in which sealing surfaces are pressed together by means of a member, e.g. a swivel nut, screwed on or into one of the joint parts (47f1-17/00 takes precedence; if using bolts or equivalent connecting means 47f1-23/00)
47f1-19/02 . Pipe ends provided with collars or flanges, integral with the pipe or not, pressed together by a screwed member, with or without flexible sealing rings between the sealing surfaces
47f1-19/04 . using additional rigid rings, sealing directly on at least one pipe end, which is flared either before or during the making of the connection
47f1-19/06 . in which radial clamping is obtained by wedging action on non-deformed pipe ends
47f1-19/08 . with metal rings which bite into the wall of the pipe

47f1-21/00 Joints with sleeve or socket (47f1-13/00, 47f1-17/00, 47f1-19/00 take precedence)
47f1-21/02 . with elastic sealing rings between pipe and sleeve or between pipe and socket, e.g. with rolling or other prefabricated profiled rings (47f1-21/06, 47f1-21/08 take precedence; if adjustability is essential 47f1-27/00)
47f1-21/04 . . in which sealing rings are compressed by axially-movable members
47f1-21/06 . with a divided sleeve or ring clamping around the pipe ends (flanged joints 47f1-23/00; couplings of the quick-acting type 47f1-37/00)
47f1-21/08 . with additional locking means (47f1-21/06 takes precedence; couplings of the quick-acting type 47f1-37/00)

47f1-23/00	**Flanged joints** (47f1-13/00, 47f1-17/00, 47f1-19/00 take precedence; adjustable joints 47f1-27/00; couplings of the quick-acting type 47f1-37/00)
47f1-25/00	**Constructive types of pipe joints not provided for in groups 47f1-13/00 to 47f1-23/00** (adjustable joints 47f1-27/00; couplings of the quick-acting type 47f1-37/00; specially adapted to be made of plastics or to be used with pipes made of plastics 47f1-47/00)
47f1-27/00	**Adjustable joints; Joints allowing movement** (for double-walled or multi-channel pipes or pipe assemblies 47f1-39/04)
47f1-27/02	. Universal joints, i.e. with mechanical connection allowing angular movement or adjustment of the axes of the parts in any direction
47f1-27/04	. . with partly-spherical engaging surfaces
47f1-27/06	. . . with special sealing means between the engaging surfaces
47f1-27/08	. allowing adjustment or movement only about the axis of one pipe
47f1-27/10	. comprising a flexible connection only
47f1-27/12	. allowing substantial longitudinal adjustment or movement (by use of screw-thread 47f1-15/02)
47f1-29/00	**Joints with fluid cut-off means** (quick-acting joints with cut-off means 47f1-37/28)
47f1-31/00	**Arrangements for connecting hoses to one another or to flexible sleeves** (47f1-33/00 takes precedence)
47f1-33/00	**Arrangements for connecting hoses to rigid members** (hand tools for inserting fittings into hoses 87a-22)**; Rigid hose-connectors, i.e. single members engaging both hoses**
47f1-33/02	. Hose-clips
47f1-33/04	. . tightened by tangentially-arranged threaded pin and nut
47f1-33/06	. . . in which the threaded pin is rigid with the hose-encircling member
47f1-33/08	. . in which a worm coacts with a part of the hose-encircling member that is toothed like a worm-wheel
47f1-33/10	. . with a substantially-radial tightening member
47f1-33/12	. . with a pivoted or swinging tightening or securing member, e.g. toggle lever
47f1-33/14	. . with a taping-bolt, i.e. winding up the end of the hose-encircling member
47f1-33/16	. with sealing or securing means using fluid pressure
47f1-33/18	. characterised by the use of additional sealing means
47f1-33/20	. Undivided rings, sleeves, or like members contracted on the hose or expanded inside the hose by means of tools; Arrangements using such members
47f1-33/22	. with means not mentioned in the preceding groups for gripping the hose between inner and outer parts
47f1-33/24	. with parts screwed directly on or into the hose (47f1-33/22 takes precedence)
47f1-33/26	. specially adapted for hoses made of metal
47f1-35/00	**Special arrangements used in connection with end fittings of hoses, e.g. safety or protecting devices**
47f1-37/00	**Couplings of the quick-acting type** (radially-binding sleeves 47f1-17/04, 47f1-21/06; connecting hoses to rigid members 47f1-33/00; connections made automatically when vehicles are brought together 20e, 63a, 63c; specially adapted for lubricating devices 47e-21/00)
47f1-37/02	. in which the connection is maintained only by friction of the parts being joined (47f1-37/22 takes precedence)
47f1-37/04	. . with an elastic outer part pressing against an inner part by reason of its elasticity (with locking members 47f1-37/08)
47f1-37/06	. . . tightened by fluid pressure
47f1-37/08	. in which the connection between abutting or axially-overlapping ends is maintained by locking members (47f1-37/22 to 47f1-37/26 take precedence)
47f1-37/10	. . using a rotary external sleeve or ring on one part
47f1-37/12	. . using hooks, pawls, or other movable or insertable locking members

47f1-37/14 . . . Joints secured by inserting between mating surfaces an element, e.g. a piece of wire, a pin, a chain
47f1-37/16 . . . Joints tightened by the action of wedge-shaped hinged hooks
47f1-37/18 . . . Joints tightened by eccentrics or rotatable cams
47f1-37/20 . . . Joints tightened by toggle-action levers
47f1-37/22 . in which the connection is maintained by means of balls, rollers, or helical springs under radial pressure between the parts
47f1-37/24 . in which the connection is made by inserting one member axially into the other and rotating it to a limited extent, e.g. with bayonet-action
47f1-37/26 . in which the connection is made by transversely moving the parts together, with or without their subsequent rotation
47f1-37/28 . with fluid cut-off means

47f1-39/00 Joints or fittings for double-walled or multi-channel pipes or pipe assemblies
47f1-39/02 . for hoses
47f1-39/04 . allowing adjustment or movement

47f1-41/00 Branching pipes; Joining pipes to walls (47f1-39/00 takes precedence; joints suitable for connecting together pipe ends, see the relevant groups; connections not designed for conveying fluid 47a1-9/00)
47f1-41/02 . Branch units, e.g. made in one piece, welded, riveted
47f1-41/04 . Tapping pipe walls, i.e. making connections through the walls of pipes while they are carrying fluids; Fittings therefor (apparatus or operations relating to metal-working steps, see the relevant classes for metal-working)
47f1-41/06 . . making use of attaching means embracing the pipe

47f1-43/00 Bends; Siphons (with cleaning apertures 47f1-45/00; siphons in general 59c)
47f1-43/02 . adapted to make use of special securing means

47f1-45/00 Pipe units with cleaning aperture and closure therefor

47f1-47/00 Connecting arrangements or other fittings specially adapted to be made of plastics or to be used with pipes made of plastics
47f1-47/02 . Welded joints; Adhesive joints

47f1-49/00 Connecting arrangements specially adapted for pipes of brittle material, e.g. glass, earthenware

47f1-51/00 Expansion-compensation arrangements for pipe-lines (telescopic pipes 47f1-27/12)
47f1-51/02 . making use of a bellows or an expansible folded or corrugated tube
47f1-51/04 . making use of bends, e.g. lyre-shaped

47f1-53/00 Heating or cooling pipes or pipe systems (preventing freezing of pipes, thawing frozen pipes 85d-10, 85d-11)

47f1-55/00 Devices or appurtenances for use in, or in connection with, pipes or pipe systems (the preceding groups take precedence; 47f1-57/00, 47f1-59/00 take precedence; aerating or venting in valves 47g1-45/00; air or other gas venting devices, devices for removing unwanted liquids, steam traps or the like 47g2; nozzles 85g; arrangements for draining water-supply systems 85d-13; devices for preventing bursting of water pipes by freezing 85d-8)
47f1-55/02 . Energy absorbers; Noise absorbers (in valves 47g1-47/00)
47f1-55/04 . Devices damping pulsations or vibrations in fluids
47f1-55/06 . Means for aerating
47f1-55/09 . Air-conditioning, e.g. de-watering, in pneumatic systems (in general 36d)
47f1-55/10 . Means for stopping flow from or in pipes or hoses (47f1-29/00, 47f1-37/28 take precedence; valves 47g1)
47f1-55/12 . . using a member which is expanded in place
47f1-55/14 . . Means, e.g. clamps, for flattening hoses
47f1-55/16 . . Devices for covering leaks in pipes or hoses, e.g. hose-menders
47f1-55/18 . Appliances for use in repairing pipes (47f1-55/10 takes precedence)

47f1-55/24 . Preventing accumulation of dirt or other matter in pipes, e.g. by traps, by strainers
47f1-55/26 . Monitoring means
47f1-55/28 . Devices for cleaning pipes

47f1-57/00 Protection of pipes or objects of similar shape against external or internal damage or wear

47f1-58/00 Protection of pipes or pipe fittings against corrosion or incrustation (by supporting pipes inside other pipes or sleeves 47f1-7/00; prevention of corrosion or incrustation in general 48d1)

Insulation

47f1-59/00 Thermal insulation not adapted to particular purposes provided for in other classes (in buildings 37a-1/62)
47f1-59/02 . Shape or form of insulating materials (chemical aspects, see the relevant classes)
47f1-59/04 . Arrangements using dry fillers, e.g. using slag wool
47f1-59/06 . Arrangements using an air layer or vacuum
47f1-59/08 . Means for preventing radiation, e.g. with metal foil
47f1-59/10 . Bandages for insulation
47f1-59/12 . Arrangements for supporting insulation from the wall or body insulated, e.g. by means of spacers between pipe and heat-insulating material; Arrangements specially adapted for supporting insulated bodies
47f1-59/14 . Arrangements for the insulation of pipes or pipe systems (47f1-59/02 to 47f1-59/12 take precedence)
47f1-59/16 . . Arrangements specially adapted to local requirements at flanges, junctions, valves, or the like

