

# CPC COOPERATIVE PATENT CLASSIFICATION

## F16H GEARING

### 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:

<a href="#">A01D 69/06</a>	Gearings in harvesting machines
<a href="#">A63H 31/00</a>	Gearing for toys
<a href="#">B21B 35/12</a>	Toothed-wheel gearing for metal-rolling mills
<a href="#">B60K</a>	Arrangement of transmissions in vehicles
<a href="#">B61C 9/00</a>	Transmissions for railway locomotives
<a href="#">B62D 3/00</a>	Vehicle steering gears
<a href="#">B62M</a>	Transmissions for cycles
<a href="#">B63H 23/00</a>	Transmissions for marine propulsions
<a href="#">B63H 25/00</a>	Marine steering gears
<a href="#">{B64C 27/12, B64C 27/58}</a>	{Transmissions for helicopters}
<a href="#">{B64D 35/00}</a>	{Transmissions for aircraft}
<a href="#">F01-F04</a>	Machines, engines, pumps
<a href="#">F15B 15/00</a>	Gearings associated with fluid-actuated devices
<a href="#">G01D 5/04</a>	Gearing used in indicating or recording apparatus in connection with measuring devices
<a href="#">H03J 1/00</a>	Driving arrangements for tuning resonant circuits
<a href="#">H04L 13/04</a>	Driving mechanisms for apparatus for transmission of coded digital information.

### Toothed gearings for conveying rotary motion

- |             |                                                                                                                                                                                  |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1/00</b> | <b>Toothed gearings for conveying rotary motion</b><br>(specific for conveying rotary motion with variable gear ratio or for reversing rotary motion <a href="#">F16H 3/00</a> ) |
| 1/003       | . {Monodirectionally torque-transmitting toothed gearing}                                                                                                                        |
| 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                                                                                                                   |
| 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 ( <a href="#">F16H 1/14</a> takes precedence)                                      |
| 1/20  | . . involving more than two intermeshing members                                                                                                  |
| 1/203 | . . . {with non-parallel axes ( <a href="#">F16H 1/22</a> 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 ( <a href="#">F16H 1/16</a> 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}	3/003	. {the gear-ratio being changed by inversion of torque direction}
1/2818	. . . {by allowing limited movement of the ring gear relative to the casing or shaft}	3/005	. . {for gearings using gears having orbital motion}
1/2827	. . . {by allowing limited movement of the planet carrier, e.g. relative to its shaft}	3/006	. {power being selectively transmitted by either one of the parallel flow paths}
1/2836	. . . {by allowing limited movement of the planets relative to the planet carrier or by using free floating planets}	2003/007	. . {with two flow paths, one being directly connected to the input, the other being connected to the input through a clutch}
1/2845	. . . {by allowing limited movement of the sun gear}	2003/008	. . {comprising means for selectively driving countershafts}
1/2854	. . {involving conical gears}	3/02	. without gears having orbital motion
1/2863	. . {Arrangements for adjusting or for taking-up backlash}	3/04	. . with internally-toothed gears
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}	3/06	. . with worm and worm-wheel or gears essentially having helical or herring-bone teeth
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 gears is forming the output}	<b>NOTE</b> In groups <a href="#">F16H 3/08</a> , <a href="#">F16H 3/16</a> and <a href="#">F16H 3/20</a> , gears which can be put out of mesh are not taken into consideration if they are used for reversal only.	
2001/289	. . {comprising two or more coaxial and identical sets of orbital gears, e.g. for distributing torque between the coaxial sets}	3/08	. . exclusively or essentially with continuously meshing gears, that can be disengaged from their shafts
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	2003/0803	. . . {with countershafts coaxial with input or output shaft}
1/32	. . in which the central axis of the gearing lies inside the periphery of an orbital gear	2003/0807	. . . {with gear ratios in which the power is transferred by axially coupling idle gears}
1/321	. . . {the orbital gear being nutating}	2003/0811	. . . {using unsynchronised clutches}
2001/322	. . . {comprising at least one universal joint, e.g. a Cardan joint}	2003/0815	. . . {using torque sharing, i.e. engaging two gear ratios simultaneously to transfer large torque, e.g. using one slipping clutch}
2001/323	. . . {comprising eccentric crankshafts driving or driven by a gearing}	2003/0818	. . . {comprising means for power-shifting}
2001/324	. . . {comprising two axially spaced, rigidly interconnected, orbital gears}	2003/0822	. . . {characterised by the arrangement of at least one reverse gear}
2001/325	. . . {comprising a carrier with pins guiding at least one orbital gear with circular holes}	2003/0826	. . . {wherein at least one gear on the input shaft, or on a countershaft is used for two different forward gear ratios}
2001/326	. . . {comprising a carrier with linear guiding means guiding at least one orbital gear}	3/083	. . . with radially acting and axially controlled clutching members, e.g. sliding keys {(clutches with clutching members movable otherwise than only axially <a href="#">F16D 11/12</a> ; clutches with wedgeable clutching members <a href="#">F16D 15/00</a> ; systems of mechanically actuated clutches <a href="#">F16D 21/04</a> )}
2001/327	. . . {with orbital gear sets comprising an internally toothed ring gear}	3/085	. . . with more than one output shaft
2001/328	. . . {comprising balancing means}	3/087	. . . characterised by the disposition of the gears ( <a href="#">F16H 3/083</a> , <a href="#">F16H 3/085</a> take precedence)
1/34	. . involving gears essentially having intermeshing elements other than involute or cycloidal teeth (in worm gearing <a href="#">F16H 1/30</a> )	<b>NOTE</b> When counting the countershafts, the reverse countershaft is not taken into consideration if it is used for reversal only.	
1/36	. . with two central gears coupled by intermeshing orbital gears	3/089	. . . . all of the meshing gears being supported by a pair of parallel shafts, one being the input shaft and the other the output shaft, there being no countershaft involved
1/46	. . Systems consisting of a plurality of gear trains each with orbital gears, {i.e. systems having three or more central gears}	3/091	. . . . including a single countershaft
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 <a href="#">F16H 1/2809</a> )}	3/0915	. . . . {with coaxial input and output shafts}
3/00	<b>Toothed gearings for conveying rotary motion with variable gear ratio or for reversing rotary motion (speed-changing or reversing mechanisms <a href="#">F16H 59/00</a> - <a href="#">F16H 63/00</a>)</b>	3/093	. . . . with two or more countershafts
3/001	. {convertible for varying the gear-ratio, e.g. for selecting one of several shafts as the input shaft}	2003/0931	. . . . {each countershaft having an output gear meshing with a single common gear on the output shaft}
3/002	. {using gears having teeth movable out of mesh ( <a href="#">F16H 3/42</a> takes precedence)}	2003/0933	. . . . {with coaxial countershafts}

