NOTES
1. Combinations including mechanical gearings are classified in groups F16H 37/00 or F16H 47/00, unless they are provided for in groups F16H 1/00 - F16H 35/00.
2. In this subclass, sets of rigidly-connected members are regarded as single members.
3. In this subclass, the following terms or expressions are used with the meanings indicated:
   • “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.
4. Attention is drawn to the following places:
   A01D 69/06 Gearings in harvesting machines
   A63H 31/00 Gearing for toys
   B21B 35/12 Toothed-wheel gearing for metal-rolling mills
   B60K Arrangement of transmissions in vehicles
   B61C 9/00 Transmissions for railway locomotives
   B62D 3/00 Vehicle steering gears
   B62M Transmissions for cycles
   B63H 23/00 Transmissions for marine propulsions
   B63H 25/00 Marine steering gears
   { B64C 27/12, B64C 27/58 } Transmissions for helicopters
   { B64D 35/00 } Transmissions for aircraft
   F01D F94 Machines, engines, pumps
   F15B 15/50 Gearings associated with fluid-actuated devices
   G01D 5/04 Gear used in indicating or recording apparatus in connection with measuring devices
   H03J 1/00 Driving arrangements for tuning resonant circuits
   H04L 13/04 Driving mechanisms for apparatus for transmission of coded digital information.

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

Toothed gearings for conveying rotary motion

| 1/00 | Toothed gearings for conveying rotary motion (specific for conveying rotary motion with variable gear ratio or for reversing rotary motion F16H 3/00) |
| 1/006 | . [the driving and driven axes being designed to assume variable positions relative to one another during operation] |
| 1/02 | . without gears having orbital motion |
| 1/04 | . . involving only two intermeshing members |
| 1/06 | . . . with parallel axes |
| 1/08 | . . . the members having helical, herringbone, or like teeth |
Toothed gearings for conveying rotary motion — F16H

1/10 . . . . . . one of the members being internally toothed
1/12 . . . . with non-parallel axes
1/125 . . . . . . [comprising spiral gears]
1/14 . . . . . . comprising conical gears only
1/145 . . . . . . [with offset axes, e.g. hypoid gearings]
1/16 . . . . . . comprising worm and worm-wheel
1/163 . . . . . . [with balls between the co-operating parts]
1/166 . . . . . . [with members rotating around axes on the worm or worm-wheel]
1/18 . . . . . . the members having helical, herringbone, or like teeth (F16H 1/14 takes precedence)
1/20 . . . involving more than two intermeshing members
1/203 . . . . . . [with non-parallel axes (F16H 1/22 takes precedence)]
1/206 . . . . . . [characterised by the driving or driven member being composed of two or more gear wheels]
1/22 . . . . with a plurality of driving or driven shafts; with arrangements for dividing torque between two or more intermediate shafts
1/222 . . . . . . [with non-parallel axes]
1/225 . . . . . . [with two or more worm and worm-wheel gearings]
1/227 . . . . . . [comprising two or more gearwheels in mesh with the same internally toothed wheel]
1/24 . . . . involving gears essentially having intermeshing elements other than involute or cycloidal teeth (F16H 1/16 takes precedence)
1/26 . . . Special means compensating for misalignment of axes
1/28 . . . with gears having orbital motion
1/2809 . . . [with means for equalising the distribution of load on the planet-wheels]
1/2818 . . . [by allowing limited movement of the ring gear relative to the casing or shaft]
1/2827 . . . [by allowing limited movement of the planet carrier, e.g. relative to its shaft]
1/2836 . . . [by allowing limited movement of the planet relative to the planet carrier or by using free floating planets]
1/2845 . . . [by allowing limited movement of the sun gear]
1/2854 . . . [involving conical gears]
1/2863 . . . [Arrangements for adjusting or for taking-up backlash]
2001/2872 . . . [comprising three central gears, i.e. ring or sun gear, engaged by at least one common orbital gear mounted on an idling carrier]
2001/2881 . . . [comprising two axially spaced central gears, i.e. ring or sun gear, engaged by at least one common orbital gear wherein one of the central gear is forming the output]
2001/289 . . . [comprising two or more coaxial and identical sets of orbital gears, e.g. for distributing torque between the coaxial sets]
1/30 . . . in which an orbital gear has an axis crossing the main axes of the gearing and has helical teeth or is a worm
1/32 . . . in which the central axis of the gearing lies inside the periphery of an orbital gear
1/321 . . . . . . [the orbital gear being nutating]
2001/322 . . . [comprising at least one universal joint, e.g. a Cardan joint]
2001/323 . . . . . . [comprising eccentric crankshafts driving or driven by a gearing]
2001/324 . . . . . . [comprising two axially spaced, rigidly interconnected, orbital gears]
2001/325 . . . . . . [comprising a carrier with pins guiding at least one orbital gear with circular holes]
2001/326 . . . . . . [comprising a carrier with linear guiding means guiding at least one orbital gear]
2001/327 . . . . . . [with orbital gear sets comprising an internally toothed ring gear]
2001/328 . . . . . . [comprising balancing means]
1/34 . . . involving gears essentially having intermeshing elements other than involute or cycloidal teeth (in worm gearing F16H 1/30)
1/36 . . . with two central gears coupled by intermeshing orbital gears
1/46 . . . Systems consisting of a plurality of gear trains each with orbital gears, [i.e. systems having three or more central gears]
1/48 . . . Special means compensating for misalignment of axes, e.g. for equalising distribution of load on the face width of the teeth (in combination with distribution of load on the planet-wheels F16H 1/2809)]

3/00 Toothed gearings for conveying rotary motion with variable gear ratio or for reversing rotary motion (speed-changing or reversing mechanisms F16H 59/00 - F16H 63/00)

3/001 . . . . . . convertible for varying the gear-ratio, e.g. for selecting one of several shafts as the input shaft)
3/002 . . . . . . [using gears having teeth movable out of mesh (F16H 3/42 takes precedence)]
3/003 . . . . . . [the gear-ratio being changed by inversion of torque direction]
3/005 . . . . . . [for gearings using gears having orbital motion]
3/006 . . . . . . [power being selectively transmitted by either one of the parallel flow paths]
2003/007 . . . . . . [with two flow paths, one being directly connected to the input, the other being connected to the input though a clutch]
2003/008 . . . . . . [comprising means for selectively driving countershafts]
3/02 . . . without gears having orbital motion
3/04 . . . with internally-toothed gears
3/06 . . . with worm and worm-wheel or gears essentially having helical or herring-bone teeth

NOTE

In groups F16H 3/08, F16H 3/16 and F16H 3/20, gears which can be put out of mesh are not taken into consideration if they are used for reversal only.

3/08 . . . exclusively or essentially with continuously meshing gears, that can be disengaged from their shafts
2003/0803 . . . . . . [with countershafts coaxial with input or output shaft]
2003/0807 . . . . . . [with gear ratios in which the power is transferred by axially coupling idle gears]
2003/0811 . . . . . . [using unsynchronised clutches]
2003/0815 . . . . . . [using torque sharing, i.e. engaging two gear ratios simultaneously to transfer large torque, e.g. using one slipping clutch]
Toothed gearings for conveying rotary motion

3/26 . . . . and two or more additional shafts
3/28 . . . . an additional shaft being coaxial with the main shafts
3/30 . . . . with driving and driven shafts not coaxial
3/32 . . . . and an additional shaft
3/34 . . . . with gears shiftable otherwise than only axially
3/36 . . . . with a single gear meshable with any of a set of coaxial gears of different diameters
3/363 . . . . (the teeth of the set of coaxial gears being arranged on a surface of generally conical shape)
3/366 . . . . (the teeth of the set of coaxial gears being arranged on a generally flat, e.g. disc-type, surface)
3/38 . . . . with synchro-meshing
3/385 . . . . (with braking means (constructional features of the final output mechanisms for reversing F16H 63/302))
3/40 . . . . Gearings for reversal only
3/42 . . . . with gears having teeth formed or arranged for obtaining multiple gear ratios, e.g. nearly infinitely variable
3/423 . . . . (the teeth being arranged on a surface of generally conical shape)
3/426 . . . . (the teeth being arranged on a generally flat, e.g. disc-type surface)
3/44 . . . . using gears having orbital motion (the gear-ratio being changed by inversion of torque direction F16H 3/005)
3/402 . . . . (comprising two or more sets of orbital gears arranged in a single plane)
3/403 . . . . (without permanent connection between the input and the set of orbital gears)
3/404 . . . . (without permanent connection between the set of orbital gears and the output)
3/46 . . . . Gearings having only two central gears, connected by orbital gears (F16H 3/68 - F16H 3/78 take precedence)
3/48 . . . . with single orbital gears or pairs of rigidly-connected orbital gears
3/50 . . . . comprising orbital conical gears
3/52 . . . . comprising orbital spur gears
3/54 . . . . one of the central gears being internally toothed and the other externally toothed
3/56 . . . . both central gears being sun gears
3/58 . . . . with sets of orbital gears, each consisting of two or more intermeshing orbital gears
3/60 . . . . Gearings for reversal only
3/62 . . . . Gearings having three or more central gears (F16H 3/68 - F16H 3/78 take precedence)
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
3/66 . . . . composed of a number of gear trains without drive passing from one train to another
3/663 . . . . (with conveying rotary motion between axially spaced orbital gears, e.g. RAVIGNEAUX)
3/666 . . . . (with compound planetary gear units, e.g. two intermeshing orbital gears (F16H 3/663 takes precedence))
Toothed gearings for conveying rotary motion

Gearing for conveying rotary motion by endless flexible members

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 F16H 9/00; (Belts, V-belts, ropes, cables, and chains F16G, chain-wheels F16H 55/30; pulleys F16H 55/36))

7/02 . . . with belts; with V-belts
7/03 . . . (with belts having a toothed contact surface or regularly spaced bosses or hollows for slipless or nearly slipless meshing with complementary profiled contact surface of a pulley (toothed belts F16G 1/28, F16G 5/20))

2007/026 . . . (with belts running in a mist of oil)
7/04 . . . with ropes
7/06 . . . with chains
7/08 . . . Means for varying tension of belts, ropes, or chains (pulleys of adjustable construction F16H 55/52; gearings with endless belts F16H 7/02; tensioning for chains or belts specially adapted for cycles B62M 9/16; belt or chain tensioning arrangements for endless conveyors B65G 23/44)

2007/082 . . . (Actuators for final output members)
2007/084 . . . (influenced by other actuators of output members)
7/0827 . . . (for disconnecting the drive)
7/0829 . . . (with vibration damping means)
7/0831 . . . (of the dry friction type)
7/0834 . . . (of the viscous friction type, e.g. viscous fluid)
7/0836 . . . (of the fluid and restriction type, e.g. dashpot)
7/0838 . . . (of the dissipating material type, e.g. elastomeric spring)

2007/084 . . . (having vibration damping characteristics dependent on the moving direction of the tensioner)
2007/0842 . . . (Mounting or support of tensioner)
2007/0844 . . . (Mounting elements essentially within boundaries of final output members)
2007/0846 . . . (comprising a mechanical stopper)
7/0848 . . . (with means for impeding reverse motion)
2007/0851 . . . [Wedges]
2007/0853 . . . [Ratchets]
2007/0855 . . . (comprising a clip member engaging with the rack teeth)
2007/0857 . . . [Screw mechanisms]
2007/0859 . . . [Check valves]
2007/0861 . . . (comprising means for sensing tensioner position)
2007/0863 . . . (Finally actuated members, e.g. constructional details thereof)
2007/0865 . . . (Pulleys)
2007/0868 . . . (comprising means for changing working diameter of pulley)
2007/087 . . . (Sprays)
2007/0872 . . . (Sliding members)
2007/0874 . . . (Two or more finally actuated members)
2007/0876 . . . (Control or adjustment of actuators)
2007/0878 . . . (Disabling during transport)
2007/088 . . . (Manual adjustment)
2007/0882 . . . (the tension being a function of temperature)
2007/0885 . . . (the tension being a function of engine running condition)
2007/0887 . . . (the tension being a function of load)
2007/0889 . . . (Path of movement of the finally actuated member)
2007/0891 . . . (Linear path)
2007/0893 . . . (Circular path)
2007/0895 . . . (Internal to external direction)
2007/0897 . . . (External to internal direction)
7/10 . . . by adjusting the axis of a pulley (F16H 7/0827 takes precedence)
7/12 . . . of an idle pulley
7/1209 . . . (with vibration damping means (vibration damping per se F16F))
7/1218 . . . (of the dry friction type)
7/1227 . . . (of the viscous friction type, e.g. viscous fluid)
7/1236 . . . (of the fluid and restriction type, e.g. dashpot)
7/1245 . . . (of the dissipating material type, e.g. elastomeric spring)
7/1254 . . . (without vibration damping means)
7/1263 . . . (where the axis of the pulley moves along a substantially straight path)
7/1272 . . . (with means for impeding reverse motion)
Other friction gearing for conveying rotary motion

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 $\text{F16H 15/00}$; (friction discs $\text{F16H 55/32}$))