47f2 (IPC: F16J) Pistons; Cylinders; Packing

47f2-1/00 Pistons; Trunk pistons; Plungers (bellows pistons 47f2-3/00; piston-rings or seatings therefor 47f2-9/00; rotary pistons, e.g. for "Wankel" type engines, 14b; specific for combustion engines, i.e. constructed to withstand high temperature or modified for guiding, igniting, vaporising, or otherwise treating the charge, 46a, 46c; for pumps 27b-17, 59a-32; floats 47g1-33/00)
47f2-1/02 . Bearing surfaces
47f2-1/04 . Resilient guiding parts, e.g. skirts, particularly for trunk pistons
47f2-1/06 . . with separate expansion members; Expansion members
47f2-1/08 . Constructional features providing for lubrication
47f2-1/10 . Connection to driving members
47f2-1/12 . . with piston-rods, e.g. rigid connections
47f2-1/14 . . with connecting-rods, i.e. pivotal connections
47f2-1/16 . . . with gudgeon-pin; Gudgeon-pins
47f2-1/18 . . . . Securing of gudgeon-pins
47f2-1/20 . . . with rolling contact, other than in ball or roller bearings
47f2-1/22 . . . with universal joint, e.g. ball-joint
47f2-1/24 . . designed to give the piston some rotary movement about its axis

47f2-3/00 Diaphragms; Bellows; Bellows pistons

47f2-7/00 Piston-rods

47f2-9/00 Piston-rings; Seatings therefor; Ring sealings of similar construction in general (tools for mounting or removing piston-rings or the like 87a)
47f2-9/02 . L-section rings
47f2-9/04 . Helical rings
47f2-9/06 . using separate springs expanding the rings; Springs therefor
47f2-9/08 . with expansion obtained by pressure of the medium
47f2-9/10 . Special members for adjusting the rings
47f2-9/12 . Details
47f2-9/14 . . Joint-closures
47f2-9/16 . . . obtained by stacking of rings
47f2-9/18 . . . with separate bridge-elements

47f2-9/20 . . Rings with special cross-section (L-section rings 47f2-9/02); Oil-scraping rings
47f2-9/22 . . Rings for preventing wear of grooves or like seatings
47f2-9/24 . . Members preventing rotation of rings in grooves

47f2-11/00 Engine or like cylinders (specific for combustion engines, e.g. constructed to withstand high temperature, 46a, 46c)**; Pressure vessels in general** (covers therefor 47f2-13/00)**; Features of hollow, e.g. cylindrical, bodies in general**
47f2-11/02 . Cylinders designed to receive moving pistons or plungers (cylinders for engines or other apparatus of particular kinds, see the appropriate subclasses)
47f2-11/04 . . Running faces; Liners
47f2-11/06 . Pressure vessels (steam boilers 13)

47f2-13/00 Covers or similar closure members (for engine or like cylinders 47f2-11/00; sealings 47f2-15/02)
47f2-13/02 . Detachable closure members; Means for tightening closures (specially for pivoted closures 47f2-13/16)
47f2-13/04 . . attached with a bridge member
47f2-13/06 . . attached only by clamps along the circumference
47f2-13/08 . . attached by one or more members actuated to project behind a part or parts of the frame (similar constructions for doors or windows 68b)
47f2-13/10 . . attached by means of a divided ring
47f2-13/12 . . attached by wedging action by means of screw-thread, interrupted screw-thread, bayonet closure, or the like
47f2-13/14 . . attached exclusively by spring action or elastic action
47f2-13/16 . Pivoted closures
47f2-13/18 . . pivoted directly on the frame
47f2-13/20 . . mounted by mobile fastening on swinging arms

47f2-15/00 Sealings
47f2-15/02 . between relatively-stationary surfaces (47f2-15/46, 47f2-15/48 take precedence)
47f2-15/04 . . without packing between the surfaces, e.g. with ground surfaces, with cutting edge
47f2-15/06 . . with solid packing compressed between sealing surfaces
47f2-15/08 . . . with exclusively metal packing
47f2-15/10 . . . with non-metallic packing
47f2-15/12 . . . . with metal reinforcement or covering
47f2-15/14 . . by means of granular or plastic material, or fluid
47f2-15/16 . between relatively-moving surfaces (47f2-15/50, 47f2-15/52 take precedence; between pistons and cylinders 47f2-9/00; spindle sealings for valves 47g1-41/00)
47f2-15/18 . . with stuffing-boxes for elastic or plastic packings
47f2-15/20 . . . Packing materials therefor
47f2-15/22 . . . . shaped as strands, ropes, threads, ribbons, or the like
47f2-15/24 . . . with radially or tangentially compressed packing
47f2-15/26 . . with stuffing-boxes for rigid sealing rings
47f2-15/28 . . . with sealing rings made of metal
47f2-15/30 . . . with sealing rings made of carbon
47f2-15/32 . . with elastic sealing lip
47f2-15/34 . . with slip-ring pressed against a more or less radial face on one member
47f2-15/36 . . . connected by a diaphragm to the other member
47f2-15/38 . . . sealed by a packing against a more or less radial face on one member
47f2-15/40 . . by means of fluid
47f2-15/42 . . . kept in sealing position by centrifugal force
47f2-15/44 . Free-space packings, e.g. labyrinth packings
47f2-15/46 . with packing ring expanded or pressed into place by fluid pressure, e.g. inflatable packings (for tube connections 47f1)
47f2-15/48 . . influenced by the pressure within the member to be sealed
47f2-15/50 . between relatively-movable members, by means of a sealing without relatively-moving surfaces, e.g. fluid-tight sealings for transmitting motion through a wall
47f2-15/52 . . by means of sealing bellows or diaphragms
47f2-15/54 . Other sealings for rotating shafts
47f2-15/56 . Other sealings for reciprocating rods

47g Machine elements for operationally blocking pipes and chambers containing gaseous, liquid and granular materials for general use

Operational blocking by means of valves, cocks, slide valves, automatic or manually operated

47g-1/01 Screw-down valves, in general
47g-1/02 Discharge valves (valves for drinking fountains 85d-4)
47g-1/03 Diaphragm valves
47g-2/01 Screw-down valves with valve body secured against rotation
47g-2/02 Screw-down valves with divided stem
47g-3 Screw-down valves for high pressure, especially gas cylinder valves
47g-4/01 Screw-down valves with especially adjustable flow section, especially radiator valves
47g-402 Special throttle elements, also for valves with adjustable flow section

Automatic shut-off valves, taps, valves with calibrated water discharge

47g-5/01 Automatic shut-off valves, acting in flow direction
47g-5/02 Automatic shut-off valves, acting against flow direction
47g-5/03 Valves opened automatically by flow pressure
47g-6 Automatic shut-off valves with braked valve body
47g-7/01 Automatically closing piston valves with back pressure chamber and auxiliary valve, cock, or slide valve (flushing valves, cocks, slide valves for toilet-flushing devices 85h-9)
47g-7/02 Automatically closing diaphragm valves with calibrated water discharge (diaphragm flushing device for toilet flushing 85h-9)
47g-8 Check valves

Control valves for engines and machines

47g-9/01 Automatic valves, in general
47g-9/02 Automatic valves, especially delivery and suction valves for pumps
47g-9/03 Strip or ribbon valves
47g-9/04 Rotary valves
47g-10/01 Automatic ring valves
47g-10/02 Spring structures for ring valves
47g-13 Controlled valves (valve gear for combustion engines 46b1)

Valves other than those classified in 47g-1 – 47g-13

47g-19/01 Valves with flap-shaped valve body
47g-19/02 Special drives for flap valves
47g-19/03 Multiway flap valve
47g-19/04 Butterfly valves
47g-20/01 Multiway cocks, valves, slide valves (for wash basins, sinks, bathtubs and showers 85f)
47g-20/02 Mixing valves and cocks (for wash basins, sinks, bathtubs and showers 85f)
47g-21/01 Miscellaneous valves
47g-21/02 Valves with streamlined valve body
47g-21/03 Valves with special throttle body
47g-21/04 Double-seat valves
47g-21/06 Hose clamps and hose valves
47g-21/10 Special valve types, other than classified in 47g-21/01 – 47g-21/06

Cock designs

47g-22/01 Cocks in general
47g-22/02 Cocks with lubricating device
47g-22/03 Cocks with air vent
47g-22/04 Cocks with loose sealing disks

47g-22/05 Closing and locking devices for cocks

Slide valve structures

47g-26/01 Flat slide valves, in general
47g-26/02 Slide valves with movable closing disks
47g-26/03 Slide valves with movable valve seats in housing
47g-27 Rotary slide valves
47g-28 Sleeve and piston valves
47g-29 Controlled slide valves for engines and machines

Miscellaneous devices for valves, cocks and slide valves

47g-34 Relief devices
47g-35/01 Sound damping (41f-1/01; for drinking-water installations 85d-6)
47g-35/02 Braking devices (for drinking-water installations 85d-6)
47g-36 Devices for absorption of fluent material surge caused by closing of valves, cocks, slide valves
47g-37 Draining devices
47g-38 Aerating and deaerating devices (for drinking-water installations 85d-14)
47g-39/01 Casing structures (casting of valves 31c)
47g-39/02 Elimination of corrosion effects
47g-39/03 Flow control valves
47g-40/01 Miscellaneous structural elements for valves, cocks, slide valves
47g-40/02 Stem seals
47g-40/03 Valve seat seals
47g-40/04 Valve body fasteners
47g-40/05 Seat ring fasteners
47g-40/06 Hand wheels
47g-40/07 Caps and sleeves
47g-40/08 Tools
47g-41/01 Cooling devices
47g-41/02 Heating devices
47g-42 Auxiliary closures

Actuators and drives for valves, cocks, slide valves

47g-43/01 Actuators in general
47g-43/02 Special stem drives
47g-43/03 Eccentric and crank drives
47g-43/04 Gear drives
47g-43/05 Time switch drives
47g-44 Actuators with floats
47g-45/01 Remote control devices of a general type
47g-45/02 Electromagnetic remote control devices
47g-45/03 Electromotive remote control devices
47g-45/04 Hydraulic remote control devices
47g-46 Closing and locking devices for valves and slide valves
47g-47/01 Deadweight safety valves
47g-47/02 Spring-loaded safety valves
47g-47/03 Safety devices for valves, e.g. bursting diaphragms, frangible and shearing pins

Pressure reduction valves

47g-48/01 with direct adjustment of valve by means of a piston
47g-48/02 with direct adjustment of valve by means of a diaphragm
47g-48/03 with adjustment of valve by means of bellows diaphragms
47g-48/04 with direct adjustment of valve by means of a float

47g-48/05 Other types
47g-49/01 Pipe burst valves of a general type
47g-49/02 Self-shutting pipe burst valve, actuated by flow energy
47g-49/03 Pipe burst valve with special by-pass
47g-49/04 Pipe burst valve with auxiliary valves Pipe burst valve with indirect control

47g1 (IPC: F16K) Valves; Taps; Cocks; Actuating floats

Constructional types (check valves 47g1-15/00)