- 2003/0935 . . . . . {with multiple countershafts comprising only one idle gear and one gear fixed to the countershaft}
- 2003/0936 . . . . . {with multiple countershafts comprising only two idle gears and one gear fixed to the countershaft}
- 2003/0938 . . . . . {with multiple gears on the input shaft directly meshing with respective gears on the output shaft}
- 3/095 . . . . . with means for ensuring an even distribution of torque between the countershafts
- 3/097 . . . . . the input and output shafts being aligned on the same axis
- 3/10 . . . with one or more one-way clutches as an essential feature
- 3/12 . . . with means for synchronisation not incorporated in the clutches ([synchronised clutches F16D 23/02](#))
- 2003/123 . . . . . {using a brake}
- 3/126 . . . . . {using an electric drive}
- 3/14 . . . Gearings for reversal only
- 3/145 . . . . . {with a pair of coaxial bevel gears, rotatable in opposite directions}
- 3/16 . . essentially with both gears that can be put out of gear and continuously-meshing gears that can be disengaged from their shafts
- 3/18 . . . Gearings for reversal only
- 3/20 . . exclusively or essentially using gears that can be moved out of gear
- 3/22 . . . with gears shiftable only axially
- 3/24 . . . . . with driving and driven shafts coaxial
- 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](#))
- 2003/442 . . {comprising two or more sets of orbital gears arranged in a single plane}
- 2003/445 . . {without permanent connection between the input and the set of orbital gears}
- 2003/447 . . {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 or 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](#))}
- 3/68 . . in which an orbital gear has an axis crossing the main axis of the gearing and has helical teeth or is a worm
- 3/70 . . in which the central axis of the gearing lies inside the periphery of an orbital gear
- 3/72 . . with a secondary drive, e.g. regulating motor, in order to vary speed continuously
- 3/721 . . . {with an energy dissipating device, e.g. regulating brake or fluid throttle, in order to vary speed continuously}
- 3/722 . . . . . {with a fluid throttle}
- 3/724 . . . {using external powered electric machines}
- 3/725 . . . . . {with means to change ratio in the mechanical gearing}
- 3/727 . . . {with at least two dynamo electric machines for creating an electric power path inside the gearing, e.g. using generator and motor for a variable power torque path ([special adapted for a hybrid electric vehicle B60K 6/20](#))}
- 3/728 . . . . . {with means to change ratio in the mechanical gearing}
- 3/74 . . Complexes, not using actuable speedchanging or regulating members, e.g. with gear ratio determined by free play of frictional or other forces
- 3/76 . . with an orbital gear having teeth formed or arranged for obtaining multiple gear ratios, e.g. nearly infinitely variable
- 3/78 . . Special adaptation of synchronisation mechanisms to these gearings