13/02 . without members having orbital motion
13/04 . with balls or with rollers acting in a similar manner
13/06 . with members having orbital motion
13/08 . with balls or with rollers acting in a similar manner
13/10 . Means for influencing the pressure between the members
13/12 . by magnetic forces
13/14 . for automatically varying the pressure mechanically

15/00 Gearings for conveying rotary motion with variable gear ratio, or for reversing rotary motion, by friction between rotary members (specific for conveying rotary motion with variable gear ratio or for reversing rotary motion $\text{F16H 3/60}$; control of change-speed or reversing-gearings conveying rotary motion $\text{F16H 59/00}$ - $\text{F16H 63/00}$)

15/01 . characterised by the use of a magnetisable powder or liquid as friction medium between the rotary members
15/02 . without members having orbital motion
15/04 . Gearings providing a continuous range of gear ratios
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
15/08 . in which the member B is a disc with a flat or approximately flat friction surface
15/10 . in which the axes of the two members cross or intersect
15/12 . in which one or each member is duplicated, e.g. for obtaining better transmission, for lessening the reaction forces on the bearings
15/14 . in which the axes of the members are parallel or approximately parallel
15/16 . in which the member B has a conical friction surface
15/18 . externally
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
15/22 . the axes of the members being parallel or approximately parallel
15/24 . internally
15/26 . in which the member B has a spherical friction surface centered on its axis of revolution
15/28 . with external friction surface
15/30 . with internal friction surface
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
15/34 . with convex friction surface
Other friction gearing for conveying rotary motion

- Gearings comprising essentially only toothed gears or friction members and not capable of conveying indefinitely-continuing rotary motion (with intermittently-driving members F16H 27/00 - F16H 31/00; rope or like tackle for lifting or haulage B66D 5/00)
  - 19/00
  - 19/001 (for conveying reciprocating or limited rotary motion)
  - 19/003 (comprising a flexible member)
  - 19/005 (for conveying oscillating or limited rotary motion)
  - 19/006 (for converting reciprocating into an other reciprocating motion)
  - 2019/008 (Facilitating the engagement or stopping of gear sections)

- Gearings comprising [flexible members, e.g. an] endless flexible member
  - 19/03 (Facilitating the engagement or stopping of racks)
  - 19/06 (comprising [flexible members, e.g. an] endless flexible member)

**WARNING**

Groups F16H 19/0604 - F16H 19/0672 are not complete pending recategorisation; see also this group

- [Facilitating the engagement or stopping of racks]
- [with means to double or half the stroke of the reciprocating member]
- [the reciprocating motion being created by drums with different diameters using a differential effect]
- [the flexible member being a toothed belt or chain engaging a rack]
- [for converting reciprocating movement into oscillating movement and vice versa, the reciprocating movement is perpendicular to the axis of oscillation]
- [the flexible member, e.g. a cable, being wound on a drum or thread for creating axial movement parallel to the drum]
- [for converting reciprocating movement into oscillating movement and vice versa, the reciprocating movement is perpendicular to the axis of oscillation]
- [the flexible member being a non-buckling chain]
- [the flexible push member uses a bended profile to generate stiffness, e.g. spreading belts]
- [using guided flexible members, i.e. the flexible member being supported at least partially by a guide to transmit the reciprocating movement]
- [with flexible members between discs creating reciprocating by relative rotation of the discs]
- [using twisting movement of flexible members to shorten the axial length]
- [combined with means for creating non-linear characteristics, e.g. cams; Means for creating different velocity on forward and reverse stroke]
- [with telescopic means, e.g. for supporting or shielding the reciprocating member]
- [Both ends of the flexible member are fixed to the casing]
- [characterised by means for tensioning the flexible member]
- [characterised by the means for fixing the flexible member to a drum]
- [characterised by an endless flexible member, i.e. the flexible member forming a closed loop]
- [the flexible member being directly driven, e.g. by a pulley, and the reciprocating member forming a part of the loop, i.e. a part of the endless flexible member]
Gearing for conveying or converting motion by means of levers, links, or cams (combination of gearings of different types F16H 37/00)

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

21/02 . for the movements of two or more independently-moving members being combined into a single movement
21/04 . Guiding mechanisms, e.g. for straight-line guidance (for drawing-machines B43L)
21/06 . which can be made ineffective when desired
21/08 . by pushing a reciprocating rod out of its operative position
21/10 . all movement being in or parallel to a single plane
21/12 . for conveying rotary motion
21/14 . by means of cranks, eccentrics, or like members fixed to one rotary member and guided along tracks on the other
21/16 . for interconverting rotary motion and reciprocating motion
21/18 . Crank gearings; Eccentric gearings
21/20 . . . with adjustment of throw (adjustable cranks or eccentrics F16C 3/28; adjustable connecting-rods F16C 7/06)
21/22 . . . with one connecting-rod and one guided slide to each crank or eccentric
21/24 . . . . without further links or guides
21/26 . . . . with toggle action
21/28 . . . . with cams or additional guides
21/30 . . . . with members having rolling contact
21/32 . . . . with additional members comprising only pivoted links or arms
21/34 . . . . with two or more connecting-rods to each crank or eccentric
21/36 . . . . without swinging connecting-rod, e.g. with epicyclic parallel motion, slot and crank motion
21/365 . . . . (with planetary gearing having a ratio of 2:1 between sun gear and planet gear)
21/38 . . . . with means for temporary energy accumulation, e.g. to overcome dead-centre positions
21/40 . . . . for interconverting rotary motion and oscillating motion
21/42 . . . . with adjustable throw
21/44 . . . . for conveying or interconverting oscillating or reciprocating motions
21/46 . . . with movements in three dimensions
21/48 . . . for conveying rotary motions
21/50 . . . for interconverting rotary motion and reciprocating motion (F16H 23/00 takes precedence)
21/52 . . . for interconverting rotary motion and oscillating motion
21/54 . . . for conveying or interconverting oscillating or reciprocating motions

23/00 Wobble-plate gearings; Oblique-crank gearings [(conveying rotary motion with toothed nutating gears F16H 1/321)]

23/02 . with adjustment of throw by changing the position of the wobble-member (F16H 29/04, F16H 33/10 take precedence)
23/04 . with non-rotary wobble-members
23/06 . . with sliding members hinged to reciprocating members
23/08 . . connected to reciprocating members by connecting-rods
23/10 . . with rotary wobble-plates with plane surfaces

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

25/02 . the movements of two or more independently moving members being combined into a single movement
25/04 . for conveying rotary motion
25/06 . . with intermediate members guided along tracks on both rotary members

2025/063 . . . [the intermediate members, e.g. balls, engaging cams on opposite coaxial discs]

2025/066 . . . [the intermediate members being rollers supported in a chain]

25/08 . for interconverting rotary motion and reciprocating motion (F16H 23/00 takes precedence)
25/10 . . with adjustable throw (adjustable cams F16H 53/04)
25/12 . . with reciprocation along the axis of rotation, e.g. gearings with helical grooves and automatic reversal, (or cams) (screw mechanisms without automatic reversal F16H 25/20)
25/122 . . . [Gearings with helical grooves and automatic reversal]
25/125 . . . [having the cam on an end surface of the rotating element]

2025/127 . . . [using electric solenoids for generating the reciprocating motion]

25/14 . . with reciprocation perpendicular to the axis of rotation (F16H 21/36 takes precedence)
25/16 . . for interconverting rotary motion and oscillating motion
25/18 . . for conveying or interconverting oscillating or reciprocating motions
25/183 . . . [conveying only reciprocating motion, e.g. wedges]
25/186 . . . [with reciprocation along the axis of oscillation]
25/20 . . Screw mechanisms (with automatic reversal F16H 25/12)

25/2003 . . . [with arrangements for taking up backlash (F16H 25/2209 takes precedence)]

25/2006 . . . [with more than one nut or with nuts consisting of more than one bearing part]

25/2009 . . . [with radial preloading]

2025/2012 . . . [using a spring member creating rotary torque for counter rotating the two nuts, e.g. a torsion bar]

25/2015 . . . [Elements specially adapted for stopping actuators in the end position; Position sensing means]

25/2018 . . . [with both screw and nut being driven, i.e. screw and nut are both rotating]

25/2021 . . . [with means for avoiding overloading]
Gearing for conveying or converting motion by means of levers, links, or cams

25/2025 . . . . . . [with means to disengage the nut or screw from their counterpart; Means for connecting screw and nut for stopping reciprocating movement (F16H 25/2015 takes precedence)]

2025/2028 . . . . . . [specially adapted for converting reciprocating motion into rotary motion, e.g. by using screw profile with high efficiency]

2025/2031 . . . . . . [Actuator casings]
2025/2034 . . . . . . [Actuator supports or means for fixing piston end, e.g. flanges]

2025/2041 . . . . . . [Axial sliding means, i.e. for rotary support and axial guiding of nut or screw shaft]

2025/2043 . . . . . . [Screw mechanisms driving an oscillating lever, e.g. lever with perpendicular pivoting axis]

2025/2046 . . . . . . [with gears arranged perpendicular to screw shaft axis, e.g. helical gears engaging tangentially the screw shaft]

25/205 . . . . . . [comprising alternate power paths, e.g. for fail safe back-up]

2025/2053 . . . . . . [Screws in parallel arrangement driven simultaneously with an output member moved by both screws]

25/2056 . . . . . . [Telescopic screws with at least three screw members in coaxial arrangement]

2025/2059 . . . . . . [Superposing movement by two coaxial screws, e.g. with opposite thread direction (telescopic screws with three screw members F16H 25/2056)]

2025/2062 . . . . . . [Arrangements for driving the actuator]

2025/2065 . . . . . . [Manual back-up means for overriding motor control, e.g. hand operation in case of failure]

2025/2068 . . . . . . [Means for returning linear actuator to zero position, e.g. upon occurrence of failure by using a spring]

2025/2071 . . . . . . [Disconnecting drive source from the actuator, e.g. using clutches for release of drive connection during manual control]

2025/2075 . . . . . . [Coaxial drive motors]
2025/2078 . . . . . . [the rotor being integrated with the nut body]

2025/2081 . . . . . . [Parallel arrangement of drive motor to screw axis]
2025/2084 . . . . . . [Perpendicular arrangement of drive motor to screw axis]

2025/2087 . . . . . . [using planetary gears]
2025/2089 . . . . . . [using worm gears]
2025/2093 . . . . . . [using conical gears]
2025/2096 . . . . . . [using endless flexible members]

25/22 . . . . . . . . . . [with balls, rollers, or similar members between the co-operating parts; Elements essential to the use of such members]

25/2204 . . . . . . . . . . [with balls]
25/2209 . . . . . . . . . . [with arrangements for taking up backlash]
25/2214 . . . . . . . . . . [with elements for guiding the circulating balls]
25/2219 . . . . . . . . . . [Axially mounted end-deflectors]
25/2223 . . . . . . . . . . [Cross over deflectors between adjacent thread turns, e.g. S-form deflectors connecting neighbouring threads]

25/2228 . . . . . . . . . . [the device for circulation forming a part of the screw member]

25/2233 . . . . . . . . . . [with cages or means to hold the balls in position]

25/2238 . . . . . . . . . . [using ball spacers, i.e. spacers separating the balls, e.g. by forming a chain supporting the balls]

2025/2242 . . . . . . . . . . [Thread profile of the screw or nut showing a pointed "gothic" arch in cross-section]

25/2247 . . . . . . . . . . [with rollers]

25/2251 . . . . . . . . . . [Planetary rollers between nut and screw]

2025/2257 . . . . . . . . . . [with means for shifting planetary rollers axially, e.g. into central position]

25/2261 . . . . . . . . . . [arranged substantially perpendicular to the screw shaft axis]

25/2266 . . . . . . . . . . [arranged substantially in parallel to the screw shaft axis (planetary rollers F16H 25/2252)]

2025/2271 . . . . . . . . . . [with means for guiding circulating rollers]

25/2276 . . . . . . . . . . [using roller spacers, i.e. spacers separating the rollers, e.g. by forming a complete chain]

25/2281 . . . . . . . . . . [Screw mechanisms having rollers being supported by the screw shaft and engaging the nut]

25/2285 . . . . . . . . . . [with rings engaging the screw shaft with the inner perimeter, e.g. using inner rings of a ball bearing]

25/229 . . . . . . . . . . [Eccentric rings with their axis arranged substantially parallel to the screw shaft axis]

25/2295 . . . . . . . . . . [Rings which are inclined or can pivot around an axis perpendicular to the screw shaft axis]

25/24 . . . . . . . . . . [Elements essential to such mechanisms, e.g. screws, nuts [F16H 25/22 takes precedence]]

25/2409 . . . . . . . . . . [one of the threads being replaced by elements specially formed for engaging the screw or nut, e.g. pins, racks, toothed belts]

25/2418 . . . . . . . . . . [Screw seals, wipers, scrapers or the like]

25/2427 . . . . . . . . . . [one of the threads being replaced by a wire or stripmetal, e.g. spring]

2025/2436 . . . . . . . . . . [Intermediate screw supports for reducing unsupported length of screw shaft]

2025/2445 . . . . . . . . . . [Supports for compensating misalignment or offset between screw and nut]

25/2454 . . . . . . . . . . [Brakes; Rotational locks]