47g1-1/00 Lift valves, i.e. cut-off apparatus with closure members having at least a component of their opening and closing motion perpendicular to the closing faces (diaphragm valves 47g1-7/00)

47g1-1/02 . with screw-spindle (47g1-1/12 to 47g1-1/28 take precedence; actuating mechanisms with screw-spindles 47g1-31/50)
47g1-1/04 . . with a cut-off member rigid with the spindle, e.g. main valves
47g1-1/06 . . Special arrangements for improving the flow, e.g. special shape of passages or casings
47g1-1/08 . . . in which the spindle is perpendicular to the general direction of flow
47g1-1/10 . . . in which the spindle is inclined to the general direction of flow
47g1-1/12 . with streamlined valve member around which the fluid flows when the valve is opened
47g1-1/14 . with ball-shaped valve members (check valves 47g1-15/04)
47g1-1/16 . with pivoted closure members
47g1-1/18 . . with pivoted discs or flaps
47g1-1/20 . . . with axis of rotation arranged externally of valve member
47g1-1/22 . . . with axis of rotation crossing the valve member, e.g. butterfly valves
47g1-1/226 . . . . Shaping or arrangement of the sealing
47g1-1/228 . . . . . Movable sealing bodies
47g1-1/24 . with valve members that, on opening of the valve, are initially lifted from the seat and next are turned around an axis parallel to the seat
47g1-1/26 . . Shape or arrangement of the sealing
47g1-1/28 . . . Movable sealing bodies
47g1-1/30 . specially adapted for pressure containers
47g1-1/32 . Details (details of more general applicability 47g1-25/00 to 47g1-51/00)
47g1-1/34 . . Cutting-off parts, e.g. valve members, seats (47g1-1/06, 47g1-1/12, 47g1-1/14, 47g1-1/26 take precedence)
47g1-1/36 . . . Valve members (for double-seat valves 47g1-1/44)
47g1-1/38 . . . . of conical shape
47g1-1/40 . . . . of helical shape
47g1-1/42 . . . Valve seats (for double-seat valves 47g1-1/44)
47g1-1/44 . . . Details of seats or valve members of double-seat valves
47g1-1/46 . . . Attachment of sealing rings
47g1-1/48 . . Attaching valve members to screw-spindles
47g1-1/50 . . Preventing rotation of valve members
47g1-1/52 . . Means for additional adjustment of the rate of flow
47g1-1/54 . . Arrangements for modifying the way in which the rate of flow varies during the actuation of the valve

47g1-3/00 Gate valves or sliding valves, i.e. cut-off apparatus with closing members having a sliding movement along the seat for opening and closing (47g1-5/00 takes precedence; in barrages or weirs 84a-7/56, 84a-8/04)

47g1-3/02 . with flat sealing faces; Packings therefor
47g1-3/03 . . with a closure member in the form of an iris-diaphragm
47g1-3/04 . . with pivoted closure members
47g1-3/06 . . . in the form of closure plates arranged between supply and discharge passages (47g1-3/10 takes precedence)
47g1-3/08 . . . . with circular closure plates rotatable around their centres
47g1-3/10 . . . with special arrangements for separating the sealing faces or for pressing them together

47g1-3/12 . . with wedge-shaped arrangements of sealing faces
47g1-3/14 . . . with special arrangements for separating the sealing faces or for pressing them together
47g1-3/16 . . with special arrangements for separating the sealing faces or for pressing them together (47g1-3/10, 47g1-3/14 take precedence)
47g1-3/18 . . . by movement of the closure members
47g1-3/20 . . . by movement of the seats
47g1-3/22 . with sealing faces shaped as surfaces of solids of revolution (47g1-13/02 takes precedence; with resilient valve members 47g1-3/28)
47g1-3/24 . . with cylindrical valve members
47g1-3/26 . . . with fluid passages in the valve member
47g1-3/28 . with resilient valve members
47g1-3/30 . Details
47g1-3/312 . . Line blinds
47g1-3/314 . . Forms or constructions of slides; Attachment of the slide to the spindle
47g1-3/316 . . Guiding of the slide
47g1-3/32 . . Means for additional adjustment of the rate of flow
47g1-3/34 . . Arrangements for modifying the way in which the rate of flow varies during the actuation of the valve
47g1-3/36 . . Features relating to lubrication

47g1-5/00 Taps or cocks comprising only cut-off apparatus having at least one of the sealing faces shaped as a more or less complete surface of a solid of revolution, the opening and closing movement being predominantly rotary (taps of the lift-valve type 47g1-1/00)

47g1-5/02 . with plugs having conical surfaces; Packings therefor
47g1-5/04 . with plugs having cylindrical surfaces; Packings therefor
47g1-5/06 . with plugs having spherical surfaces; Packings therefor
47g1-5/08 . Details
47g1-5/10 . . Means for additional adjustment of the rate of flow
47g1-5/12 . . Arrangements for modifying the way in which the rate of flow varies during the actuation of the valve
47g1-5/14 . . Special arrangements for separating the sealing faces or for pressing them together
47g1-5/16 . . . for plugs with conical surfaces
47g1-5/18 . . . for plugs with cylindrical surfaces
47g1-5/20 . . . for plugs with spherical surfaces
47g1-5/22 . . Features relating to lubrication

47g1-7/00 Diaphragm cut-off apparatus, e.g. with a member deformed, but not moved bodily, to close the passage (means for plugging pipes or hoses 47f1-55/10)

47g1-7/02 . with tubular diaphragm
47g1-7/04 . . constrictable by external radial force
47g1-7/06 . . . by means of a screw-spindle, cam, or other mechanical means
47g1-7/07 . . . by means of fluid pressure
47g1-7/08 . . constrictable by twisting
47g1-7/10 . with inflatable member
47g1-7/12 . with flat, dished, or bowl-shaped diaphragm
47g1-7/14 . . arranged to be deformed against a flat seat
47g1-7/16 . . . the diaphragm being mechanically actuated, e.g. by screw-spindle or cam
47g1-7/17 . . . the diaphragm being actuated by fluid pressure
47g1-7/18 . with diaphragm secured at one side only, e.g. to be laid on the seat by rolling action
47g1-7/20 . with a compressible solid closure member

47g1-9/00 Arrangements for cutting-off by means of liquid or granular medium

47g1-11/00 Multiple-way valves, e.g. mixing valves; Pipe fittings incorporating such valves

47g1-11/02 . with all movable sealing faces moving as one unit
47g1-11/04 . . comprising only lift valves

47g1-11/06 . . comprising only sliding valves
47g1-11/07 . . . with cylindrical slides
47g1-11/08 . . comprising only taps or cocks
47g1-11/10 . with two or more closure members not moving as a unit
47g1-11/12 . . with one plug turning in another
47g1-11/14 . . operated by one actuating member, e.g. a handle (with one plug turning in another 47g1-11/12)
47g1-11/16 . . . which only slides, or only turns, or only swings in one plane
47g1-11/18 . . . with separate operating movements for separate closure members
47g1-11/20 . . operated by separate actuating members (with one plug turning in another 47g1-11/12)
47g1-11/22 . . . with an actuating member for each valve, e.g. interconnected to form multiple-way valves
47g1-11/24 . . . with an electromagnetically-operated valve, e.g. for washing machines

47g1-13/00 Other constructional types of cut-off apparatus (means for plugging pipes or hoses 47f1-55/10)
47g1-13/02 . with both sealing faces shaped as small segments of a cylinder and the moving member pivotally mounted
47g1-13/04 . with a breakable closure member
47g1-13/06 . . constructed to be ruptured by an explosion

Functional types

47g1-15/00 Check valves (adapted especially for inflatable balloons 77a-41/00)
47g1-15/02 . with guided rigid valve members
47g1-15/03 . . with a hinged closure member
47g1-15/04 . . shaped as balls
47g1-15/06 . . with guided stems
47g1-15/08 . . shaped as rings
47g1-15/10 . . . integral with, or rigidly fixed to, a common valve plate
47g1-15/12 . . Springs for ring valves
47g1-15/14 . with flexible valve members
47g1-15/16 . . with tongue-shaped laminae
47g1-15/18 . with actuating mechanism; Combined check valves and actuated valves
47g1-15/20 . Specially designed for inflatable bodies, e.g. tyres (combinations of valves with tyres 63e-31)

47g1-17/00 Safety valves; Equalising valves
47g1-17/02 . opening on surplus pressure on one side; closing on insufficient pressure on one side (check valves 47g1-15/00)
47g1-17/04 . . spring-loaded
47g1-17/06 . . . with special arrangements for adjusting the opening pressure
47g1-17/08 . . . with special arrangements for providing a large discharge passage
47g1-17/10 . . . with auxiliary valve for fluid operation of the main valve
47g1-17/12 . . weight-loaded
47g1-17/14 . . with fracturing member
47g1-17/16 . . . with fracturing diaphragm
47g1-17/164 . . and remaining closed after return of the normal pressure
47g1-17/168 . . combined with manually-controlled valves, e.g. a valve combined with a safety valve
47g1-17/18 . opening on surplus pressure on either side
47g1-17/19 . . Equalising valves predominantly for tanks
47g1-17/192 . . . with closure member in the form of a movable liquid column
47g1-17/194 . . . weight-loaded
47g1-17/196 . . . spring-loaded
47g1-17/20 . Excess-flow valves (actuated in consequence of shock or similar extraneous influence 47g1-17/36)
47g1-17/22 . . actuated by the difference of pressure between two places in the flow line
47g1-17/24 . . . acting directly on the cutting-off member
47g1-17/26 . . . . operating in either direction
47g1-17/28 . . . . operating in one direction only

47g1-17/30 . . . . . spring-loaded
47g1-17/32 . . . acting on a servo-mechanism or on a catch-releasing mechanism
47g1-17/34 . . in which the flow-energy of the flowing medium actuates the closing mechanism
47g1-17/36 . actuated in consequence of extraneous circumstances, e.g. shock, change of position
47g1-17/38 . . of excessive temperature
47g1-17/40 . with a fracturing member, e.g. fracturing diaphragm, glass, fusible joint (valves opening on surplus pressure 47g1-17/14)
47g1-17/42 . Valves preventing penetration of air in the outlet of containers for liquids

47g1-18/00 Pressure relief valves

47g1-19/00 Valve arrangements specially adapted for mixing fluids coming from different conduits; Valve fittings with mixing devices (multiple-way valves 47g1-11/00)

47g1-21/00 Fluid-delivery valves (for liquid handling 64c; for flushing devices for water-closets or the like 85h-3/02)
47g1-21/02 . providing a continuous small flow
47g1-21/04 . Self-closing valves, i.e. closing automatically after operation
47g1-21/06 . . in which the closing movement, either retarded or not, starts immediately after opening
47g1-21/08 . . . with ball-shaped closing members
47g1-21/10 . . . with hydraulic brake cylinder acting on the closure member
47g1-21/12 . . . with hydraulically-operated opening means; with arrangements for pressure relief before opening
47g1-21/14 . . with special means for preventing the self-closing
47g1-21/16 . . closing after a predetermined quantity of fluid has been delivered (47g1-21/10 takes precedence)
47g1-21/18 . . closed when a rising liquid reaches a predetermined level (float-actuated valves 47g1-31/18)
47g1-21/20 . . . by means making use of air-suction through an opening closed by the rising liquid

47g1-23/00 Valves for preventing drip from nozzles

Details (venting or aerating means 47g1-45/00)

Note:
Details not provided for in the following groups are classified in the preceding groups.