**Gearing for conveying rotary motion by endless flexible members**

<b>7/00</b>	<b>Gearings for conveying rotary motion by endless flexible members</b> (specific for conveying rotary motion with variable gear ratio or for reversing rotary motion <a href="#">F16H 9/00</a> ; {Belts, V-belts, ropes, cables, and chains <a href="#">F16G</a> , chain-wheels <a href="#">F16H 55/30</a> ; pulleys <a href="#">F16H 55/36</a> })
7/02	. with belts; with V-belts
7/023	. . {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 <a href="#">F16G 1/28</a> , <a href="#">F16G 5/20</a> )}
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 <a href="#">F16H 55/52</a> ; {gearings with endless belts <a href="#">F16H 7/02</a> ; tensioning for chains or belts specially adapted for cycles <a href="#">B62M 9/16</a> ; belt or chain tensioning arrangements for endless conveyors <a href="#">B65G 23/44</a> })
2007/0802	. . {Actuators for final output members}
2007/0804	. . . {Leaf springs}
2007/0806	. . . {Compression coil springs}
2007/0808	. . . {Extension coil springs}
2007/081	. . . {Torsion springs}
2007/0812	. . . {Fluid pressure}
2007/0814	. . . . {with valves opening on surplus pressure}
2007/0817	. . . . {with means for venting unwanted gas}
2007/0819	. . . {Rubber or other elastic materials}
2007/0821	. . . {working with gravity}
2007/0823	. . . {Electric actuators}
2007/0825	. . . {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	. . . {Sprockets}
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 ( <a href="#">F16H 7/0827</a> takes precedence)}
7/12	. . . of an idle pulley
7/1209	. . . . {with vibration damping means (vibration damping per se <a href="#">F16F</a> )}
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}
7/1281	. . . . . {where the axis of the pulley moves along a substantially circular path}
7/129	. . . . . {with means for impeding reverse motion}
7/14	. . . of a driving or driven pulley
7/16	. . . . without adjusting the driving or driven shaft
7/18	. Means for guiding or supporting belts, ropes, or chains (construction of pulleys <a href="#">F16H 55/36</a> )
2007/185	. . {the guiding surface in contact with the belt, rope or chain having particular shapes, structures or materials}
7/20	. . Mountings for rollers or pulleys
7/22	. Belt, rope, or chain shifters
7/24	. Equipment for mounting belts, ropes or chains
<b>9/00</b>	<b>Gearings for conveying rotary motion with variable gear ratio, or for reversing rotary motion, by endless flexible members</b> (control of change-speed or reversing-gearings conveying rotary motion <a href="#">F16H 59/00</a> - <a href="#">F16H 63/00</a> )
9/02	. without members having orbital motion
9/04	. . using belts, V-belts, or ropes (with toothed belts <a href="#">F16H 9/24</a> ; pulleys of adjustable construction <a href="#">F16H 55/52</a> )
9/06	. . . engaging a stepped pulley
9/08	. . . engaging a conical drum ( <a href="#">F16H 9/12</a> takes precedence)
9/10	. . . engaging a pulley provided with radially-actuatable elements carrying the belt