25/2463 . . . . . . . . . . [using a wrap spring brake, i.e. a helical wind up spring for braking or locking]

25/2472 . . . . . . . . . . [Safety nuts]

2025/2481 . . . . . . . . . . [Special features for facilitating the manufacturing of spindles, nuts, or sleeves of screw devices]

2025/249 . . . . . . . . . . [Special materials or coatings for screws or nuts (lubrication F16H 57/0497)]

Gearings with intermittently-driving member

27/00 Step-by-step mechanisms without freewheel members, e.g. Geneva driven (rotary gearings with cyclically-varying velocity ratio F16H 35/02; impulse couplings F16D 5/00; clockwork escapements G04B 1/00)
Gearings with intermittently-driving member

27/02 . with at least one reciprocating or oscillating transmission member ([F16H 27/04 takes precedence])
27/04 . for converting continuous rotation into a step-by-step rotary movement
27/045 . [Mechanism comprising a member with partially helical tracks]
27/06 . Mechanics with driving pins in driven slots, e.g. Geneva drives
27/08 . with driving toothed gears with interrupted toothing
27/10 . obtained by means of disengageable transmission members, combined or not combined with mechanisms according to group F16H 27/08

29/00 Gearings for conveying rotary motion with intermittently-driving members, e.g. with freewheel action (freewheels F16D 41/00 [: Gearings for converting oscillating or reciprocating movement with freewheeling members or other intermittently-driving members into a rotary movement F16H 31/00])
29/02 . between one of the shafts and an oscillating or reciprocating intermediate member, not rotating with either of the shafts (F16H 29/20, F16H 29/22 take precedence)
29/04 . in which the transmission ratio is changed by adjustment of a crank, an eccentric a wobble-plate, or cam, on one of the shafts
29/06 . with concentric shafts, an annular intermediate member moving around and being supported on an adjustable crank or eccentric
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
29/10 . in which the transmission ratio is changed by directly operating on the intermittently driving members
29/12 . between rotary driving and driven members (F16H 29/20, F16H 29/22 take precedence)
29/14 . in which the transmission ratio is changed by adjustment of an otherwise stationary guide member for the intermittently-driving members
29/16 . in which the transmission ratio is changed by adjustment of the distance between the axes of the rotary members
29/18 . in which the intermittently-driving members slide along approximately radial guides while rotating with one of the rotary members
29/20 . the intermittently-acting members being shaped as worms, screws, or racks
29/22 . with automatic speed change

31/00 Other gearings with freewheeling members or other intermittently driving members (F16H 21/00, F16H 23/00, F16H 25/00 take precedence; gearings involving the use of automatic changing-mechanisms, e.g. cyclically-actuated reversal gearings, see the appropriate groups)
31/001 . [Mechanisms with freewheeling members]
31/002 . [Hand-driven ratchets (wrenches of the ratchet type B25B 13/46)]
31/003 . [Step-by-step mechanisms for rotary motion]
31/004 . [with pawls driven by a rotary cam]
31/005 . [with pawls driven by a reciprocating or oscillating transmission member (F16H 31/002, F16H 31/004 take precedence)]
31/006 . [with friction means]
31/007 . [Step-by-step mechanisms for linear motion]
31/008 . [with friction means]

33/00 Gearings based on repeated accumulation and delivery of energy
33/02 . Rotary transmissions with mechanical accumulators, e.g. weights, springs, intermittently-connected flywheels
33/04 . Gearings for conveying rotary motion with variable velocity ratio, in which self-regulation is sought
33/06 . . . based essentially on spring action (ratchet slip couplings F16D 7/04)
33/08 . . . based essentially on inertia
33/10 . . . . . with gyroscopic action, e.g. comprising wobble-plates, oblique cranks
33/12 . . . . . with a driving member connected differentially with both a driven member and an oscillatory member with large resistance to movement, e.g. Constantinesco gearing
33/14 . . . . . having orbital members influenced by regulating masses
33/16 . . . . . . which have their own free motion, or consist of fluid
33/18 . . . . . . of which the motion is constrained
33/185 . . . . . . . {the masses being fixed to the orbital members}
33/20 . for interconversion, based essentially on inertia, of rotary motion and reciprocating or oscillating motion {for converting into a linear propulsion force, i.e. inertia motors F03G 3/00}
Gearings with intermittently-driving member

Arrangements or devices for absorbing overload or preventing damage by overload ([for screw mechanisms F16H 25/2021]; couplings for transmitting rotation F16D)

2037/0103 . . . [with drive interruption by structural failure of overload preventing means, e.g. using shear pins]

2037/0106 . . . [Monitoring of overload]

37/012 . Transmitting mechanisms with delayed effect (vibration- or shock-dampers in general F16F)

35/014 . Mechanisms with only two stable positions, e.g. acting at definite angular positions

35/016 . Mechanisms for movements or movement relations conforming to mathematical formulae (devices in which computing operations are performed mechanically G06G 3/00)

35/018 . Turning devices for rotatable members, e.g. shafts (starting devices for internal-combustion engines F02N)

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 B60K)

37/02 . comprising essentially only toothed or friction gearings

37/021 . . . [toothed gearing combined with continuous variable friction gearing]

37/022 . . . [the toothed gearing having orbital motion]

2037/023 . . . [CVT's provided with at least two forward and one reverse ratio in a serial arranged sub-transmission]

2037/025 . . . [CVT's in which the ratio coverage is used more than once to produce the overall transmission ratio coverage, e.g. by shift to end of range, then change ratio in sub-transmission and shift CVT through range once again]

2037/026 . . . [CVT layouts with particular features of reversing gear, e.g. to achieve compact arrangement]

37/027 . . . [toothed gearing combined with a gear using endless flexible members for reversing rotary motion only]

2037/028 . . . [having two distinct forward drive ratios and one reverse drive ratio arranged in series with a continuously variable transmission unit]

37/004 . Combinations of toothed gearings only (F16H 37/06 takes precedence)

37/0041 . . . [for conveying rotary motion with constant gear ratio]

WARNING

This group is not complete pending a reorganisation; see also subgroups of F16H 1/00

37/0042 . . . [change gear transmissions in group arrangement]

37/0043 . . . [without gears having orbital motion]

2037/0044 . . . [comprising a separate gearing unit for shifting between forward or reverse]

2037/0045 . . . [comprising a separate gearing unit for shifting between high and low ratio range]

2037/0046 . . . [with an additional planetary gear train, e.g. creep gear, overdrive]
Gearings with intermittently-driving member

Fluid gearing (fluid actuators F15B; couplings or clutches with a fluid or semi-fluid as power-transmitting means F16D 31/00 - F16D 39/00; fluid-resistance brakes F16D 57/00)

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 motor vehicles B60K]; application to lifting or pushing equipment B66F; control of exclusively fluid gearing F16H 61/38)

2039/005 . . . . . [comprising arrangements or layout to change the capacity of the motor or pump by moving the hydraulic chamber of the motor or pump]

39/01 Pneumatic gearing; Gearing working with subatmospheric pressure (pneumatic hammers B25D 9/00)

39/02 . . . with liquid motors at a distance from liquid pumps

39/04 . . . with liquid motor and pump combined in one unit

39/06 . . . pump and motor being of the same type

39/08 . . . each with one main shaft and provided with pistons reciprocating in cylinders

39/10 . . . with cylinders arranged around and parallel or approximately parallel to the main axis of the gearing

2039/105 . . . . . . . . . . {at least one pair of motors or pumps sharing a common swash plate}

39/12 . . . . . . . with stationary cylinders

39/14 . . . . . . . with cylinders carried in rotary cylinder blocks or cylinder-bearing members

39/16 . . . . . . . with cylinders arranged perpendicular to the main axis of the gearing

39/18 . . . . . . . the connections of the pistons being at the outer ends of the cylinders

39/20 . . . . . . . the connections of the pistons being at the inner ends of the cylinders

39/22 . . . . . . . with liquid chambers shaped as bodies of revolution concentric with the main axis of the gearing

39/24 . . . . . . . with rotary displacement members, e.g. provided with axially or radially movable vanes passing movable sealing members

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

39/28 . . . . . . . with liquid chambers formed in rotary members

39/30 . . . . . . . with liquid chambers formed in stationary members

39/32 . . . . . . . with sliding vanes carried by the rotor

39/34 . . . . . . . in which a rotor on one shaft co-operates with a rotor on another shaft

39/36 . . . . . . . toothed-gear type

39/38 . . . . . . . Displacement screw-pump type

39/40 . . . . . . . Hydraulic differential gearings, e.g. having a rotary input housing with interconnected liquid chambers for both outputs

39/42 . . . . . . . pump and motor being of different types

41/00 Rotary fluid gearing of the hydrokinetic type (control of exclusively fluid gearing F16H 61/38)

41/02 . . . with pump and turbine connected by conduits or ducts

41/04 . . . Combined pump-turbine units

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

41/24 . . . Details

2041/243 . . . . . . . [Connections between pump shell and cover shell of the turbine]

2041/246 . . . . . . . [relating to one way clutch of the stator]

41/26 . . . Shape of runner blades or channels with respect to function

41/28 . . . with respect to manufacture, e.g. blade attachment

2041/285 . . . . . . . . . . {of stator blades}

41/30 . . . relating to venting, lubrication, cooling, circulation of the cooling medium

41/32 . . . Selection of working fluids (chemical aspects, see the relevant classes)

43/00 Other fluid gearing, e.g. with oscillating input or output ([generating mechanical vibrations of infrasonic or sonic frequency B06B; percussive tools B25D 9/00; mine roof supports for step by step movement E21D 23/00; reciprocating-piston machines without rotary main shaft F01B 11/08; fluid pressure actuators F15B])

43/02 . . . Fluid gearing actuated by pressure waves
Fluid gearing

45/00 Combinations of fluid gearings for conveying rotary motion with couplings or clutches ([F16H 41/22, [F16H 47/085] take precedence; conjoint control of driveline clutches and change-speed gearing in vehicles B6OW 10/02, B6OW 10/10 and B6OW 30/18])

NOTE Clutches for varying working conditions in fluid torque-converters are regarded as part of the torque converter

2045/002 . . . [comprising a clutch between prime mover and fluid gearing]
2045/005 . . . [comprising a clutch between fluid gearing and the mechanical gearing unit]
2045/007 . . . [comprising a damper between turbine of the fluid gearing and the mechanical gearing unit]
45/02 . . . [with mechanical clutches for bridging a fluid gearing of the hydrokinetic type (control of torque converter lock-up clutches F16H 61/14)]
2045/0205 . . . [two chamber system, i.e. without a separated, closed chamber specially adapted for actuating a lock-up clutch]
2045/021 . . . [three chamber system, i.e. comprising a separated, closed chamber specially adapted for actuating a lock-up clutch]
2045/0215 . . . [Details of oil circulation]
2045/0221 . . . [with damping means]
2045/0226 . . . [comprising two or more vibration dampers]
2045/0231 . . . [arranged in series]
2045/0236 . . . [with axial dampers, e.g. comprising a ramp system]
2045/0242 . . . [with viscous dampers]
2045/0247 . . . [having a turbine with hydrodynamic damping means]
2045/0252 . . . [having a damper arranged on input side of the lock-up clutch]
2045/0257 . . . [having a pump adapted for use as a secondary mass of the damping system]
2045/0263 . . . [the damper comprising a pendulum]
2045/0268 . . . [the damper comprising a gearing]
2045/0273 . . . [characterised by the type of the friction surface of the lock-up clutch]
2045/0278 . . . [comprising only two co-acting friction surfaces]
2045/0284 . . . [Multiple disk type lock-up clutch]
2045/0289 . . . [Details of friction surfaces of the lock-up clutch]
2045/0294 . . . [Single disk type lock-up clutch, i.e. using a single disc engaged between friction members]

47/00 Combinations of mechanical gearing with fluid clutches or fluid gearing (conjunct control of driveline clutches and change-speed gearing in vehicles B6OW 10/02 and B6OW 10/10)
47/02 . . . the fluid gearing being of the volumetric type
2047/025 . . . [the fluid gearing comprising a plurality of pumps or motors]
47/04 . . . the mechanical gearing being of the type with members having orbital motion
2047/045 . . . [the fluid gearing comprising a plurality of pumps or motors]
47/06 . . . the fluid gearing being of the hydrokinetic type
47/065 . . . [the mechanical gearing being of the friction or endless flexible member type]
47/07 . . . using two or more power-transmitting fluid circuits ([F16H 47/065, 1F16H 47/10 take precedence)]
47/08 . . . the mechanical gearing being of the type with members having orbital motion ([F16H 47/065 takes precedence)]
47/085 . . . [with at least two mechanical connections between the hydraulic device and the mechanical transmissions]
47/10 . . . using two or more power-transmitting fluid circuits
47/12 . . . the members with orbital motion having vanes interacting with the fluid

48/00 Differential gearings (cooling or lubricating of differential gearing F16H 57/04)

NOTE When classifying in this main group, in the absence of an indication to the contrary, classification is made in all appropriate places.