47g1-25/00 Details relating to contact between valve members and seats (sealing constructions, see the appropriate groups according to the type of valve; movement of valve members other than for opening and closing 47g1-29/00)
47g1-25/02 . Arrangements using fluid issuing from valve members or seats
47g1-25/04 . Arrangements for preventing erosion, not otherwise provided for

47g1-27/00 Construction of housings (methods for welding housings 49h)**; Applications of materials therefor**
47g1-27/02 . of lift valves (for reducing the flow resistance of screw-spindle lift-valves 47g1-1/06)
47g1-27/03 . . specially adapted for tank-cars
47g1-27/04 . of sliding valves
47g1-27/06 . of taps or cocks
47g1-27/08 . Guiding yokes for spindles; Means for closing housings; Dust caps, e.g. for tyre valves
47g1-27/10 . Welded housings
47g1-27/12 . Covers for housings

47g1-29/00 Arrangements for movement of valve members other than for opening and closing the valve, e.g. for grinding-in, for preventing sticking
47g1-29/02 . providing for continuous motion

47g1-31/00 Operating means; Releasing devices

47g1-31/02 . electric; magnetic
47g1-31/04 . . using a motor
47g1-31/05 . . . specially adapted for operating hand-operated valves or for combined motor and hand operation
47g1-31/06 . . using a magnet
47g1-31/08 . . . using a permanent magnet
47g1-31/10 . . . with additional mechanism between armature and closure member
47g1-31/12 . actuated by fluid (fluid-actuated check valves 47g1-15/00; fluid-actuated safety valves 47g1-17/00)
47g1-31/14 . . for mounting on, or in combination with, hand-actuated valves
47g1-31/143 . . . the fluid acting on a piston
47g1-31/145 . . . the fluid acting on a diaphragm
47g1-31/16 . . with a mechanism, other than pulling- or pushing-rod, between fluid motor and closure member (with float 47g1-31/18)
47g1-31/163 . . . the fluid acting on a piston
47g1-31/165 . . . the fluid acting on a diaphragm
47g1-31/18 . . actuated by a float (floats 47g1-33/00)
47g1-31/20 . . . actuating a lift valve
47g1-31/22 . . . . with the float rigidly connected to the valve
47g1-31/24 . . . . with a transmission with parts linked together from a single float to a single valve
47g1-31/26 . . . . . with the valve guided for rectilinear movement and the float attached to a pivoted arm
47g1-31/28 . . . . with two or more floats actuating one valve
47g1-31/30 . . . actuating a gate valve or sliding valve
47g1-31/32 . . . actuating a tap or cock
47g1-31/34 . . . acting on pilot valve controlling the cut-off apparatus
47g1-31/36 . . in which fluid from the conduit is constantly supplied to the fluid motor
47g1-31/363 . . . the fluid acting on a piston (47g1-31/38 takes precedence)
47g1-31/365 . . . the fluid acting on a diaphragm
47g1-31/38 . . . in which the fluid works directly on both sides of the fluid motor, one side being connected by means of a restricted passage and the motor being actuated by operating a discharge from that side (47g1-31/40 takes precedence)
47g1-31/383 . . . . the fluid acting on a piston
47g1-31/385 . . . . the fluid acting on a diaphragm
47g1-31/40 . . . with electrically-actuated member in the discharge of the motor
47g1-31/42 . . by means of electrically-actuated members in the supply or discharge conduits of the fluid motor (47g1-31/40 takes precedence)
47g1-31/44 . Mechanical actuating means
47g1-31/46 . . for remote operation
47g1-31/48 . . actuated by mechanical timing-device, e.g. with dash-pot (self-closing valves 47g1-21/16)
47g1-31/50 . . with screw-spindle
47g1-31/52 . . with crank, eccentric, or cam
47g1-31/524 . . . with a cam
47g1-31/528 . . . with pin and slot
47g1-31/53 . . with toothed gearing
47g1-31/54 . . . with pinion and rack
47g1-31/56 . . without stable intermediate position, e.g. with snap action
47g1-31/58 . . comprising a movable discharge-nozzle
47g1-31/60 . . Handles
47g1-31/62 . . Pedals or like operating members, e.g. actuated by knee or hip

47g1-33/00 Floats for actuation of valves or other apparatus

47g1-35/00 Means to prevent accidental or unauthorised actuation

47g1-35/02 . to be locked or disconnected by means of a push or pull
47g1-35/04 . yieldingly resisting the actuation
47g1-35/06 . using a removable actuating or locking member, e.g. a key (47g1-35/10, 47g1-35/12 take precedence)

47g1-35/08 . requiring setting according to a code, e.g. permutation locks
47g1-35/10 . with locking caps or locking bars
47g1-35/12 . with sealing wire
47g1-35/14 . interlocking two or more valves
47g1-35/16 . with locking member actuated by magnet

47g1-37/00 Special means in or on valves or other cut-off apparatus for indicating or recording operation thereof, or for enabling an alarm to be given

47g1-39/00 Devices for relieving the pressure on the sealing faces
47g1-39/02 . for lift valves
47g1-39/04 . for sliding valves
47g1-39/06 . for taps or cocks

47g1-41/00 Spindle sealings
47g1-41/02 . with stuffing-box
47g1-41/04 . . with at least one ring of rubber or like material between spindle and housing
47g1-41/06 . . with at least one ring attached to both spindle and housing
47g1-41/08 . . with at least one ring provided with axially-protruding peripheral closing-lip
47g1-41/10 . with diaphragm, e.g. shaped as bellows or tube
47g1-41/12 . . with approximately flat diaphragm
47g1-41/14 . with conical flange on the spindle which co-operates with a conical surface in the housing
47g1-41/16 . with a flange on the spindle which rests on a sealing ring
47g1-41/18 . . sealing only when the closure member is in the opened position

47g1-43/00 Auxiliary closure means in valves, which in case of repair, e.g. rewashering, of the valve, can take over the function of the normal closure means; Devices for temporary replacement of parts of valves for the same purpose

47g1-45/00 Means, e.g. valves, for venting or aerating (equalising valves 47g1-17/00; aerating-means for use in pipes 47f1-55/06; apparatus for draining-off, or releasing, liquid from containers or pipe-lines 47g2)
47g1-45/02 . for venting of superfluous air
47g1-45/04 . for aeration

47g1-47/00 Means in valves for absorbing fluid energy (for pipes 47f1-55/00)
47g1-47/02 . for preventing water-hammer or noise
47g1-47/04 . for decreasing pressure, the throttle being incorporated in the closure member
47g1-47/06 . . with a throttle in the form of a helical channel
47g1-47/08 . for decreasing pressure and having a throttling member separate from the closure member
47g1-47/10 . . in which the medium in one direction must flow through the throttling channel, and in the other direction may flow through a much wider channel parallel to the throttling channel
47g1-47/12 . . the throttling channel being of helical form
47g1-47/14 . . the throttling member being a perforated membrane
47g1-47/16 . . the throttling member being a cone

47g1-49/00 Means in or on valves for heating or cooling (for pipes 47f1-53/00; thermal insulation in connection with pipes or pipe systems 47f1-59/16)

47g1-51/00 Other details not peculiar to particular types of valves or cut-off apparatus

47g2 (IPC: F16T) Steam traps or the like

47g2-1/00 Steam traps or like apparatus for releasing, e.g. draining-off liquid from pipe lines, e.g. steam lines or from containers for gases or vapours, e.g. steam drums
47g2-1/02 . with valves controlled thermally
47g2-1/04 . . by expansion rods

47g2-1/06	. . by expansion tubes
47g2-1/08	. . by bimetallic strips or plates
47g2-1/10	. . by thermally-expansible liquids
47g2-1/12	. with valves controlled by excess or release of pressure
47g2-1/14	. . involving a piston, diaphragm, or bellows, e.g. displaceable under pressure of incoming condensate
47g2-1/16	. . involving a high-pressure chamber and a low-pressure chamber communicating with one another, i.e. thermodynamic steam chambers
47g2-1/18	. . involving a vacuum chamber
47g2-1/20	. with valves controlled by floats
47g2-1/22	. . of closed-hollow-body type
47g2-1/24	. . . using levers
47g2-1/26	. . of upright-open-bucket type
47g2-1/28	. . . using levers
47g2-1/30	. . of inverted-open-bucket type; of bell type
47g2-1/32	. . of rocking or tilting type
47g2-1/34	. without moving parts other than hand valves, e.g. labyrinth type
47g2-1/36	. specially adapted for steam lines of low pressure
47g2-1/38	. Component parts; Accessories
47g2-1/40	. . Actuating mechanisms of ball valves
47g2-1/42	. . Actuating mechanisms of slide valves
47g2-1/44	. . Valve arrangements for venting air from pipe lines; Valve arrangements for preventing inlet of atmospheric air into pipe lines
47g2-1/46	. . Valves opening when pressure or vacuum is cut off
47g2-1/48	. . Monitoring arrangements for inspecting, e.g. flow of steam and steam condensate

47h Drives

Crank, cam, wedge and screw drives

47h-1	Crank drives: eccentrics, slot-and-crank mechanisms, dead centre overcoming devices, lever mechanisms, treadle mechanisms, straight and parallel guide systems, variable stroke crank drives
47h-2	Cam and wedge drives; cam-and-follower drives, wobble plate drives
47h-3	Screw and worm drives

Interlocking mechanisms (interlocking mechanisms as precision-mechanical elements 47i-4)

47h-4	Detents: retarding mechanisms, catches, cocking and triggering mechanisms (47h-5)
47h-5	Intermittent mechanisms: only such as serve to produce intermittently progressive movements, like ratchet drives, mesh and belt shifting mechanisms, also with adjustable displacement, Geneva movements (starting and stopping gears 47h-27, 47h-4)