2048/02 . . . [Transfer gears for influencing drive between outputs]
2048/04 . . . [having unequal torque transfer between two outputs]
48/05 . . . Multiple inter-connected differential sets
48/06 . . . with gears having orbital motion
48/08 . . . comprising bevel gears
2048/082 . . . [characterised by the arrangement of output shafts]
2048/085 . . . [characterised by shafts or gear carriers for orbital gears]
2048/087 . . . [characterised by the pinion gears, e.g. their type or arrangement]
48/10 . . . with orbital spur gears
2048/102 . . . [with spur gears engaging face gears]
2048/104 . . . [characterised by two ring gears]
2048/106 . . . [characterised by two sun gears]
2048/108 . . . [characterised by intermeshing orbital gears, i.e. at least two intermeshing orbital gears]
48/11 . . . having intermeshing planet gears
48/12 . . . without gears having orbital motion
48/14 . . . with cams
48/142 . . . [consisting of linked clutches using axially movable inter-engaging parts]
48/145 . . . [with friction clutching members]
48/147 . . . [with driven cam followers or balls engaging two opposite cams]
48/16 . . . with freewheels
48/18 . . . with fluid gearing
48/19 . . . consisting of two linked clutches
48/20 . . . Arrangements for suppressing or influencing the differential action, e.g. locking devices
2048/201 . . . [with means directly braking the orbital gears]
2048/202 . . . [using freewheel clutches]
2048/204 . . . [Control of arrangements for suppressing differential actions]
2048/205 . . . [using the steering as a control parameter]
2048/207 . . . [using torque sensors]
2048/208 . . . [using flywheels]
48/22 . . . using friction clutches or brakes
Fluid gearing

Fluid gearing

48/24 . . . using positive clutches or brakes
48/26 . . . using fluid action, e.g. viscous clutches
2048/265 . . . [with a fluid throttling means]
48/27 . . . using internally-actuable fluid pressure, e.g. internal pump types
48/28 . . . using self-locking gears or self-braking gears
2048/282 . . . [using the axial movement of axially movable bevel gears]
48/29 . . . with self-locking intermeshing gears having parallel axes and having worms or helical teeth
48/295 . . . using self-locking intershelling gears having perpendicular arranged axes and having worms or helical teeth
48/30 . . . using externally-actuable means
2048/305 . . . [using manual actuators]
48/32 . . . using fluid pressure actuators
48/34 . . . using electromagnetic or electric actuators
2048/343 . . . [using a rotary motor]
2048/346 . . . [using a linear motor]
48/36 . . . characterised by intentionally generating speed difference between outputs
48/362 . . . [using a continuously variable transmission]
48/364 . . . [using electric or hydraulic motors]
48/366 . . . [using additional non-orbital gears in combination with clutches or brakes]
48/368 . . . [using additional orbital gears in combination with clutches or brakes]
48/38 . . . Constructional details (the outer casing comprising the differential and supporting input and output shafts F16H 57/037)
2048/382 . . . [Methods for manufacturing differential gearings]
2048/385 . . . [of the ring or crown gear]
2048/387 . . . [Shields or washers]
48/40 . . . characterised by features of the rotating cases
2048/405 . . . [characterised by features of the bearing of the rotating case]
48/42 . . . characterised by features of the input shafts, e.g. mounting of drive gears thereon
2048/423 . . . [characterised by bearing arrangement]
2048/426 . . . . . . [characterised by spigot bearing arrangement, e.g. bearing for supporting the free end of the drive shaft pinion]
49/00 Other gearings
49/001 . . . [Wave gearings, e.g. harmonic drive transmissions (harmonic drives specially adapted for positioning programme-controlled manipulators B25J 9/1025)]
2049/003 . . . [Features of the flexspline therefor]
49/005 . . . [Magnetic gearings with physical contact between gears (rotating torque transmitting elements of the permanent-magnet type H02K 49/102)]
2049/006 . . . [Wave generators producing a non-elliptical shape of flexspline, i.e. with a qualified different shape than elliptical]
2049/008 . . . [Linear wave gearings, i.e. harmonic type gearing imposing a strain wave to a straight flexible member engaging a second member with different pitch to generate linear motion thereof]

Details of gearing or mechanisms (of screw-and-nut gearing F16H 25/00; of fluid gearing F16H 39/00 - F16H 43/00; shafts, Bowden mechanisms, cranks, eccentrics, bearings, pivotal, pivotal connections, crossheads, connecting-rods F16C; chains, belts F16G; piston-rods F16J 7/00)

51/00 Levers of gearing mechanisms ([connecting rods or links pivoted at both ends F16C 7/00; gear levers F16H 59/00]; manipulating levers G05G)
51/02 . . . adjustable
53/00 Cams; Non-rotary cams; Cam followers, e.g. rollers
53/02 . . . Single-track cams for single-revolution cycles; Camshafts with such cams
53/025 . . . [characterised by their construction, e.g. assembling or manufacturing features (grinding of camshafts B24B 19/12)]
53/04 . . . Adjustable cams
53/06 . . . Cam-followers (F16H 53/08 takes precedence)
53/08 . . . Multi-track cams, e.g. for cycles consisting of several revolutions; Cam-followers specially adapted for such cams

55/00 Elements with teeth or friction surfaces for conveying motion; Worms; Pulleys; Sheaves (pulley-blocks B66D 3/04)
55/02 . . . Toothed members: Worms
55/06 . . . Use of materials; Use of treatments of toothed members or worms to affect their intrinsic material properties (coatings for lubrication F16H 57/041; producing gear wheels from plastics or substances in a plastic state B29D 15/00; heat treatment C21D 9/32; electrolytic surface treatment C25D; heating by electromagnetic field H05B 6/00)
2055/065 . . . [Moulded gears, e.g. inserts therefor]
55/08 . . . Profiling
55/0806 . . . [Involute profile]
55/0813 . . . [Intersecting-shaft arrangement of the toothed members]
55/082 . . . . . . [Skewd-shaft arrangement of the toothed members, e.g. non-intersecting shafts]
55/0826 . . . [Novikov-Wildhaber profile]
55/0833 . . . [Flexible toothed member, e.g. harmonic drive]
55/084 . . . [Non-circular rigid toothed member, e.g. elliptic gear]
55/0846 . . . [Intersecting-shaft arrangement of the toothed members (F16H 55/0813, F16H 55/0826, F16H 55/083, F16H 55/084 take precedence)]
55/0853 . . . [Skewd-shaft arrangement of the toothed members (F16H 55/082, F16H 55/083, F16H 55/084 take precedence)]
2055/086 . . . [Silent gear profiles]
2055/0866 . . . [Profiles for improving radial engagement of gears, e.g. chamfers on the tips of the teeth]
55/0873 . . . . . . [for improving axial engagement, e.g. a chamfer at the end of the tooth flank]
55/088 . . . . . . [with corrections on tip or foot of the teeth, e.g. addendum relief for better approach contact]
55/0886 . . . . . . [with corrections along the width, e.g. flank width crowning for better load distribution]
2055/0893 . . . [for parallel shaft arrangement of toothed members]
Details of gearing or mechanisms

55/10 . . . Constructively simple tooth shapes, e.g. shaped as pins, as balls (gearwork for clocks and watches G04B 13/00)

55/12 . . . with body or rim assembled out of detachable parts

55/14 . . . Construction providing resilience or vibration-damping (F16H 55/06 takes precedence; resilient coupling of wheel or wheel-rim with shaft F16D 3/50, F16D 3/80)

55/16 . . . relating to teeth only

55/17 . . . Toothed wheels (with simple tooth shapes F16H 55/10; worm wheels F16H 55/22; chain wheels F16H 55/30)

55/171 . . . (Toothed belt pulleys)

2055/173 . . . [Crown gears, i.e. gears have axially aligned teeth]

2055/175 . . . [specially adapted for easy repair, e.g. exchange of worn teeth]

2055/176 . . . [Ring gears with inner teeth]

2055/178 . . . [combined with clutch means, e.g. gear with integrated synchronizer clutch]

55/18 . . . Special devices for taking up backlash (in tuner actuating devices H03J H03J 1/06; in gear-train of clocks or watches G04B 3/00)

2055/185 . . . [using compound gears with coincident teeth of different material, e.g. laminated construction of metal and elastomeric gear layers, where elastic layer is slightly oversized]

55/20 . . . for bevel gears

55/22 . . . for transmissions with crossing shafts, especially worms, worm-gears (bevel gears, crown wheels, helical gears F16H 55/17)

55/24 . . . Special devices for taking up backlash

55/26 . . . Racks

55/28 . . . Special devices for taking up backlash

2055/281 . . . [Cylindrical or half-cylindrical bushings around the rack, e.g. using special wedges to reduce play]

55/283 . . . [using pressure yokes]

55/285 . . . [with rollers or balls to reduce friction]

55/286 . . . [with asymmetric layout of the yoke]

55/288 . . . [comprising two or more pressure yokes]

55/30 . . . Chain-wheels (specially adapted for cycles B62M)

55/303 . . . [for round linked chains, i.e. hoisting chains with identical links]

2055/306 . . . [with means providing resilience or vibration damping in chain sprocket wheels]

55/32 . . . Friction members (friction surfaces F16D 69/00)

2055/325 . . . [characterized by roughness or hardness of friction surface]

55/34 . . . Non-adjustable friction discs

55/36 . . . Pulleys (with features essential for adjustments F16H 55/52)

2055/363 . . . [with special means or properties for lateral tracking of the flexible members running on the pulley, e.g. with crowning to keep a belt on track]

2055/366 . . . [with means providing resilience or vibration damping]

55/38 . . . Means or measures for increasing adhesion (in general F16D 69/00)

55/40 . . . with spokes (F16H 55/48 takes precedence)

55/42 . . . Laminated pulleys

55/44 . . . Sheet-metal pulleys

55/46 . . . Split pulleys

55/48 . . . manufactured exclusively or in part of non-metallic material, e.g. plastics (F16H 55/38, F16H 55/42, F16H 55/46 take precedence; manufacture of wooden wheels B27H 7/00)

55/49 . . . Features essential to V-belts pulleys

55/50 . . . Features essential to rope pulleys

55/52 . . . Pulleys or friction discs of adjustable construction

55/54 . . . of which the bearing parts are radially adjustable

55/56 . . . of which the bearing parts are relatively axially adjustable

55/563 . . . [actuated by centrifugal masses]

55/566 . . . [only adjustable when pulley is stationary]

57/00 General details of gearing (of screw-and-nut gearing F16H 25/00; of fluid gearing F16H 39/00; F16H 43/00)

57/0006 . . . [Vibration-damping or noise reducing means specially adapted for gearings (devices for varying tension of belts, ropes or chains with damping means F16H 70/08; toothed members with construction providing vibration damping F16H 55/14; reducing vibrations or noise of the gearbox casing F16H 57/02; suppression of vibrations or noise of gear selectors F16H 59/0208; control of hydrostatic fluid gearing preventing or reducing vibrations or noise F16H 61/4183)]

2057/0012 . . . [for reducing drive line oscillations]

57/0018 . . . [Shaft assemblies for gearings (camshafts with single track cams F16H 53/02)]

57/0025 . . . [with gearing elements rigidly connected to a shaft, e.g. securing gears or pulleys by specially adapted splines, keys or methods]

57/0031 . . . [with gearing elements rotatable supported on the shaft (F16H 57/02 takes precedence)]

57/0037 . . . [Special features of coaxial shafts, e.g. relative support thereof]

2057/0043 . . . [Mounting or adjusting transmission parts by robots]

2057/005 . . . [Mounting preassembled units, i.e. using pre-mounted structures to speed up final mounting process (mounting of gears or shafts in a gearbox F16H 57/022)]

2057/0056 . . . [Mounting parts arranged in special position or by special sequence, e.g. for keeping particular parts in his position during assembly]

2057/0062 . . . [Tools specially adapted for assembly of transmissions]

2057/0068 . . . [Repairing of transmissions by using repair kits (for gear wheels F16H 2052/175)]

2057/0075 . . . [Modifying standard transmissions from manufacturer, e.g. by adding an extension for additional ratios (for control F16H 2061/0062)]

2057/0081 . . . [Fixing of, or adapting to transmission failure additional ratios (for control F16H 2061/0062)]

2057/0087 . . . [Computer aided design (CAD) specially adapted for gearing features (computer aided design per se G06F 17/50); Analysis of gear systems]

2057/0093 . . . [Means or measures for transport, shipping or packaging]

57/01 . . . Monitoring wear or stress of transmission elements, e.g. for triggering maintenance
Details of gearing or mechanisms

2057/012 . . . [of gearings]
2057/014 . . . [of friction elements in transmissions]
2057/016 . . . [Monitoring of overload conditions]
2057/018 . . . [Detection of mechanical transmission failures (fixing or adapting to failure F16H 2057/0081; of transmission control F16H 61/12)]

57/02 . . . Gearboxes; Mounting gearing therein

NOTE

When classifying in this group, in the absence of an indication to the contrary, classification is made in all appropriate subgroups.