Gearings with rolling contact along pitch circles

47h-6	Gear drives in general (47h-12)
47h-7	Epicyclic gear drives in general: planetary gearings, differential and compensation gearings (47h-3)
47h-8	Friction drives in general, also with electromagnetic coupling (47h-14)

Drives by means of wheels connected by endless power transmission devices

47h-9	Belt pulley drives in general (47h-15; 47h-19)
47h-10	Rope pulley drives in general (47h-16; 47h-19)
47h-11	Chain sprocket drives in general (47h-17; 47h-19)

Change-speed and reversing mechanisms (automatic 47h-21, 47h-25; for intermittent mechanisms 47h-5)

47h-12	Gear shifting and reversing mechanisms (47h-6; 47h-19)
47h-13	Epicyclic gear shifting and reversing mechanisms (47h-7; 47h-19)
47h-14	Friction gear shifting and reversing mechanisms (47h-8; 47h-19)

47h-15 Belt pulley gear shifting and reversing mechanisms (47h-9; 47h-19)

47h-16 Rope pulley gear shifting and reversing mechanisms (47h-10; 47h-19)

47h-17 Chain sprocket gear shifting and reversing mechanism (47h-11; 47h-19; 63c-12; 63k-13; 63k-14)

47h-18 Hydraulic and compressed air drives with unlimited rotary movement as torque converters (hydraulic and compressed air drives with limited movement 47h-22; hydraulic clutches with power transmission without torque conversion 47c-14)

47h-19 Reversing mechanisms (47h-1; 47h-2; 47h-5; 47h-12 – 47h-18; 47h-21)

Compound drives

47h-20 Drives for mechanical transmission of a movement, in general, with exception of 47h-1 – 47h-19, 47h-21 – 47h-27 (46e-8); structurally combined drives with power machines (21d1-44; 21d1-47; 34b-13/10; 49a-21); transmission by means of pulling and pushing devices (hydraulic devices 47h-22); synchronous power amplification

47h-21 Drives for mechanical transformation of movements with exception of 47h-1 – 47h-5; drives consisting of rack or rack sector and pinion, multilated gearings; transformation of continuous rotation into intermittent movement, into non-uniform movement and into movement with periodically reversing direction of rotation

47h-22 Hydraulic and compressed air drives with limited, particularly reciprocating, movement, hydraulic or compressed air columns between impulse transmitter and impulse receiver (servomotors for general purposes and their connections 60-30, 60-35); common features in hydraulic and compressed air drives

47h-23 Mechanical energy storage in drive mechanisms, e.g. by means of springs and weights (power engines 46e)

47h-24 Generation of curved movements: oval and cycloidal movement devices, etc.

47h-25 Drives for automatic equalisation between driving force and load, for machines (60; 63c-13)

47h-26 Methods and devices for damping of mechanical vibrations in drive mechanisms (14a-15; 42s; 46a11; 47b-28; 63c-8/01; 63c-13/01; 65f2-6; for foundations 47a-20)

47h-27 Mechanical starting and shutting-off devices for machines, in general (47h-22; 46c5; 21c-45, 21c-46)

47h (IPC: F16H) Gearing

Note:
In this subclass
"Toothed gearing" includes worm gearing and other gearing involving at least one wheel or sector provided with teeth or the equivalent, except gearing with chains or toothed belts, which is treated as friction gearing.
"Conveying . . . motion" includes transmitting energy, and means that the applied and resultant motions are of the same kind, though they may differ in, e.g. speed, direction, extent.
"Rotary" implies that the motion may continue indefinitely.
"Oscillating" means moving about an axis to an extent which is limited by the construction of the gearing and which may exceed one revolution, the movement being alternately forwards and backwards during continued operation of the gearing.
"Reciprocating" means moving substantially in a straight line, the movement being alternately forwards and backwards during continued operation of the gearing.
"Reversing" or "reversal" means that an applied movement in one direction may produce a resultant movement in either of two opposed directions at will.
"Central gears" includes any gears whose axis is the main axis of the gearing. Sets of rigidly-connected members are regarded as single members.

Toothed gearings for conveying rotary motion

47h-1/00	**Toothed gearings for conveying rotary motion** (specific for conveying rotary motion with variable gear ratio or for reversing rotary motion 47h-3/00)
47h-1/02	. without gears having orbital motion
47h-1/04	. . involving only two intermeshing members
47h-1/06	. . . with parallel axes
47h-1/08	. . . . the members having helical, herring-bone, or like teeth
47h-1/10	. . . . one of the members being internally toothed
47h-1/12	. . . with non-parallel axes
47h-1/14	. . . . comprising conical gears only
47h-1/16	. . . . comprising worm and worm-wheel
47h-1/18	. . . . the members having helical, herring-bone, or like teeth (47h-1/14 takes precedence)
47h-1/20	. . involving more than two intermeshing members
47h-1/22	. . . with a plurality of driving or driven shafts; with arrangements for dividing torque between two or more intermediate shafts
47h-1/24	. . involving gears essentially having intermeshing elements other than involute or cycloidal teeth (47h-1/16 takes precedence)
47h-1/26	. . Special means compensating for misalignment of axes
47h-1/28	. with gears having orbital motion
47h-1/30	. . in which an orbital gear has an axis crossing the main axis of the gearing and has helical teeth or is a worm
47h-1/32	. . in which the central axis of the gearing lies inside the periphery of an orbital gear
47h-1/34	. . involving gears essentially having intermeshing elements other than involute or cycloidal teeth (in worm gearing 47h-1/30)
47h-1/36	. . with two central gears coupled by intermeshing orbital gears
47h-1/38	. . Differential gearings
47h-1/40	. . . comprising orbital conical gears
47h-1/42	. . . comprising orbital spur gears
47h-1/44	. . . with locking devices or other provisions for suppressing or influencing the differential action
47h-1/46	. . Systems consisting of a plurality of gear trains, each with orbital gears
47h-1/48	. . Special means compensating for misalignment of axes

47h-3/00	**Toothed gearings for conveying rotary motion with variable gear ratio or for reversing rotary motion** (speed-changing or reversing mechanisms 47h-5/00)
47h-3/02	. without gears having orbital motion
47h-3/04	. . with internally-toothed gears
47h-3/06	. . with worm and worm-wheel or gears essentially having helical or herring-bone teeth
47h-3/08	. . exclusively or essentially with continuously-meshing gears, that can be disengaged from their shafts
47h-3/10	. . . with one or more one-way clutches as an essential feature
47h-3/12	. . . with means for synchronisation not incorporated in the clutches (synchronised clutches 47c-23/02)
47h-3/14	. . . Gearings for reversal only
47h-3/16	. . essentially with both gears that can be put out of gear and continuously-meshing gears that can be disengaged from their shafts
47h-3/18	. . . Gearings for reversal only
47h-3/20	. . exclusively or essentially using gears that can be moved out of gear
47h-3/22	. . . with gears shiftable only axially
47h-3/24	. . . . with driving and driven shafts coaxial
47h-3/26	. . . . . and two or more additional shafts
47h-3/28	. . . . . an additional shaft being coaxial with the main shafts
47h-3/30	. . . . with driving and driven shafts not coaxial
47h-3/32	. . . . . and an additional shaft
47h-3/34	. . . with gears shiftable otherwise than only axially
47h-3/36	. . . with a single gear meshable with any of a set of coaxial gears of different diameters
47h-3/38	. . . with synchro-meshing
47h-3/40	. . . Gearings for reversal only
47h-3/42	. . with gears having teeth formed or arranged for obtaining multiple gear ratios, e.g. nearly infinitely variable
47h-3/44	. using gears having orbital motion
47h-3/46	. . Gearings having only two central gears, connected by orbital gears (47h-3/68 to 47h-3/78 take precedence)
47h-3/48	. . . with single orbital gears or pairs of rigidly-connected orbital gears
47h-3/50	. . . . comprising orbital conical gears
47h-3/52	. . . . comprising orbital spur gears
47h-3/54	. . . . . one of the central gears being internally toothed and the other externally toothed
47h-3/56	. . . . . both central gears being sun gears
47h-3/58	. . . with sets of orbital gears, each consisting of two or more intermeshing orbital gears
47h-3/60	. . . Gearings for reversal only
47h-3/62	. . Gearings having three or more central gears (47h-3/68 to 47h-3/78 take precedence)
47h-3/64	. . . composed of a number of gear trains, the drive always passing through all the trains, each train having not more than one connection for driving another train
47h-3/66	. . . composed of a number of gear trains without drive passing from one train to another
47h-3/68	. . in which an orbital gear has an axis crossing the main axis of the gearing and has helical teeth or is a worm
47h-3/70	. . in which the central axis of the gearing lies inside the periphery of an orbital gear
47h-3/72	. . with a secondary drive, e.g. regulating motor, in order to vary speed continuously
47h-3/74	. . Complexes, not using actuatable speed-changing or regulating members, e.g. with gear ratio determined by free play of frictional or other forces
47h-3/76	. . with an orbital gear having teeth formed or arranged for obtaining multiple gear ratios, e.g. nearly infinitely variable
47h-3/78	. . Special adaptation of synchronisation mechanisms to these gearings

47h-5/00 **Speed-changing or reversing mechanisms for toothed gearings conveying rotary motion** (mechanisms adapted only for special gearings, see the relevant groups for those gearings; control devices in general 42r1)