57/02004 . . . [the gears being positioned relative to one another by rolling members or by specially adapted surfaces on the gears]
57/02008 . . . [characterised by specific dividing lines or planes of the gear case]
57/02013 . . . [Extension units for gearboxes, e.g. additional units attached to a main gear]
57/02017 . . . [characterised by special features related to the manufacturing of the gear case, e.g. special adaptations for casting]
57/02021 . . . [with means for adjusting alignment]
57/02026 . . . [Connection of auxiliaries with a gear case; Mounting of auxiliaries on the gearbox]
57/0203 . . . [the gearbox is associated or combined with a crank case of an engine]
57/02034 . . . [Gearboxes combined or connected with electric machines (structural association with electric machines H02K 7/116)]
57/02039 . . . [Gearboxes for particular applications]
57/02043 . . . [for vehicle transmissions]
57/02047 . . . [Automatic transmissions]
57/02052 . . . [Axle units; Transfer casings for four wheel drive]
57/02056 . . . [for utility vehicles, e.g. tractors or agricultural machines]
57/0206 . . . [for commercial vehicles, e.g. buses or trucks]
57/02065 . . . [for motorcycles or scooters]
57/02069 . . . [for industrial applications]
57/02073 . . . [Reduction gearboxes for industry]
57/02078 . . . [for wind turbines]
57/02082 . . . [for application in vehicles other than propelling, e.g. adjustment of parts]
57/02086 . . . [Measures for reducing size of gearbox, e.g. for creating a more compact transmission casing]
57/02091 . . . [Measures for reducing weight of gearbox (by using particular materials F16H 57/032)]
57/02095 . . . [Measures for reducing number of parts or components]
57/021 . . . [Shaft support structures, e.g. partition walls, bearing eyes, casing walls or covers with bearings]
57/0213 . . . [Support of worm gear shafts]
57/0216 . . . [Intermediate shaft supports, e.g. by using a partition wall]
57/022 . . . [Adjustment of transmission shafts or bearings (for compensating misalignment of axes of toothed gearings without orbital motion F16H 1/26; for compensating misalignment of axes of planetary gears F16H 1/48)]
57/0221 . . . [Axial adjustment]
57/0222 . . . [Lateral adjustment]
Details of gearing or mechanisms

F16H

57/0415 . . . [Air cooling or ventilation; Heat exchangers; Thermal insulations]
57/0416 . . . [Air cooling or ventilation]
57/0417 . . . [Heat exchangers adapted or integrated in the gearing]
57/0419 . . . [Thermal insulations]
57/042 . . . [Guidance of lubricant]
57/0421 . . . [on or within the casing, e.g. shields or baffles for collecting lubricant, tubes, pipes, grooves, channels or the like]
57/0423 . . . [Lubricant guiding means mounted or supported on the casing, e.g. shields or baffles for collecting lubricant, tubes or pipes (means for guiding lubricant into an axial channel of a shaft F16H 57/0426; lubrication by injection, injection nozzles or tubes therefore F16H 57/0456)]
57/0424 . . . [Lubricant guiding means in the wall of or integrated with the casing, e.g. grooves, channels, holes (means for guiding lubricant into an axial channel of a shaft F16H 57/0426)]
57/0426 . . . [Means for guiding lubricant into an axial channel of a shaft]
57/0427 . . . [on rotary parts, e.g. using baffles for collecting lubricant by centrifugal force]
57/0428 . . . [Grooves with pumping effect for supplying lubricants]
57/043 . . . [within rotary parts, e.g. axial channels or radial openings in shafts]
57/0431 . . . [Means for guiding lubricant directly onto a tooth surface or to foot areas of a gear, e.g. by holes or grooves in a tooth flank]
57/0432 . . . [Lubricant guiding means on or inside shift rods or shift forks (shift rods or shift forks to be lubricated, cooled or heated F16H 57/0468)]
57/0434 . . . [relating to lubrication supply, e.g. pumps (arrangement of pumps F16H 57/0441); Pressure control (grooves with pumping effect for supplying lubricant F16H 57/0428; generation and variation of line pressure for transmission control F16H 61/0021)]
57/0435 . . . [Pressure control for supplying lubricant; Circuits or valves therefor]
57/0436 . . . [Pumps]
57/0438 . . . [Pumps of jet type, e.g. jet pumps with means to inject high pressure fluid to the suction area thereby supercharging the pump or means reducing cavitations]
57/0439 . . . [Pumps with different power sources, e.g. one and the same pump may selectively driven by either the engine or an electric motor]
57/0441 . . . [Arrangements of pumps]
57/0442 . . . [for supply in case of failure, i.e. auxiliary supply]
57/0443 . . . [for supply of lubricant during tilt or high acceleration, e.g. problems related to the tilt or extreme acceleration of the transmission casing and the supply of lubricant under these conditions]
57/0445 . . . [for supply of different gearbox casings or sections]
57/0446 . . . [the supply forming part of the transmission control unit, e.g. for automatic transmissions]
57/0447 . . . [Control of lubricant levels, e.g. lubricant level control dependent on temperature]
57/0449 . . . [Sensors or indicators for controlling the fluid level]
57/045 . . . [Lubricant storage reservoirs, e.g. reservoirs in addition to a gear sump for collecting lubricant in the upper part of a gear case]
57/0452 . . . [Oil pans]
57/0453 . . . [Section walls to divide a gear sump]
57/0454 . . . [Sealings between different partitions of a gearing or to a reservoir (means for sealing gearboxes F16H 57/029)]
57/0456 . . . [Lubrication by injection; Injection nozzles or tubes therefor (oil mist or spray lubrication F16H 57/058)]
57/0457 . . . [Splash lubrication (characterised by the problem reducing losses, e.g. splash losses F16H 57/049)]
57/0458 . . . [Oil-mist or spray lubrication; Means to reduce foam formation (lubrication by injection F16H 57/056; venting F16H 57/027)]
57/046 . . . [Oil-mist or spray lubrication]
57/0461 . . . [Means to reduce foam formation]
57/0463 . . . [Grease lubrication; Drop-feed lubrication]
57/0464 . . . [Grease lubrication]
57/0465 . . . [Drop-feed lubrication]
57/0467 . . . [Elements of gearings to be lubricated, cooled or heated]
57/0468 . . . [Shift rods or shift forks]
57/0469 . . . [Bearings or seals]
57/0471 . . . [Bearing]
57/0472 . . . [Seals]
57/0473 . . . [Friction devices, e.g. clutches or brakes]
57/0475 . . . [Engine and gearing, i.e. joint lubrication or cooling or heating thereof (electric machines and gearing F16H 57/046)]
57/0476 . . . [Electric machines and gearing, i.e. joint lubrication or cooling or heating thereof]
57/0478 . . . [Synchronesh devices]
57/0479 . . . [Gears or bearings on planet carriers]
57/048 . . . [Type of gearings to be lubricated, cooled or heated]
57/0482 . . . [Gearings with gears having orbital motion]
57/0483 . . . [Axle or inter-axle differentials]
57/0484 . . . [with variable gear ratio or for reversing rotary motion]
57/0486 . . . [with fixed gear ratio (differentials F16H 57/0483)]
57/0487 . . . [Friction gearings]
57/0489 . . . [with endless flexible members, e.g. belt CVTs]
57/049 . . . [of the toroid type]
57/0491 . . . [of the cone ring type]
57/0493 . . . [Gearings with spur or bevel gears (differentials with spur or bevel gears F16H 57/0483)]
57/0494 . . . [with variable gear ratio or for reversing rotary motion]
57/0495 . . . [with fixed gear ratio]
57/0497 . . . [Screw mechanisms]
57/0498 . . . [Worm gearings]
57/05 . . . [of chains (for conveyors B65G 45/02]
57/08 . . . [of gearings with members having orbital motion]
5. Combinations of features individually covered by groups

4. Combinations of features individually covered by group

3. In groups F16H 59/00

2. In groups F16H 59/00 and F16H 63/00 are classified in group F16H 61/00, the following terms or expressions are used with the meaning indicated:

- "mechanism" means a kinematic chain consisting either of a single element or alternatively of a series of elements, the position of each point on the kinematic chain being derivable from the position of any other point on the chain, and therefore, for a given position of a point on one of the elements forming the kinematic chain there is only one position for each of the other points on the elements forming the kinematic chain;

- "final output element" means the final element which is moved to establish a gear ratio, i.e. which achieves the linking between two power transmission means, e.g. reverse idler gear, gear cluster, coupling sleeve, apply piston of a hydraulic clutch;

- "actuating mechanism" means the mechanism, the movement of which causes the movement of another mechanism by being in mutual contact;

- "final actuating mechanism" means the mechanism actuating the final output mechanism;

- "mechanical force" means the force transmitted by an actuating mechanism or the human body;

- "final output mechanism" means the mechanism which is driven by the final output element;

- "final output mechanism element" means the final output mechanism in mutual contact;

- "actuating mechanism" means the mechanism, the movement of which is actuated by another mechanism;

- "final actuating mechanism" means the mechanism actuating the final output element;

- "mechanical force" means the force transmitted by an actuating mechanism.

Control of gearings conveying rotary motion

NOTES

1. Attention is drawn to the Notes after the title of subclass B60W.

2. In groups F16H 59/00 - F16H 63/00, clutches positioned within a gearbox are considered as comprising part of the gearings.

3. In groups F16H 59/00 - F16H 63/00, the following terms or expressions are used with the meaning indicated:

- "control units" means the units of the equipment which give the signals which represent the control inputs to the control units of change-speed-, or reversing-gearings for conveying rotary motion

- "selector" means a unit providing a selection of speed ratios, or modes of operation, e.g. for vehicles

- "selector F16H 59/042" relating to the type of gearing controlled or from group F16H 59/00 relating to control inputs

59/00 Control inputs to {control units of} change-speed-, or reversing-gearings for conveying rotary motion

2059/003 . (Detecting or using driving style of a driver, e.g. for adapting shift schedules)

2059/006 . (Overriding automatic control)

59/02 . Selector apparatus

NOTE

Selection apparatus of general applicability or of interest apart from its use in control of gearings conveying rotary motion is also classified in subclass G05G

59/0204 . (for automatic transmissions with means for range selection and manual shifting, e.g. range selector with tiptronic)

59/0208 . (with means for suppression of vibrations or reduction of noise)

59/0213 . (with sealing means, e.g. against entry of dust)

59/0217 . (with electric switches or sensors not for gear or range selection, e.g. for controlling auxiliary devices [for gear selection F16H 59/044; for range selection F16H 59/105])

2059/0221 . (for selecting modes, i.e. input device (for selecting between different modes with range selector F16H 2059/082; for conjoint control B60W 30/182)]

2059/0226 . (for selecting particular shift speeds, e.g. a fast shift speed with aggressive gear change)

2059/023 . (Selectors for gearings using voice control [for vehicle control B60R 16/0373])

2059/0234 . (Selectors for gearings using foot control)

2059/0239 . (Up- and down-shift selection by repeated movement (mechanical step by step selection devices F16H 63/14))

2059/0243 . (with push buttons, e.g. shift buttons arranged on steering wheel [range selection with push buttons F16H 59/12])

2059/0247 . (with lever or paddle behind steering wheel)

2059/0252 . (with means for initiating skip or double gear shifts, e.g. by moving selection lever beyond a threshold)

2059/0256 . (Levers for forward-reverse selection only, e.g. for working machines having a separate lever for switching between forward and reverse mode)

2059/026 . (Details or special features of the selector casing or lever support [for mechanical gear shifting F16H 59/042])

2059/0265 . (Selector lever support with pivot axis offset, e.g. support by four bar linkage to create pivoting centre outside the mechanism)

2059/0269 . (Ball joints or spherical bearings for supporting the lever)

2059/0273 . (Cardan or gimbal type joints for supporting the lever)

59/0278 . (Constructional features of the selector lever, e.g. grip parts, mounting or manufacturing)

2059/0282 . (Lever handles with lock mechanisms, e.g. for allowing selection of reverse gear or releasing lever from park position)

2059/0286 . (with range or splitter selector on selector lever)
Control of gearings conveying rotary motion

Inputs being a function of gearing status

- Inputs being a function of ambient conditions
  - Sensing neutral state of the transmission
  - Sensing pressure in control systems or in fluid systems
  - Sensing engine or motor speed
- Inputs being a function of the status of the machine
  - Engines
  - Supercharger pressure in internal combustion engines
- Inputs being a function of gearing elements
  - of gearing elements
  - of engine or motor shaft
- Inputs being a function of acceleration
  - Detecting travel direction, e.g. the forward or reverse movement of the vehicle
  - Detecting vehicle stop, i.e. the vehicle is at stand still, e.g. for engaging parking lock
- Inputs being a function of the status of the machine, e.g. position of doors or safety belts
  - Axle-load distribution
  - Wheel slip
  - Inputs being a function of ambient conditions
- Inputs being a function of speed
  - Rate of change of output shaft speed or vehicle speed
  - Rate of change of input shaft speed, e.g. of engine or motor shaft

Inputs being a function of gearing status

- Rate of change of output shaft speed
- Rate of change of input shaft speed

Inputs being a function of speed

- Rate of change of input shaft speed
- Rate of change of output shaft speed

Inputs being a function of gearing status

- Rate of change of input shaft speed
- Rate of change of output shaft speed

Inputs being a function of gearing status

- Rate of change of input shaft speed
- Rate of change of output shaft speed
Control of gearings conveying rotary motion

61/00 Control functions within [control units of] change-speed- or reversing-gearings for conveying rotary motion; Control of exclusively fluid gearing, friction gearing, gearings with endless flexible members or other particular types of gearing

61/0003 [Arrangement or mounting of elements of the control apparatus, e.g. valve assemblies or snapfittings of valves; Arrangements of the control unit on or in the transmission gearbox]

61/0006 [Special features of electronic control units]

61/0009 [Special features of hydraulic control units, e.g. valve plates or valve units]

6061/0012 Transmission control for optimising power output of driveline

6061/0015 Transmission control for optimising fuel consumptions

6061/0018 Transmission control for optimising exhaust emissions

6061/0021 Generation or control of line pressure

6061/0025 Supply of control fluid; Pumps therefore

6061/0028 [using a single pump driven by different power sources]

6061/0031 [using auxiliary pumps, e.g. pump driven by a different power source than the engine]

6061/0034 Accumulators for fluid pressure supply; Control thereof

2061/0037 [characterised by controlled fluid supply to lubrication circuits of the gearing (see also lubrication control F16H 57/0446)]

2061/004 Venting trapped air from hydraulic systems (venting of hydrostatic transmissions F16H 61/4174; deaeration or removal of unsolved gas F15B 21/0441)

2061/0043 [Cleaning of hydraulic parts, e.g. removal of an orifice clogging]

2061/0046 [Details of fluid supply channels, e.g. within shafts, for supplying friction devices or transmission actuators with control fluid]

2061/005 [Supply of electric power, e.g. batteries for back up supply]

2061/0053 [Initialising the parameters of the controller]

2061/0056 [Powering down of the controller]

61/0059 Braking of gear output shaft using simultaneous engagement of friction devices applied for different gear ratios

2061/0062 [Modifying an existing transmission control from a manufacturer for improvement or adaptation, e.g. by replacing a valve or an electric part]

2061/0065 [Modifying or tuning an existing transmission control for racing, e.g. adaptation of valves for very fast shifting]

2061/0068 [Method or means for testing of transmission controls or parts thereof]

2061/0071 [Robots or simulators for testing control functions in automatic transmission (testing of transmissions G01M 13/02)]

2061/0075 [characterised by a particular control method]

2061/0078 [Linear control, e.g. PID, state feedback or Kalman]

2061/0081 Fuzzy logic

2061/0084 [Neural networks]

2061/0087 [Adaptive control, e.g. the control parameters adapted by learning]

2061/0093 [using formulas or mathematic relations for calculating parameters]

2061/0096 [using models to estimate the state of the controlled object]

61/002 [characterised by the signals used (for shift actuators F16H 61/28, for continuously variable gearings F16H 61/66)]

NOTES

1. Control units where gearshift is controlled by an electric circuit, are classified in F16H 61/0202

2. Control units where gearshift is controlled by hydraulic signals and a subfunction, e.g. kickdown, is controlled by an electric circuit, are classified in F16H 61/0262 with indexing of the electric features

61/0202 [the signals being electric (F16H 61/04 takes precedence)]

61/0204 [for gearshift control, e.g. control functions for performing shifting or generation of shift signal]

61/0206 [Layout of electro-hydraulic control circuits, e.g. arrangement of valves (for control of actuators selecting and moving final output members, e.g. shift forks F16H 61/2807)]
Control of gearings conveying rotary motion

2061/0209 {with independent solenoid valves modulating the pressure individually for each clutch or brake}

61/0211 {characterised by low integration or small number of valves}

61/0213 {characterised by the method for generating shift signals}

2061/0216 {Calculation or estimation of post shift values for different gear ratios, e.g. by using engine performance tables}

2061/0218 {Calculation or estimation of the available ratio range, i.e. possible gear ratios, e.g. for prompting a driver with a display}

2061/022 {Calculation or estimation of optimal gear ratio, e.g. best ratio for economy drive or performance according driver preference, or to optimise exhaust emissions}

2061/0223 {Generating of new shift maps, i.e. methods for determining shift points for a schedule by taking into account driveline and vehicle conditions}

2061/0225 {Modifying of shift maps by manual control, e.g. by learning values from the driver during manual shift mode}

2061/0227 {Shift map selection, i.e. methods for controlling selection between different shift maps, e.g. to initiate switch to a map for up-hill driving}

2061/023 {Drive-off gear selection, i.e. optimising gear ratio for drive off of a vehicle}

2061/0232 {Selecting ratios for bringing engine into a particular state, e.g. for fast warming up or for reducing exhaust emissions}

2061/0234 {Adapting the ratios to special vehicle conditions}

2061/0237 {Selecting ratios for providing engine braking}

2061/0239 {Selecting ratios for preventing or cancelling wheel slip}

2061/0241 {Adapting the ratio to special transmission conditions, e.g. shifts during warming up phase of transmission when fluid viscosity is high}

2061/0244 {Adapting the automatic ratio to direct driver requests, e.g. manual shift signals or kick down}

61/0246 {characterised by initiating reverse gearshift}

61/0248 {Control units where shifting is directly initiated by the driver, e.g. semi-automatic transmissions (generation of movements for final actuating mechanisms F16H 61/28)}

61/0251 {Elements specially adapted for electric control units, e.g. valves for converting electrical signals to fluid signals}

2061/0253 {Details of electro hydraulic valves, e.g. lands, ports, spools or springs}

2061/0255 {Solenoid valve using PWM or duty-cycle control}

2061/0258 {Proportional solenoid valve}

2061/026 {On-off solenoid valve}

61/0262 {the signals being hydraulic (F16H 61/04 takes precedence)}

61/0265 {for gearshift control, e.g. control functions for performing shifting or generation of shift signals}

61/0267 {Layout of hydraulic control circuits, e.g. arrangement of valves (for control of actuators selecting and moving final output members, e.g. shift forks F16H 61/30)}

61/0269 {characterised by low integration or small number of valves}

61/0272 {characterised by initiating reverse gearshift}

61/0274 {Control units where shifting is directly initiated by the driver, e.g. semi-automatic transmissions (generation of movements for final actuating mechanisms F16H 61/28)}

61/0276 {Elements specially adapted for hydraulic control units, e.g. valves}

2061/0279 {Details of hydraulic valves, e.g. lands, ports, spools or springs}

2061/0281 {Rotary shift valves, e.g. with a rotary moveable spool for supply of fluid to different channels}

61/0283 {Governor valves}

61/0286 {Manual valves}

2061/0288 {Relay valve, e.g. valve arranged between shift valve and servo}

61/029 {Throttle valves}

61/0293 {the signals being purely mechanical}

61/0295 {Automatic gear shift control, e.g. initiating shift by centrifugal forces}

61/0297 {Gear shift control where shifting is directly initiated by the driver, e.g. semi-automatic transmissions}

61/04 {Smoothing ratio shift}

61/0403 {Synchronisation before shifting}

2061/0407 {by control of clutch in parallel torque path}

2061/0411 {by control of shaft brakes}

2061/0414 {by retarder control}

2061/0418 {by using different synchronisation devices simultaneously, e.g. for faster synchronisation}

2061/0422 {by an electric machine, e.g. by accelerating or braking the input shaft}

2061/0425 {Bridging torque interruption}

2061/0429 {by torque supply with a clutch in parallel torque path}

2061/0433 {by torque supply with an electric motor}

61/0437 {by using electrical signals (F16H 61/0403 and F16H 61/061 take precedence)}

2061/044 {when a freewheel device is disengaged or bridged}

2061/0444 {during fast shifting over two gearsteps, e.g. jumping from fourth to second gear}

2061/0448 {using a particular sequence of gear ratios or friction members}

2061/0451 {during swap-shifts, i.e. gear shifts between different planetary units, e.g. with double transitions shift involving three or more friction members}

2061/0455 {during shifts involving three or more friction members, e.g. release of 3-4 clutch, 2-4 brake and apply of forward clutch C1 (swap shift F16H 2061/0451)}

2061/0459 {using map for shift parameters, e.g. shift time, slip or pressure gradient, for performing controlled shift transition and adapting shift parameters by learning}

2061/0462 {by controlling slip rate during gear shift transition}
Control of gearings conveying rotary motion

- Smoothing shift shock by apply or release of band brake servos, e.g. overlap control of band brake and a clutch or vice versa
- By preventing or solving a tooth but situation upon engagement failure due to misalignment of teeth
- By smoothing engagement of positive clutches; Methods or means for shock free engagement of dog clutches (for tooth but situations F16H 2061/047)
- By suppression of excessive engine flare or turbine racing during shift transition (engine flare caused by lock-up release F16H 61/143)
- During range shift from drive (D) or reverse (R) to neutral (N)
- During range shift from neutral (N) to reverse (R)
- During range shift from neutral (N) to drive (D)
- For high engine torque, e.g. during acceleration or uphill driving
- For low engine torque, e.g. during coasting, sailing or engine braking
- By controlling rate of change of fluid pressure
- By controlling filling of clutches or brake servos, e.g. fill time, fill level or pressure during filling
- For calibration of pressure levels for friction members, e.g. by monitoring the speed change of transmission shafts
- Using fluid control means
- Using an accumulator
- Using an orifice control valve (F16H 61/067 takes precedence)
- Timing control
- Timing of auxiliary gear shifts
- Controlling shift hysteresis
- Detecting malfunction or potential malfunction, e.g. fail safe (in control of hydrostatic gearing F16H 61/4192); (Circumventing or fixing failures)
- For malfunction caused by simultaneous engagement of different ratios resulting in transmission lock state or tie-up condition (lock state for braking F16H 61/059)
- With diagnostic check cycles; Monitoring of failures
- Plausibility checks; Counting means for repeated failures
- Display or indication of detected failures
- Avoiding failures by using redundant parts
- Adapting to failures or work around with other constraints, e.g. circumvention by avoiding use of failed parts
- Fixing failures by repairing failed parts, e.g. loosening a sticking valve
- Bringing the control into a predefined state, e.g. giving priority to particular actuators or gear ratios
- Using fail priority valves
- Limiting the input power, torque or speed
- Keeping the current state
- Resuming normal operation
- Fail safe valves (fail priority valves F16H 2061/1236)

- Characterised by the parts or units where malfunctioning was assumed or detected
- The failing part is the controller
- Hydraulic parts of the controller, e.g. a sticking valve or clogged channel
- Electric parts of the controller, e.g. a defect solenoid, wiring or microprocessor
- The failing part is a part of the final output mechanism, e.g. shift rods or forks
- The failing part is a friction device, e.g. brakes
- The main clutch
- The failing part is a sensor
- The failing part is an actuator
- The failing part is the power supply, e.g. the electric power supply
- The failing part is an electric machine forming part of the transmission
- Control of torque converter lock-up clutches
- Using means only actuated by centrifugal force
- The means being hydraulic valves
- Using electric control means
- For controlling slip, e.g. approaching target slip value
- For smoothing gear shift shock
- During engine braking, e.g. to attenuate gear clunk when torque direction is changed
- Using mechanical control means
- Inhibiting (or initiating) shift during unfavourable conditions, e.g. preventing forward reverse shift at high vehicle speed, preventing engine over speed (unintentional control input F16H 61/18)
- By checking feasibility of shifts, i.e. determine if requested shift can be successfully completed and post shift values are in an acceptable range
- Holding the gear for delaying gear shifts under unfavorable conditions, e.g. during cornering
- Preventing reverse gear shifts if vehicle speed is too high for safe shifting
- Preventing or initiating shifts for preventing stall or overspeed of engine
- Forced shifts into neutral for safety reasons, e.g. in case of transmission failure or emergency braking
- Preventing unintentional or unsafe shift, e.g. preventing manual shift from highest gear to reverse gear
- Means, e.g. catches or interlocks, for preventing unintended shift into reverse gear
- Preventing gear creeping (Transmission control during standstill, e.g. hill hold control)
- Active creep control for slow driving, e.g. by controlling clutch slip
- Hill hold control, e.g. with torque converter or a friction device slightly engaged to keep vehicle stationary
- By neutral control
- Providing engine brake control
- For emergency braking, e.g. for increasing brake power in emergency situations
- By using exhaust brakes
Control of gearings conveying rotary motion

NOTES

1. The generation or transmission of movements comprising only the selector apparatus, is classified in group F16H 63/00.

2. The generation or transmission of movements, when part of the final output mechanisms, is classified in group F16H 63/00.