47h-5/02 . for non-automatic operation (mechanisms with preselection 47h-5/74)
47h-5/04 . . actuated entirely mechanically
47h-5/06 . . . specific for gearings without orbital gears
47h-5/08 . . . . with gears that can be disengaged from their shafts
47h-5/10 . . . specific for gearings with orbital gears
47h-5/12 . . actuated by fluid pressure
47h-5/14 . . . specific for gearings without orbital gears
47h-5/16 . . . . with gears that can be disengaged from their shafts
47h-5/18 . . . specific for gearings with orbital gears
47h-5/20 . . actuated electrically
47h-5/22 . . . specific for gearings without orbital gears
47h-5/24 . . . . with gears that can be disengaged from their shafts
47h-5/26 . . . specific for gearings with orbital gears
47h-5/28 . . with essential mechanical and fluid-pressure and electrical features, or with essential features of at least two of these kinds
47h-5/30 . . . specific for gearings without orbital gears
47h-5/32 . . . . with gears that can be disengaged from their shafts
47h-5/34 . . . specific for gearings with orbital gears
47h-5/36 . . for additional actuation of an auxiliary gearing, a main clutch or one or more separating clutches
47h-5/38 . . Means for indicating synchronisation of the gears to be engaged
47h-5/40 . automatically controlled, e.g. by speed, torque, acceleration, temperature, atmospheric pressure which mechanisms may or may not actuated other transmission members (mechanisms with preselection 47h-5/74)
47h-5/42 . . by speed
47h-5/44 . . . actuated entirely mechanically
47h-5/46 . . . . using centrifugal clutches for speed-changing (clutches 47c-43/00 to 47c-43/18)
47h-5/48 . . . actuated by fluid pressure
47h-5/50 . . . actuated electrically
47h-5/52 . . by torque, e.g. position of throttle valve of engine
47h-5/54 . . . actuated entirely mechanically
47h-5/56 . . . actuated by fluid pressure
47h-5/58 . . . actuated electrically
47h-5/60 . . by both speed and torque
47h-5/62 . . . actuated entirely mechanically
47h-5/64 . . . actuated by fluid pressure
47h-5/66 . . . actuated electrically
47h-5/68 . . specific for reversal
47h-5/70 . . . cyclically actuated
47h-5/72 . . . with change of velocity ratio on change in direction of the driving torque
47h-5/74 . with preselection, automatic or non-automatic, which mechanisms may or may not actuate, or be actuated by, other transmission members
47h-5/76 . . acting or actuated entirely mechanically
47h-5/78 . . acting or actuated by fluid pressure
47h-5/80 . . acting or actuated electrically
47h-5/82 . . specific for automatic preselection (not specially adapted for gearings, see 42r1)
47h-5/84 . . with blocking of the engagement as long as the elements that are to be engaged are not running synchronously

Gearing for conveying rotary motion by endless flexible members

47h-7/00 **Gearings for conveying rotary motion by endless flexible members** (specific for conveying rotary motion with variable gear ratio or for reversing rotary motion 47h-9/00)

47h-7/02 . with belts; with V-belts
47h-7/04 . with ropes
47h-7/06 . with chains

47h-7/08 . Means for varying tension of belts, ropes, or chains (pulleys of adjustable construction 47h-55/52)
47h-7/10 . . by adjusting the axis of a pulley
47h-7/12 . . . of an idle pulley
47h-7/14 . . . of a driving or driven pulley
47h-7/16 . . . . without adjusting the driving or driven shaft
47h-7/18 . Means for guiding or supporting belts, ropes, or chains (construction of pulleys 47h-55/36)
47h-7/20 . . Mountings for rollers or pulleys
47h-7/22 . Belt, rope, or chain shifters
47h-7/24 . Equipment for mounting belts, ropes, or chains

47h-9/00 Gearings for conveying rotary motion with variable gear ratio, or for reversing rotary motion, by endless flexible members (speed-changing or reversing mechanisms 47h-11/00)
47h-9/02 . without members having orbital motion
47h-9/04 . . using belts, V-belts, or ropes (with toothed belts 47h-9/24; pulleys of adjustable construction 47h-55/52)
47h-9/06 . . . engaging a stepped pulley
47h-9/08 . . . engaging a conical drum (47h-9/12 takes precedence)
47h-9/10 . . . engaging a pulley provided with radially-actuatable elements carrying the belt
47h-9/12 . . . engaging a pulley built-up out of relatively axially-adjustable parts in which the belt engages the opposite flanges of the pulley directly without interposed belt-supporting members
47h-9/14 . . . . using only one pulley built-up out of adjustable conical parts
47h-9/16 . . . . using two pulleys, both built-up out of adjustable conical parts
47h-9/18 . . . . . only one flange of each pulley being adjustable
47h-9/20 . . . . . both flanges of the pulleys being adjustable
47h-9/22 . . . specially adapted for ropes
47h-9/24 . . using chains or toothed belts; Chains specially adapted to such gearing
47h-9/26 . with members having orbital motion

47h-11/00 Speed-changing or reversing mechanisms for gearings for conveying rotary motion by endless flexible members
47h-11/02 . for infinitely-variable types
47h-11/04 . . non-automatic
47h-11/06 . . automatic
47h-11/08 . for types with stepped variation of speed

Other friction gearing for conveying rotary motion

47h-13/00 Gearings for conveying rotary motion by friction between rotary members (specific for conveying rotary motion with variable gear ratio or for reversing rotary motion 47h-15/00)
47h-13/02 . without members having orbital motion
47h-13/04 . . with balls or with rollers acting in a similar manner
47h-13/06 . with members having orbital motion
47h-13/08 . . with balls or with rollers acting in a similar manner
47h-13/10 . Means for influencing the pressure between the members
47h-13/12 . . by magnetic forces
47h-13/14 . . for automatically varying the pressure mechanically

47h-15/00 Gearings for conveying rotary motion with variable gear ratio, or for reversing rotary motion, by friction between rotary members (speed-changing or reversing mechanisms 47h-17/00)
47h-15/02 . without members having orbital motion
47h-15/04 . . Gearings providing a continuous range of gear ratios
47h-15/06 . . . in which a member A of uniform effective diameter mounted on a shaft may co-operate with different parts of a member B
47h-15/08 . . . . in which the member B is a disc with a flat or approximately-flat friction surface
47h-15/10 . . . . . in which the axes of the two members cross or intersect

47h-15/12 . . . . . in which one or each member is duplicated, e.g. for obtaining better transmission, for lessening the reaction forces on the bearings
47h-15/14 . . . . . in which the axes of the members are parallel or approximately parallel
47h-15/16 . . . . in which the member B has a conical friction surface
47h-15/18 . . . . . externally
47h-15/20 . . . . . co-operating with the outer rim of the member A, which is perpendicular or nearly perpendicular to the friction surface of the member B
47h-15/22 . . . . . the axes of the members being parallel or approximately parallel
47h-15/24 . . . . . internally
47h-15/26 . . . . in which the member B has a spherical friction surface centered on its axis of revolution
47h-15/28 . . . . . with external friction surface
47h-15/30 . . . . . with internal friction surface
47h-15/32 . . . . in which the member B has a curved friction surface formed as a surface of a body of revolution generated by a curve which is neither a circular arc centered on its axis of revolution nor a straight line
47h-15/34 . . . . . with convex friction surface
47h-15/36 . . . . . with concave friction surface, e.g. a hollow toroid surface
47h-15/38 . . . . . with two members B having hollow toroid surfaces opposite to each other, the member or members A being adjustably mounted between the surfaces
47h-15/40 . . . in which two members co-operate by means of balls, or rollers of uniform effective diameter, not mounted on shafts
47h-15/42 . . . in which two members co-operate by means of rings or by means of parts of endless flexible members pressed between the first-mentioned members
47h-15/44 . . . in which two members of non-uniform effective diameter directly co-operate with one another
47h-15/46 . . Gearings providing a discontinuous or stepped range of gear ratios
47h-15/48 . with members having orbital motion
47h-15/50 . . Gearings providing a continuous range of gear ratios
47h-15/52 . . . in which a member of uniform effective diameter mounted on a shaft may co-operate with different parts of another member
47h-15/54 . . . in which two members co-operate by means of rings or by means of parts of endless flexible members pressed between the first-mentioned members
47h-15/56 . . Gearings providing a discontinuous or stepped range of gear ratios

47h-17/00 Speed-changing or reversing mechanisms for gearings for conveying rotary motion by friction between rotary members

47h-17/02 . for infinitely-variable types
47h-17/04 . . non-automatic
47h-17/06 . . automatic
47h-17/08 . for types with stepped variation of speed

47h-19/00 Gearings comprising essentially only toothed gears or friction members and not capable of conveying indefinitely-continuing rotary motion (with intermittently-driving members 47h-27/00 to 47h-31/00; rope or like tackle for lifting or haulage 35c)

47h-19/02 . for interconverting rotary motion and reciprocating motion
47h-19/04 . . comprising a rack
47h-19/06 . . comprising an endless flexible member
47h-19/08 . for interconverting rotary motion and oscillating motion

Gearing for conveying or converting motion by means of levers, links, or cams (combinations of gearings of different types 47h-37/00)

47h-21/00 Gearings comprising primarily only links or levers, with or without slides

47h-21/02 . the movements of two or more independently-moving members being combined into a single movement
47h-21/04 . Guiding mechanisms, e.g. for straight-line guidance (for drawing-machines 70e)
47h-21/06 . which can be made ineffective when desired
47h-21/08 . . by pushing a reciprocating rod out of its operative position

47h-21/10 . all movement being in, or parallel to, a single plane
47h-21/12 . . for conveying rotary motion
47h-21/14 . . . by means of cranks, eccentrics, or like members fixed to one rotary member and guided along tracks on the other
47h-21/16 . . for interconverting rotary motion and reciprocating motion
47h-21/18 . . . Crank gearings; Eccentric gearings
47h-21/20 . . . . with adjustment of throw (adjustable cranks or eccentrics 47b-3/28; adjustable connecting-rods 47b-7/06)
47h-21/22 . . . . with one connecting-rod and one guided slide to each crank or eccentric
47h-21/24 . . . . . without further links or guides
47h-21/26 . . . . . with toggle action
47h-21/28 . . . . . with cams or additional guides
47h-21/30 . . . . . with members having rolling contact
47h-21/32 . . . . . with additional members comprising only pivoted links or arms
47h-21/34 . . . . with two or more connecting-rods to each crank or eccentric
47h-21/36 . . . . without swinging connecting-rod, e.g. with epicyclic parallel motion, slot-and-crank motion
47h-21/38 . . . . with means for temporary energy accumulation, e.g. to overcome dead-centre positions
47h-21/40 . . for interconverting rotary motion and oscillating motion
47h-21/42 . . . with adjustable throw
47h-21/44 . . for conveying or interconverting oscillating or reciprocating motions
47h-21/46 . with movements in three dimensions
47h-21/48 . . for conveying rotary motion
47h-21/50 . . for interconverting rotary motion and reciprocating motion (47h-23/00 takes precedence)
47h-21/52 . . for interconverting rotary motion and oscillating motion
47h-21/54 . . for conveying or interconverting oscillating or reciprocating motions

47h-23/00 Wobble-plate gearings; Oblique-crank gearings

47h-23/02 . with adjustment of throw by changing the position of the wobble-member (47h-29/04, 47h-33/10 take precedence)
47h-23/04 . with non-rotary wobble-members
47h-23/06 . . with sliding members hinged to reciprocating members
47h-23/08 . . connected to reciprocating members by connecting-rods
47h-23/10 . with rotary wobble-plates with plane surfaces