- Locking [of the control input devices] (F16H 63/34 takes precedence ; vehicle fittings for preventing unauthorised use, e.g. ignition keys interlocked with gear box or gear lever B60R 25/06))
- Electrical gear shift lock, i.e. locking of lever in park or neutral position by electric means if brake is not applied; Key interlock, i.e. locking the key if lever is not in park position)
- Manual distress release of the locking means for shift levers, e.g. to allow towing of vehicle in case of breakdown (for parking locks F16H 63/3491)
- Providing feel, e.g. to enable selection
- Actuators providing feel or simulating a shift gate, i.e. with active force generation for providing counter forces for feed back
- Mechanical shift gates or similar guiding means during selection and shifting
- Cams or detent arrays for guiding and providing feel
- Ramp contours for generating force threshold, e.g. cams or pushers for generating additional resistance for a reverse path
- Additional mass or weight on shift linkage for improving feel
- Detents for range selectors
- with audible signals for providing selection or shift feed back

- Generation or transmission of movements for final actuating mechanisms

1. with at least one movement of the final actuating mechanism being caused by a non-mechanical force, e.g. power-assisted
- using electric control signals, e.g. electro-hydraulic control (F16H 61/30, F16H 61/32 take precedence; methods for generating shift signals F16H 61/0213)
- with a control using only relays and switches
- Controlling actuator force way characteristic, i.e. controlling force or movement depending on the actuator position, e.g. for adapting force to synchronisation and engagement of gear clutch
- Adjustment or calibration of actuator positions, e.g. neutral position
- Arrangements with single drive motor for selecting and shifting movements, i.e. one motor used for generating both movements
- Arrangements of actuators for enabling jump shifting for skipping of gear ratios
- Electromagnetic solenoids
- Linear motors
- Cam or crank gearing
- Racks
- Screw-nut devices

- comprising two mechanisms, one for the preselection movement, and one for the shifting movement (F16H 61/36 takes precedence)
- with at least one movement being transmitted by a cable
- Control of exclusively fluid gearings
- Control of circuit pressure
- Control of high pressure, e.g. avoiding excess pressure by a relief valve
- Control of low pressure
- Control of circuit flow
- Control of a bypass valve
- by using a variable restriction, e.g. an orifice valve
- Control related to directional control valves, e.g. change-over valves, for crossing the feeding conduits (forward reverse switching by using swash plate F16H 61/438)
- Valves related to the control of neutral, e.g. shift off valves (zero tilt rotation holding means F16H 61/439)
- Fluid exchange between hydrostatic circuits and external sources or consumers
- with pressure accumulators
- Flushing, e.g. by using flushing valves or by connection to exhaust
- Fluid exchange by aspiration from reservoirs, e.g. sump
- Replenishing or scavenging pumps, e.g. auxiliary charge pumps
- Open loop circuits
- Control of braking, e.g. preventing pump overspeeding when motor acts as a pump
- Control of cooling or lubricating
- Control of venting, e.g. removing trapped air
Control of gearings conveying rotary motion

61/4183 . . . Preventing or reducing vibrations or noise, e.g. avoiding cavitations
61/4192 . . . Detecting malfunction or potential malfunction, e.g. fail safe
61/42 . . . involving adjustment of a pump or motor with adjustable output or capacity (F16H 61/46 takes precedence)
61/421 . . . Motor capacity control by electro-hydraulic control means, e.g. using solenoid valves
61/423 . . . Motor capacity control by fluid pressure control means
61/425 . . . Motor capacity control by electric actuators
61/427 . . . Motor capacity control by mechanical control means, e.g. by levers or pedals
61/431 . . . Pump capacity control by electro-hydraulic control means, e.g. using solenoid valves
61/433 . . . Pump capacity control by fluid pressure control means
61/435 . . . Pump capacity control by electric actuators
61/437 . . . Pump capacity control by mechanical control means, e.g. by levers or pedals
61/438 . . . Control of forward-reverse switching, e.g. control of the swash plate causing discharge in two directions (using a directional control valve F16H 61/4061)
61/439 . . . Control of the neutral position, e.g. by zero tilt rotation holding means (using a neutral valve or a shutoff valve F16H 61/4069)
61/44 . . . with more than one pump or motor in operation
61/444 . . . by changing the number of pump or motor units in operation
61/448 . . . Control circuits for tandem pumps or motors
61/452 . . . Selectively controlling multiple pumps or motors, e.g. switching between series or parallel
61/456 . . . Control of the balance of torque or speed between pumps or motors (hydrostatic differentials F16H 48/18)
61/46 . . . Automatic regulation in accordance with output requirements
61/461 . . . [not involving a variation of the output capacity of the main pumps or motors]
61/462 . . . for achieving a target speed ratio
61/465 . . . for achieving a target input speed
61/468 . . . for achieving a target input torque
61/47 . . . for achieving a target output speed
61/472 . . . for achieving a target output torque
61/475 . . . for achieving a target power, e.g. input power or output power
61/478 . . . for preventing overload, e.g. high pressure limitation
61/48 . . . hydrodynamic
61/50 . . . controlled by changing the flow, force, or reaction of the liquid in the working circuit, while maintaining a completely filled working circuit
61/52 . . . by altering the position of blades
61/54 . . . by means of axially-shiftable blade runners
61/56 . . . to change the blade angle
61/58 . . . by change of the mechanical connection of, or between, the runners
61/60 . . . exclusively by the use of freewheel clutches
61/62 . . . . . . . involving use of a speed-changing gearing or of a clutch in the connection between runners (F16H 45/02, F16H 61/60 take precedence)
61/64 . . . controlled by changing the amount of liquid in the working circuit
61/66 . . . specially adapted for continuously variable gearings (F16H 61/38 takes precedence)
2061/6601 . . . [with arrangements for dividing torque and shifting between different ranges]
2061/6602 . . . [with at least two dynamo-electric machines for creating an electric power path inside the transmission device, e.g. using generator and motor for a variable power torque path]
2061/6603 . . . [characterised by changing ratio in the mechanical gearing]
2061/6604 . . . [Special control features generally applicable to continuously variable gearings]
2061/6605 . . . [Control for completing downshift applicable to continuously variable gearings]
2061/6607 . . . [Controls concerning lubrication or cooling (lubrication features of friction gearings F16H 570/487)]
2061/6608 . . . [Control of clutches, or brakes for forward-reverse shift]
2061/6609 . . . [Control of clutches or brakes in torque split transmissions]
2061/661 . . . [Conjoint control of CVT and drive clutch]
2061/6611 . . . [Control to achieve a particular driver perception, e.g. for generating a shift shock sensation]
2061/6612 . . . [for engine braking]
2061/6614 . . . [Control of ratio during dual or multiple pass shifting for enlarged ration coverage]
2061/6615 . . . [Imitating a stepped transmissions]
2061/6616 . . . [the shifting of the transmission being manually controlled]
2061/6617 . . . [Manual control of CVTs while continuously varying the ratio]
2061/6618 . . . [Protecting CVTs against overload by limiting clutch capacity, e.g. torque fuse]
61/662 . . . with endless flexible means
2061/66204 . . . [Control for modifying the ratio control characteristic]
2061/66209 . . . [dependent on ambient conditions]
2061/66213 . . . [dependent on driver's choice]
2061/66218 . . . [dependent on control input parameters other than ambient conditions or driver's choice]
2061/66222 . . . [the ratio is varied in order to reduce surface wear of belt or pulley]
61/66227 . . . [controlling shifting exclusively as a function of speed and torque]
61/66231 . . . [controlling shifting exclusively as a function of speed]
61/66236 . . . [using electrical or electronical sensing or control means]
61/6624 . . . [using only hydraulic and mechanical sensing or control means]
61/66245 . . . [using purely mechanical sensing or control means]
61/6625 . . . [controlling shifting exclusively as a function of torque]
Control of gearings conveying rotary motion

61/66254 . . . [controlling of shifting being influenced by a signal derived from the engine and the main coupling]
61/66259 . . . [using electrical or electronical sensing or control means]
61/66263 . . . [using only hydraulical and mechanical sensing or control means]
61/66268 . . . [using purely mechanical sensing or control means]
61/66272 . . . [characterised by means for controlling the torque transmitting capability of the gearing]
2061/66277 . . . [by optimising the clamping force exerted on the endless flexible member]
2061/66281 . . . [by increasing the line pressure at the occurrence of input torque peak]
2061/66286 . . . [Control for optimising pump efficiency]
2061/6629 . . . [Detection of slip for determining level of wear]
2061/66295 . . . [characterised by means for controlling the geometrical interrelationship of pulleys and the endless flexible member, e.g. belt alignment or position of the resulting axial pulley force in the plane perpendicular to the pulley axis]
61/664 . . . Friction gearings
2061/6641 . . . [Control for modifying the ratio control characteristic]
2061/6642 . . . [dependent on ambient conditions]
2061/6643 . . . [dependent on driver's choice]
2061/6644 . . . [dependent on control input parameters other than ambient conditions or driver's choice]
61/6645 . . . [controlling shifting exclusively as a function of speed and torque]
61/6646 . . . [controlling shifting exclusively as a function of speed]
61/6647 . . . [controlling shifting exclusively as a function of torque]
61/6648 . . . [controlling of shifting being influenced by a signal derived from the engine and the main coupling]
61/6649 . . . [characterised by the means for controlling the torque transmitting capability of the gearing]
61/68 . . . specially adapted for stepped gearings
61/682 . . . with interruption of drive
61/684 . . . without interruption of drive
61/686 . . . with orbital gears
61/688 . . . with two inputs, e.g. selection of one of two torque-flow paths by clutches
61/70 . . . specially adapted for change-speed gearing in group arrangement, i.e. with separate change-speed gear trains arranged in series, e.g. range or overdrive-type gearing arrangements
61/702 . . . [using electric or electrohydraulic control means]
61/705 . . . [using hydraulic and mechanical control means]
61/707 . . . [using only mechanical control means]
63/00 Control outputs [from the control unit] to change-speed- or reversing-gearings for conveying rotary motion [or to other devices than the final output mechanism]
2063/005 . . . [Preassembled gear shift units for mounting on gear case (for hydraulic shift units F16H 2061/308)]
63/02 . . . Final output mechanisms therefor; Actuating means for the final output mechanisms
2063/025 . . . [Final output mechanisms for double clutch transmissions]
63/04 . . . a single final output mechanism being moved by a single final actuating mechanism ((constructional features of the final output mechanisms F16H 63/30))
63/06 . . . the final output mechanism having an indefinite number of positions
63/062 . . . [electric or electro-mechanical actuating means]
63/065 . . . [hydraulic actuating means]
63/067 . . . [mechanical actuating means]
63/08 . . . Multiple final output mechanisms being moved by a single common final actuating mechanism ((constructional features of the final output mechanisms F16H 63/30))
63/10 . . . the final actuating mechanism having a series of independent ways of movement, each way of movement being associated with only one final output mechanism
63/12 . . . two or more ways of movement occurring simultaneously
63/14 . . . the final output mechanisms being successively actuated by repeated movement of the final actuating mechanism
63/16 . . . the final output mechanisms being successively actuated by progressive movement of the final actuating mechanism
63/18 . . . the final actuating mechanism comprising cams
63/20 . . . with preselection and subsequent movement of each final output mechanism by movement of the final actuating mechanism in two different ways, e.g. guided by a shift gate
2063/202 . . . [using cam plates for selection or shifting, e.g. shift plates with recesses or groves moved by a selector extension]
2063/204 . . . [the gear shift lever being the immediate final actuating mechanism, e.g. the shift finger being a part of the gear shift lever]
63/206 . . . [the final output mechanisms being mounted coaxially on a single shaft, e.g. mono rail shift mechanism]
2063/208 . . . [using two or more selecting fingers]
63/22 . . . the final output mechanisms being simultaneously moved by the final actuating mechanism
63/24 . . . each of the final output mechanisms being moved by only one of the various final actuating mechanisms ((constructional features of the final output mechanisms F16H 63/30))
63/26 . . . some of the movements of the final output mechanisms being caused by another final output mechanism
63/28 . . . two or more final actuating mechanisms moving the same final output mechanism ((constructional features of the final output mechanisms F16H 63/30))
63/285 . . . [with a first final actuating member applying a force to two or more final output members and a second final actuating member locking in position another final output member]
63/30 . . . Constructional features of the final output mechanisms
63/3003 . . . [Band brake actuating mechanisms]
Control of gearings conveying rotary motion

2063/3006 . . . . [moved by a non-mechanical force]

63/3099 . . . . [the final output mechanisms having elements remote from the gearbox]

2063/3013 . . . . [the final output mechanism being characterised by linkages converting movement, e.g. into opposite direction by a pivoting lever linking two shift rods]

2063/3016 . . . . [Final output mechanisms varying the leverage or force ratio]

63/302 . . . . [Final output mechanisms for reversing]

2063/3023 . . . . [the final output mechanisms comprising elements moved by fluid pressure (band brake actuating mechanisms F16H 63/3003)]

2063/3026 . . . . [comprising friction clutches or brakes (band brake actuating mechanisms F16H 63/3003)]

2063/303 . . . . [the friction member is actuated and released by applying pressure to different fluid chambers]

2063/3033 . . . . [the brake is actuated by springs and released by a fluid pressure]

2063/3036 . . . . [the clutch is actuated by springs and released by a fluid pressure]

2063/304 . . . . [the final output mechanisms comprising elements moved by electrical or magnetic force (band brake actuating mechanisms F16H 63/3003)]

2063/3043 . . . . [comprising friction clutches or brakes]

2063/3046 . . . . [using electromagnetic clutch for coupling gear wheel to shaft (friction clutches F16H 63/3043)]

2063/305 . . . . [using electromagnetic solenoids]

2063/3053 . . . . [using linear motors]

2063/3056 . . . . [using cam or crank gearing]

2063/3059 . . . . [using racks]

2063/3063 . . . . [using screw devices]

2063/3066 . . . . [using worm gears]

2063/3069 . . . . [Interrelationship between two or more final output mechanisms (interlocking devices F16H 63/36)]

2063/3073 . . . . [final output mechanisms mounted on a single shaft]

2063/3076 . . . . [Selector shaft assembly, e.g. supporting, assembly or manufacturing of selector or shift shafts; Special details thereof]

2063/3079 . . . . [Shift rod assembly, e.g. supporting, assembly or manufacturing of shift rails or rods; Special details thereof]

2063/3083 . . . . [Shift finger arrangements, e.g. shape or attachment of shift fingers]

2063/3086 . . . . [Shift head arrangements, e.g. forms or arrangements of shift heads for preselection or shifting]

2063/3089 . . . . [Spring assisted shift, e.g. springs for accumulating energy of shift movement and release it when clutch teeth are aligned]

2063/3093 . . . . [Final output elements, i.e. the final elements to establish gear ratio, e.g. dog clutches or other means establishing coupling to shaft (fluid actuated clutches F16H 63/3026; electromagnetic clutches F16H 2063/3046)]

2063/3096 . . . . [Sliding keys as final output elements; Details thereof]

63/32 . . . . Gear shift yokes, [e.g. shift forks]

2063/321 . . . . [characterised by the interface between fork body and shift rod, e.g. fixing means, bushes, cams or pins]

2063/322 . . . . [characterised by catches or notches for moving the fork]

2063/324 . . . . [characterised by slide shoes, or similar means to transfer shift force to sleeve]

2063/325 . . . . [Rocker or swiveling forks, i.e. the forks are pivoted in the gear case when moving the sleeve]

2063/327 . . . . [essentially made of sheet metal]

2063/328 . . . . [essentially made of plastics, e.g. injection molded]

2063/329 . . . . Locking or disabling mechanisms

63/3408 . . . . [the locking mechanism being moved by the final actuating mechanism]

2063/3416 . . . . [Parking lock mechanisms or brakes in the transmission]

2063/3425 . . . . [characterised by pawls or wheels]

2063/3433 . . . . [Details of latch mechanisms, e.g. for keeping pawls out of engagement]

2063/3441 . . . . [Parking locks engaging axially]

2063/345 . . . . [using friction brakes, e.g. a band brakes]

2063/3458 . . . . [with electric actuating means, e.g. shift by wire]

2063/3466 . . . . [using electric motors]

2063/3475 . . . . [using solenoids]

2063/3483 . . . . [with hydraulic actuating means]

2063/3491 . . . . [Emergency release or engagement of parking locks or brakes]

2063/36 . . . . Interlocking devices

2063/38 . . . . Detents [(spring-loaded ball units for holding levers in a limited number of positions G05G 5/065)]

2063/40 . . . . comprising signals other than signals for actuating the final output mechanisms

2063/42 . . . . Ratio indicator devices

2063/423 . . . . [Range indicators for automatic transmissions, e.g. showing selected range or mode]

2063/426 . . . . [with means for advising the driver for proper shift action, e.g. prompting the driver with allowable selection range of ratios]

2063/44 . . . . Signals to the control unit of auxiliary gearing

2063/46 . . . . Signals to a clutch outside the gearbox

2063/48 . . . . Signals to a parking brake [or parking lock; Control of parking locks or brakes being part of the transmission]

2063/483 . . . . [Circuits for controlling engagement of parking locks or brakes]

2063/486 . . . . [Common control of parking locks or brakes in the transmission and other parking brakes, e.g. wheel brakes]

2063/50 . . . . Signals to an engine or motor

2063/502 . . . . [for smoothing gear shifts]

2063/504 . . . . [for bringing engine into special condition by transmission control, e.g. by changing torque converter characteristic to modify engine set point to higher engine speed for better acceleration performance]

2063/506 . . . . [for engine torque resume after shift transition, e.g. a resume adapted to the driving style]

2063/508 . . . . [for limiting transmission input torque, e.g. to prevent damage of transmission parts]
2200/00 Transmissions for multiple ratios

2200/0004 . comprising a power take off shaft
2200/0008 . specially adapted for front-wheel-driven vehicles
2200/0013 . specially adapted for rear-wheel-driven vehicles
2200/0017 . specially adapted for four-wheel-driven vehicles
2200/0021 . specially adapted for electric vehicles
2200/0026 . comprising at least one creep low gear, e.g. additional gear for extra low speed or creeping
2200/0033 . characterised by the number of forward speeds
2200/0034 . the gear ratios comprising two forward speeds
2200/0039 . the gear ratios comprising three forward speeds
2200/0043 . the gear ratios comprising four forward speeds
2200/0047 . the gear ratios comprising five forward speeds
2200/0052 . the gear ratios comprising six forward speeds
2200/0056 . the gear ratios comprising seven forward speeds
2200/006 . the gear ratios comprising eight forward speeds
2200/0065 . the gear ratios comprising nine forward speeds
2200/0069 . the gear ratios comprising ten forward speeds
2200/0073 . the gear ratios comprising eleven forward speeds
2200/0078 . the gear ratio comprising twelve or more forward speeds
2200/0082 . characterised by the number of reverse speeds
2200/0086 . the gear ratios comprising two reverse speeds
2200/0091 . the gear ratios comprising three reverse speeds
2200/0095 . the gear ratios comprising four reverse speeds
2200/20 . Transmissions using gears with orbital motion
2200/2002 . characterised by the number of sets of orbital gears
2200/2005 . with one sets of orbital gears
2200/2007 . with two sets of orbital gears
2200/201 . with three sets of orbital gears
2200/2012 . with four sets of orbital gears
2200/2015 . with five sets of orbital gears
2200/2017 . with six sets of orbital gears
2200/202 . characterised by the type of Ravigneaux set
2200/2023 . using a Ravigneaux set with 4 connections
2200/2025 . using a Ravigneaux set with 5 connections
2200/2028 . using a Ravigneaux set with 6 connections
2200/203 . characterised by the engaging friction means not of the freewheel type, e.g. friction clutches or brakes
2200/2033 . with one engaging means
2200/2035 . with two engaging means
2200/2038 . with three engaging means
2200/2041 . with four engaging means
2200/2043 . with five engaging means
2200/2046 . with six engaging means
2200/2048 . with seven engaging means
2200/2051 . with eight engaging means
2200/2053 . with nine engaging means
2200/2056 . with ten engaging means
2200/2058 . with eleven engaging means
2200/2061 . with twelve engaging means
2200/2064 . using at least one positive clutch, e.g. dog clutch
2200/2066 . using one freewheel mechanism
2200/2069 . using two freewheel mechanism
2200/2071 . using three freewheel mechanism
2200/2074 . using four freewheel mechanism
2200/2076 . using at least five freewheel mechanism
2200/2079 . using freewheel type mechanisms, e.g. freewheel clutches
2200/2082 . one freewheel mechanisms
2200/2084 . two freewheel mechanisms
2200/2087 . three freewheel mechanisms
2200/2089 . four freewheel mechanisms
2200/2092 . at least five freewheel mechanisms
2200/2094 . positive clutches, e.g. dog clutches
2200/2097 . comprising an orbital gear set member permanently connected to the housing, e.g. a sun wheel permanently connected to the housing

2300/00 Determining of new ratio

2300/02 . Computing a new ratio
2300/14 . Selecting a state of operation, e.g. depending on two wheel or four wheel drive mode
2300/18 . Determining the range

2302/00 Determining the way or trajectory to new ratio, e.g. by determining speed, torque or time parameters for shift transition

2302/02 . Optimizing the way to the new ratio
2302/04 . Determining a modus for shifting (selection of shift speed modus F16H 2059/0226)
2302/06 . Determining timing parameters of shifting, e.g. start of shifting (for smoothing gear shift F16H 61/08)

2306/00 Shifting

2306/14 . Skipping gear shift (for smoothing gear shift F16H 2061/0444)
2306/18 . Preparing coupling or engaging of future gear
2306/20 . Timing of gear shifts (for smoothing gear shift F16H 61/08)
2306/21 . for auxiliary gear shifts (for smoothing auxiliary gear shifts F16H 2061/085)
2306/22 . Swap shifting (for smoothing gear shift F16H 2061/0451)
2306/24 . Interruption of shift, e.g. if new shift is initiated during ongoing previous shift
2306/30 . characterised by the way or trajectory to a new ratio, e.g. by performing shift according to a particular algorithm or function (determining the way or trajectory to a new ratio F16H 2302/00)
2306/32 . Preparing the opening or release of the torque transmitting element
2306/36 . Filling the dead volume of actuators (controlling filling of clutches or brake servos F16H 61/62)
2306/40 . Shifting activities
2306/42 . Changing the input torque to the transmission
2306/44 . Removing torque from current gears
2306/46 . Uncoupling of current gear
2306/48 . Synchronising of new gear
2306/50 . Coupling of new gear
2306/52 . Applying torque to new gears
2306/54 . Synchronizing engine speed to transmission input speed

2312/00 Driving activities

2312/02 . Driving off
2312/022 . Preparing to drive off
2312/04 . Holding or hillholding
2312/06 . Creeping
2312/08 . Rocking
2312/09 . Switching between forward and reverse (rocking F16H 2312/08)
Calibrating

Control dependent on speed, wherein only the toothed wheels may be disengaged, control being mechanical

Control dependent on speed, wherein only the toothed wheels remain engaged, control being mechanical

Calibrating valves

Transmission housings and mounting of transmission components therein; Cooling; Lubrication; Flexible suspensions, e.g. floating frames

Starting devices or devices to start turning of shafts

Combinations of two or more transmissions

Mechanical transmissions with planetary gearing combined with one or more other mechanical transmissions

Combinations of a speed-change mechanism without planetary gearing with a differential for driving a vehicle drive axle

Combinations of transmissions with parallel force splitting paths having same output

Control mechanisms and elements applying a mechanical movement

Speed-change devices wherein the control lever actuates directly sliding gears pivoting around two non-parallel axis

Speed-change devices with an intermediary mechanism placed between control member and actuator

Rotary transmissions with mechanical energy accumulation and recovery without means for automatic self-regulation essentially based on spring action or inertia

Control devices for speed-changing geared mechanisms, e.g. specially adapted couplings for synchronising devices, devices to simplify control, control of auxiliary gearboxes

only the toothed wheels may be disengaged

the control being mechanical

the control being hydraulic or pneumatic

the control being electric

the gearing is not described or not essential

the control being mechanical

the control being hydraulic or pneumatic

the control being electric

Control dependent on speed

Control dependent on speed wherein only the toothed wheels may be disengaged, control being mechanical

Control dependent on speed wherein only the toothed wheels remain engaged, control being mechanical

Control dependent on speed, wherein only the toothed wheels may be disengaged, control being mechanical

Control dependent on speed, wherein only the toothed wheels remain engaged, control being mechanical

Mechanisms for changing direction

Automatic control, e.g. for an alternating movement

the control being hydraulic or pneumatic

only with toothed wheels or friction wheels

only the toothed wheels may be disengaged

with a combination of engaged and disengageable toothed wheels

Different types speed-changing mechanisms for toothed gearing

only with toothed wheels remaining engaged

with specially adapted devices

Control devices for speed-change mechanisms of planetary gearings, with toothed wheels remaining engaged, e.g. also for devices to simplify the control or for synchronising devices combined with control devices

the control being mechanical

the control being hydraulic or pneumatic

Circuits thereof

the control being electric

only the toothed wheels may be disengaged, the control being mechanical

with preselection system, mainly semi-automatic, e.g. with automatic preselection, but controlled at the intended moment, with force amplification

only the toothed wheels remain engaged

only the toothed wheels may be disengaged

Control devices for speed-change mechanisms, the speed change control is dependent on function parameters of the gearing

Control dependent on speed and torque, wherein only the toothed wheels remain engaged, control being mechanical

Control dependent on speed

Control dependent on speed wherein only the toothed wheels may be disengaged, control being mechanical

Control dependent on speed wherein only the toothed wheels remain engaged, control being mechanical

Control dependent on speed, wherein only the toothed wheels may be disengaged, control being mechanical

Control dependent on speed, wherein only the toothed wheels remain engaged, control being mechanical
<table>
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<tr>
<th>Code</th>
<th>Text</th>
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<tbody>
<tr>
<td>2718/10</td>
<td>only the toothed wheels remain engaged</td>
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<tr>
<td>2718/12</td>
<td>the control being mechanical</td>
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<td>2718/14</td>
<td>the control being hydraulic or pneumatic</td>
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<td>2718/16</td>
<td>the control being electric</td>
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<td>2718/18</td>
<td>Control dependent on torque</td>
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<td>2718/20</td>
<td>only the toothed wheels remain engaged</td>
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<td>2718/22</td>
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<td>2718/24</td>
<td>the control being hydraulic or pneumatic</td>
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<tr>
<td>2718/26</td>
<td>the control being electric</td>
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**2720/00** | Different types of speed-change gear mechanisms
- Gears with a non-circular rolling curve or gears with special teeth
- Combining a planetary speed-change gearing with a motor vehicle drive axle differential