47h-25/00 Gearings comprising primarily only cams, cam-followers and screw-and-nut mechanisms

47h-25/02 . the movements of two or more independently-moving members being combined into a single movement
47h-25/04 . for conveying rotary motion
47h-25/06 . . with intermediate members guided along tracks on both rotary members
47h-25/08 . for interconverting rotary motion and reciprocating motion (47h-23/00 takes precedence)
47h-25/10 . . with adjustable throw (adjustable cams 47h-53/04)
47h-25/12 . . with reciprocation along the axis of rotation, e.g. gearings with helical grooves and automatic reversal (screw mechanisms without automatic reversal 47h-25/20)
47h-25/14 . . with reciprocation perpendicular to the axis of rotation (47h-21/36 takes precedence)
47h-25/16 . for interconverting rotary motion and oscillating motion
47h-25/18 . for conveying or interconverting oscillating or reciprocating motions
47h-25/20 . . Screw mechanisms (with automatic reversal 47h-25/12)
47h-25/22 . . . with balls, rollers, or similar members between the co-operating parts; Elements essential to the use of such members
47h-25/24 . . . Elements essential to such mechanisms, e.g. screws, nuts (47h-25/22 takes precedence)

Gearings with intermittently-driving members

47h-27/00 **Step-by-step mechanisms without freewheel members, e.g. Geneva drives** (rotary gearings with cyclically-varying velocity ratio 47h-35/02; impulse couplings 47c-5/00; clockwork escapements 83a)

47h-27/02 . with at least one reciprocating or oscillating transmission member
47h-27/04 . for converting continuous rotation into a step-by-step rotary movement
47h-27/06 . . Mechanisms with driving pins in driven slots, e.g. Geneva drives
47h-27/08 . . with driving toothed gears with interrupted toothing
47h-27/10 . . obtained by means of disengageable transmission members, combined or not combined with mechanisms according to group 47h-27/06 or 47h-27/08

47h-29/00 **Gearings for conveying rotary motion with intermittently-driving members, e.g. with freewheel action** (freewheels 47c-41/00)

47h-29/02 . between one of the shafts and an oscillating or reciprocating intermediate member, not rotating with either of the shafts (47h-29/20, 47h-29/22 take precedence)
47h-29/04 . . in which the transmission ratio is changed by adjustment of a crank, an eccentric, a wobble-plate, or a cam, on one of the shafts
47h-29/06 . . . with concentric shafts, an annular intermediate member moving around and being supported on an adjustable crank or eccentric
47h-29/08 . . in which the transmission ratio is changed by adjustment of the path of movement, the location of the pivot, or the effective length, of an oscillating connecting member
47h-29/10 . . in which the transmission ratio is changed by directly operating on the intermittently driving members
47h-29/12 . between rotary driving and driven members (47h-29/20, 47h-29/22 take precedence)
47h-29/14 . . in which the transmission ratio is changed by adjustment of an otherwise stationary guide member for the intermittently-driving members
47h-29/16 . . in which the transmission ratio is changed by adjustment of the distance between the axes of the rotary members
47h-29/18 . . . in which the intermittently-driving members slide along approximately radial guides while rotating with one of the rotary members
47h-29/20 . the intermittently-acting members being shaped as worms, screws, or racks
47h-29/22 . with automatic speed change

47h-31/00 **Other gearings with freewheeling members or other intermittently-driving members** (47h-21/00, 47h-23/00, 47h-25/00 take precedence; gearings involving the use of automatic changing-mechanisms, e.g. cyclically-actuated reversal gearings, see the appropriate groups)

47h-33/00 **Gearings based on repeated accumulation and delivery of energy**

47h-33/02 . Rotary transmissions with mechanical accumulators, e.g. weights, springs, intermittently-connected flywheels
47h-33/04 . . Gearings for conveying rotary motion with variable velocity ratio, in which self-regulation is sought
47h-33/06 . . . based essentially on spring action (ratchet slip couplings 47c-7/04)
47h-33/08 . . . based essentially on inertia
47h-33/10 . . . . with gyroscopic action, e.g. comprising wobble-plates, oblique cranks
47h-33/12 . . . . with a driving member connected differentially with both a driven member with large resistance to movement, e.g. Constantinesco gearing
47h-33/14 . . . . having orbital members influenced by regulating masses
47h-33/16 . . . . . which have their own free motion, or consist of fluid
47h-33/18 . . . . . of which the motion is constrained
47h-33/20 . for interconversion, based essentially on inertia, of rotary motion and reciprocating or oscillating motion (shaking, jolting, or vibratory apparatus 42s)

47h-35/00 **Gearings or mechanisms with other special functional features**

47h-35/02 . for conveying rotary motion with cyclically-varying velocity ratio (speed-changing mechanisms operating cyclically, see the appropriate groups)
47h-35/04 . Mechanical differential gearings without members having orbital motion (comprising freewheels only 47c-41/00)

47h-35/06 . Gearings designed to allow relative movement between supports thereof without ill effects (47h-1/26, 47h-1/48 take precedence)
47h-35/08 . for adjustment of members on moving parts from a stationary place
47h-35/10 . Arrangements or devices for absorbing overload or preventing damage by overload (couplings, clutches 47c)
47h-35/12 . Transmitting mechanisms with delayed effect (vibration- or shock-dampers in general 47a3)
47h-35/14 . Mechanisms with only two stable positions
47h-35/16 . Mechanisms for movements or movement relations conforming to mathematical formulae (devices in which computing operations are performed mechanically 42m4-3/00)
47h-35/18 . Turning devices for rotatable members, e.g. shafts (starting devices for internal-combustion engines 46l)

47h-37/00 Combinations of mechanical gearings, not hereinbefore provided for (applications of "underdrives" or "overdrives" in motor vehicles, combinations with differential gearings in motor vehicles 63c)
47h-37/02 . comprising essentially only toothed or friction gearings
47h-37/04 . . Combinations of toothed gearings only (47h-37/06 takes precedence)
47h-37/06 . . with a plurality of driving or driven shafts; with arrangements for dividing torque between two or more intermediate shafts
47h-37/08 . . . with differential gearing
47h-37/10 . . . . at both ends of intermediate shafts
47h-37/12 . Gearings comprising primarily toothed or friction gearing, links or levers, and cams, or members of at least two of these three types (47h-21/14, 47h-21/28, 47h-21/30 take precedence; toothed or friction gearing or cam gearing, with only an additional lever or link, see the appropriate group for the main gearing)
47h-37/14 . . the movements of two or more independently-moving members being combined into a single movement
47h-37/16 . . with a driving or driven member which both rotates or oscillates on its axis and reciprocates

Fluid gearing (fluid actuators 60a)

47h-39/00 Rotary fluid gearing using pumps and motors of the volumetric type, i.e. passing a predetermined volume of fluid per revolution (application to lifting or pushing equipment 35)
47h-39/02 . the motors being at a distance from pumps
47h-39/04 . with the motor and pump combined in one unit
47h-39/06 . . pump and motor being of the same type
47h-39/08 . . . each with one main shaft and provided with pistons reciprocating in cylinders
47h-39/10 . . . . with cylinders arranged around, and parallel or approximately parallel to, the main axis of the gearing
47h-39/12 . . . . . with stationary cylinders
47h-39/14 . . . . . with cylinders carried in rotary cylinder blocks or cylinder-bearing members
47h-39/16 . . . . with cylinders arranged perpendicular to the main axis of the gearing
47h-39/18 . . . . . the connections of the pistons being at the outer ends of the cylinders
47h-39/20 . . . . . the connections of the pistons being at the inner ends of the cylinders
47h-39/22 . . . with liquid chambers shaped as bodies of revolution concentric with the main axis of the gearing
47h-39/24 . . . . with rotary displacement members, e.g. provided with axially or radially movable vanes passing movable sealing members
47h-39/26 . . . with liquid chambers not shaped as bodies of revolution or shaped as bodies of revolution eccentric to the main axis of the gearing
47h-39/28 . . . . with liquid chambers formed in rotary members
47h-39/30 . . . . with liquid chambers formed in stationary members
47h-39/32 . . . . . with sliding vanes carried by the rotor
47h-39/34 . . . in which a rotor on one shaft co-operates with a rotor on another shaft
47h-39/36 . . . . Toothed-gear type
47h-39/38 . . . . Displacement screw-pump type

47h-39/40 . . . Hydraulic differential gearings, e.g. having a rotary input housing with interconnected liquid chambers for both outputs
47h-39/42 . . pump and motor being of different types
47h-39/44 . Control (involving modification of the gearing 47h-39/02 to 47h-39/42)
47h-39/46 . . involving adjustment of a pump or motor with adjustable output or capacity
47h-39/48 . . by varying the number of pump or motor units in operation
47h-39/50 . . Automatic regulation in accordance with output requirements (servomotors 60a)
47h-39/52 . . . for use in drives for winding or unwinding mechanisms for tapes, threads, or wire

47h-41/00 Rotary fluid gearing of the hydrokinetic type

47h-41/02 . with pump and turbine connected by conduits or ducts
47h-41/04 . Combined pump-turbine units
47h-41/06 . . controlled by changing the flow, force, or reaction of the liquid in the working circuit, while maintaining a completely filled working circuit
47h-41/08 . . . by altering the position of blades
47h-41/10 . . . . by means of axially-shiftable blade runners
47h-41/12 . . . . to change the blade angle
47h-41/14 . . . by change of the mechanical connection of or between the runners
47h-41/16 . . . . exclusively by the use of freewheel clutches
47h-41/18 . . . . involving use of a speed-changing gearing or of a clutch in the connection between runners (47h-41/16, 47h-45/02 take precedence)
47h-41/20 . . controlled by changing the amount of liquid in the working circuit
47h-41/22 . . Gearing systems consisting of a plurality of hydrokinetic units operating alternatively, e.g. made effective or ineffective by filling or emptying or by mechanical clutches
47h-41/24 . Details
47h-41/26 . . Shape of runner blades or channels with respect to function
47h-41/28 . . with respect to manufacture, e.g. blade attachment
47h-41/30 . . relating to venting, lubrication, cooling, circulation of the cooling medium
47h-41/32 . Selection of working fluids (chemical aspects, see the relevant classes)

47h-43/00 Other fluid gearing, e.g. with oscillating input or output

47h-45/00 Combinations of fluid gearings for conveying rotary motion with couplings or clutches (47h-41/22 takes precedence)

Note:
Clutches for varying working conditions in fluid torque-converters are regarded as a part of the latter.

47h-45/02 . with mechanical clutches for bridging a fluid gearing of the hydrokinetic type

47h-47/00 Combinations of mechanical gearing with fluid gearing

47h-47/02 . the fluid gearing being of the volumetric type
47h-47/04 . . the mechanical gearing being of the type with members having orbital motion
47h-47/06 . the fluid gearing being of the hydrokinetic type
47h-47/08 . . the mechanical gearing being of the type with members having orbital motion

47h-49/00 Other gearing

Details of gearing or mechanisms (of screw-and-nut gearing 47h-25/00; of fluid gearing 47h-39/00 to 47h-43/00; shafts, Bowden mechanisms, cranks, eccentrics, bearings, pivotal connections, crossheads, connecting-rods 47b; chains, belts 47d; piston-rods 47f2-7/00)

47h-51/00 Levers

47h-51/02 . adjustable

47h-53/00 Cams; Non-rotary cams; Cam-followers, e.g. rollers

47h-53/02 . Single-track cams for single-revolution cycles; Camshafts with such cams
47h-53/04 . . Adjustable cams
47h-53/06 . Cam-followers (47h-53/08 takes precedence)
47h-53/08 . Multi-track cams, e.g. for cycles consisting of several revolutions; Cam-followers specially adapted for such cams

47h-55/00	Elements with teeth or friction surfaces for conveying motion; Worms; Pulleys; Sheaves (pulley-blocks 35c-3/04)
47h-55/02	. Toothed members; Worms
47h-55/04	. . Toothed wheels (worm wheels 47h-55/22; chain wheels 47h-55/30)
47h-55/06	. . . Uses of materials or of treatments of material
47h-55/08	. . . Profiling
47h-55/10	. . . Constructively simple tooth shapes, e.g. shaped as pins, as balls
47h-55/12	. . . with body or rim assembled out of detachable parts
47h-55/14	. . . Construction providing resilience or vibration-damping (47h-55/06 takes precedence; resilient coupling of wheel or wheel-rim with shaft 47c-3/50, 47c-3/80)
47h-55/16	. . . . relating to teeth only
47h-55/18	. . . Special devices for taking-up backlash
47h-55/20	. . . . for bevel gears
47h-55/22	. . for transmissions with crossing shafts, especially worms, worm-gears (bevel gears, crown wheels, helical gears 47h-55/04)
47h-55/24	. . . Special devices for taking up backlash
47h-55/26	. . Racks
47h-55/28	. . . Special devices for taking up backlash
47h-55/30	. . Chain wheels (specially adapted for cycles 63k)
47h-55/32	. Friction members (friction surfaces 47c-69/00)
47h-55/34	. . Non-adjustable friction discs
47h-55/36	. . Pulleys (with features essential for adjustment 47h-55/52)
47h-55/38	. . . Means or measures for increasing adhesion (in general 47c-69/00)
47h-55/40	. . . with spokes (47h-55/48 takes precedence)
47h-55/42	. . . Laminated pulleys
47h-55/44	. . . Sheet-metal pulleys
47h-55/46	. . . Split pulleys
47h-55/48	. . . manufactured exclusively or in part of wood or other non-metallic material (47h-55/38, 47h-55/42, 47h-55/46 take precedence)
47h-55/50	. . . Features essential to rope pulleys
47h-55/52	. . Pulleys or friction discs of adjustable construction
47h-55/54	. . . of which the bearing parts are radially adjustable
47h-55/56	. . . of which the bearing parts are relatively axially adjustable
47h-57/00	**General details of gearing**
47h-57/02	. Gear-boxes; Mounting gearing therein
47h-57/04	. Features relating to lubrication or cooling
47h-57/05	. . of chains (for conveyers 81e)
47h-57/06	. Means for preventing the actuation of speed-changing or reversing mechanism in unfavourable conditions
47h-57/08	. of gearings with members having orbital motion
47h-57/10	. . Braking arrangements

47i Compound precision-mechanical structural elements, if not classified in special classes

47i-1	Bearings for precision drive mechanisms (as machine elements 47b; for measuring instruments in general 42d-1/01; for electric machinery 21d1-47; for small electric machines 21d1-9 – 21d1-12; bearings for gyro instruments 47c-25/51; for clockworks 83a-48)
47i-2	Servo mechanisms for coarse and fine adjustment (for HF telecommunication devices 21a4-70)
47i-3	Guides and guideways for moving parts (as machine elements 47b; guides in connection with linkages as machine elements 47h-1; for measuring instruments in general 42d-1/01)
47i-4	Joints, arresting and locking devices (joints as machine elements 47a; interlocking devices as machine elements 47h-4; connections for electric lines 21c-20 – 21c-27)
47i-5	Movement transmission devices (couplings for power transmission in general 47c; drives for power transmission in general 47h; for electric devices 21d1-47)

47i-6	Indicating and reading devices (for radio apparatus 21a4-70; for measuring instruments 42d-2/01; for remote indication, signalling and control devices 74b-74; for electric clocks 83b)
47i-7	Other precision-mechanical structural elements not classified above

47i (IPC: G12B) Details of instruments, or comparable details of other apparatus, not otherwise provided for

Notes:
(1) This subclass includes only details which are not restricted to measuring instruments or to any other apparatus covered by a single class. Details which are covered by any other subclass are classified in the relevant subclass. In particular, details which are restricted to measuring instruments are covered by the relevant subclass of class 42.
(2) Constructional details restricted to electric apparatus, e.g. casings, screenings, are covered by class 21.

47i-1/00	**Sensitive elements capable of producing movement or displacement for purposes not limited to measurement; Associated transmission mechanisms therefor**
47i-1/02	. Compound strips or plates, e.g. bimetallic
47i-1/04	. Hollow bodies having parts which are deformable or displaceable under pressure, e.g. Bourdon tube, bellows (bellows in general 47f2-3/00)
47i-3/00	**Details of movements not otherwise provided for** (damping of shock or vibrations in general 47a3; avoiding out-of-balance forces 47a3-15/00; testing balance 42k)
47i-3/02	. Caging of movements, i.e. locking of movements when not in use
47i-3/04	. Suspensions (bearings 47b)
47i-3/06	. Reducing effects of friction, e.g. by vibration (by lubrication 47e)
47i-3/08	. Damping of movements, e.g. to promote rapid non-oscillatory movement to a final reading
47i-3/10	. . using eddy currents
47i-5/00	**Adjusting position or attitude, e.g. level, of instruments or other apparatus, or of parts thereof** (levels per se 42c-24)**; Compensating for the effects of tilting or acceleration, e.g. for optical apparatus**
47i-7/00	**Compensating for the effects of temperature** (by cooling 47i-15/00)
47i-9/00	**Housing or supporting of instruments or other apparatus**
47i-9/02	. Casings; Housings; Cabinets (sealing arrangements for transmission members 47f2, particularly 47f2-15/50)
47i-9/04	. . Details, e.g. cover
47i-9/06	. . . Metal casings
47i-9/08	. Supports; Devices for carrying
47i-9/10	. . Instrument boards; Panels; Desks; Racks; Frameworks
47i-11/00	**Indicating elements; Illumination thereof**
47i-11/02	. Scales; Dials
47i-11/04	. Pointers; Setting-mechanisms therefor
47i-13/00	**Calibrating of instruments and apparatus** (calibrating of measuring instruments 42)
47i-15/00	**Cooling** (by refrigeration, e.g. circulation of refrigerated fluid, 17c; heat-exchange or heat-transfer details of general application 17e, 17f)
47i-15/02	. by closed-cycle fluid-circulating systems
47i-15/04	. by currents of fluid, e.g. air, in open cycle
47i-15/06	. by contact with heat-absorbing or radiating masses, e.g. heat-sink

47i-17/00 **Screening** (insulation or other protection of buildings 37a; emergency protection of apparatus in general 47a4-7/00; in connection with acoustic waves 42g-1/10; in connection with nuclear radiation 21g)

Note:
This group covers
(a) the protection of instruments or other apparatus from external radiation or other influences,
(b) the prevention of the emission of undesirable radiation or other influences by instruments or other apparatus.

47i-17/02 . from electric or magnetic fields, e.g. radio waves
47i-17/04 . from visible, ultra-violet, or infra-red light (screening of lighting devices 4a, 4b; optical filters 42h-34/08)
47i-17/06 . from heat (47i-17/04 takes precedence; cooling 47i-15/00)
47i-17/08 . from influences producing mechanical damage, e.g. caused by blast, by external object, by person (47i-17/02 to 47i-17/06 take precedence)

47k Feeding, guiding and storage, e.g. winding, of material in form of filaments, threads, wires, hoses, tapes or webs (special adaptations in special classes)

47k-1/00 **Lengthwise feeding of the material**
47k-1/02 . Continuous feeding
47k-1/04 . Stepwise feeding
47k-1/06 . Compensation for irregular feeding
47k-1/08 . Stopping the feeding

47k-3/00 **Guiding of the material**
47k-3/02 . Synchronous feeding of two or more tapes etc.
47k-3/04 . Controlling the tension
47k-3/06 . Storing with stepwise feeding of the material (storing of flexible material in general 47k-5/00)
47k-3/08 . Connecting the ends of the material
47k-3/10 . Monitoring the material

47k-5/00 **Storing the material, e.g. winding or depositing**
47k-5/02 . Winding on cores or formers, e.g. reels or bobbins
47k-5/04 . . Securing the material to the core or former
47k-5/06 . . Feeding to correct positions, protection of edges
47k-5/08 . . Construction of cores or formers
47k-5/10 . . Storing, securing, handling or replacing cores or formers; Severing the material when replacing the core or former (connecting the ends 47k-3/08)
47k-5/12 . Unwinding
47k-5/14 . Rewinding
47k-5/16 . Winding without core or former by driving the package by means or rolls or belts acting on its periphery
47k-5/18 . Winding into moving or stationary containers, with or without core, with or without guiding means
47k-5/20 . Other storing, e.g. depositing in loops

47k-7/00 **Repeated feeding, e.g. paying-out or taking up, of cables, hoses, etc. in order to serve a mobile user, e.g. vehicle, hoisting device, machine, etc.** (feeding of flexible material in general 47k-1/00)
47k-7/02 . Paying-out
47k-7/04 . Taking up

47k-9/00 **Storing cables, hoses, etc. on mobile users** (storing elongated, flexible material in general 47k-5/00)
47k-9/02 . on reels or in containers
47k-9/04 . in loose or tensioned loops