9/12	. . . engaging a pulley built-up out of relatively axially-adjustable parts in which the belt engages the opposite flanges of the pulley directly without interposed belt-supporting members	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
9/125	. . . . {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}	15/08	. . . . in which the member B is a disc with a flat or approximately flat friction surface
9/14	. . . . using only one pulley built-up out of adjustable conical parts	15/10	. . . . . in which the axes of the two members cross or intersect
9/16	. . . . using two pulleys, both built-up out of adjustable conical parts	15/12	. . . . . in which one or each member is duplicated, e.g. for obtaining better transmission, for lessening the reaction forces on the bearings
2009/163	. . . . . {Arrangements of two or more belt gearings mounted in parallel, e.g. for increasing transmittable torque}	15/14	. . . . . in which the axes of the members are parallel or approximately parallel
2009/166	. . . . . {Arrangements of two or more belt gearings mounted in series, e.g. for increasing ratio coverage}	15/16	. . . . . in which the member B has a conical friction surface
9/18	. . . . . only one flange of each pulley being adjustable	15/18	. . . . . externally
9/20	. . . . . both flanges of the pulleys being adjustable	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
9/22	. . . specially adapted for ropes	15/22	. . . . . the axes of the members being parallel or approximately parallel
9/24	. . using chains or toothed belts, belts in the form of links; Chains or belts specially adapted to such gearing (toothed belts F16G 1/28; V-belts in the form of links F16G 5/18; toothed V-belts F16G 5/20)	15/24	. . . . . internally
2009/245	. . . {with idle wheels to assist ratio change}	15/26	. . . . . in which the member B has a spherical friction surface centered on its axis of revolution
9/26	. with members having orbital motion	15/28	. . . . . with external friction surface
<b>Other friction gearing for conveying rotary motion</b>		15/30	. . . . . with internal friction surface
<b>13/00</b>	<b>Gearings for conveying rotary motion by friction between rotary members (specific for conveying rotary motion with variable gear ratio or for reversing rotary motion F16H 15/00; {friction discs F16H 55/32})</b>	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
13/02	. without members having orbital motion	15/34	. . . . . with convex friction surface
13/04	. . with balls or with rollers acting in a similar manner	15/36	. . . . . with concave friction surface, e.g. a hollow toroid surface
13/06	. with members having orbital motion	15/38	. . . . . with two members B having hollow toroid surface opposite to each other, the member or members A being adjustably mounted between the surfaces
13/08	. . with balls or with rollers acting in a similar manner	2015/383	. . . . . {with two or more sets of toroid gearings arranged in parallel}
13/10	. Means for influencing the pressure between the members	2015/386	. . . . . {with two or more sets of toroid gearings arranged in series}
13/12	. . by magnetic forces	15/40	. . . in which two members co-operative by means of balls, or rollers of uniform effective diameter, not mounted on shafts
13/14	. . for automatically varying the pressure mechanically	15/42	. . . in which two members co-operate by means of rings or by means of parts of endless flexible members pressed between the first mentioned members
<b>15/00</b>	<b>Gearings for conveying rotary motion with variable gear ratio, or for reversing rotary motion, by friction between rotary members ({gearings for reversal only F16H 3/14, F16H 3/60} ; control of change-speed or reversing-gearings conveying rotary motion F16H 59/00 - F16H 63/00)</b>	15/44	. . . in which two members of non-uniform effective diameter directly co-operate with one another
15/01	. characterised by the use of a magnetisable powder or liquid as friction medium between the rotary members	15/46	. . Gearings providing a discontinuous or stepped range of gear ratios
15/02	. without members having orbital motion	15/48	. with members having orbital motion
15/04	. . Gearings providing a continuous range of gear ratios	15/50	. . Gearings providing a continuous range of gear ratios
		15/503	. . . {in which two members co-operate by means of balls or rollers of uniform effective diameter, not mounted on shafts}

15/506	. . . {in which two members of non-uniform effective diameter directly co-operate with one another}	19/0631	. . . {the flexible member, e.g. a cable, being wound with one string to a drum and unwound with other string from the same or an other drum to create reciprocating movement of the flexible member}
15/52	. . . in which a member of uniform effective diameter mounted on a shaft may co-operate with different parts of another member	19/0636	. . . {the flexible member being a non-buckling chain}
15/54	. . . in which two members co-operate by means of rings or by means of parts of endless flexible members pressed between the first-mentioned members	19/064	. . . {the flexible push member uses a bended profile to generate stiffness, e.g. spreading belts}
15/56	. . Gearings providing a discontinuous or stepped range of gear ratios	19/0645	. . . {using guided flexible members, i.e. the flexible member being supported at least partially by a guide to transmit the reciprocating movement}
<b>19/00</b>	<b>Gearings comprising essentially only toothed gears or friction members and not capable of conveying indefinitely-continuing rotary motion (with intermittently-driving members <a href="#">F16H 27/00</a> - <a href="#">F16H 31/00</a>; rope or like tackle for lifting or haulage <a href="#">B66D 3/00</a>)</b>	19/065	. . . {with flexible members between discs creating reciprocation by relative rotation of the discs}
19/001	. {for conveying reciprocating or limited rotary motion}	19/0654	. . . {using twisting movement of flexible members to shorten the axial length}
19/003	. . {comprising a flexible member}	19/0659	. . . {combined with means for creating non-linear characteristics, e.g. cams; Means for creating different velocity on forward and reverse stroke}
19/005	. . . {for conveying oscillating or limited rotary motion}	19/0663	. . . {with telescopic means, e.g. for supporting or shielding the reciprocating member}
19/006	. . . {for converting reciprocating into an other reciprocating motion}	2019/0668	. . . {Both ends of the flexible member are fixed to the casing}
2019/008	. . {Facilitating the engagement or stopping of gear sections}	19/0672	. . . {characterised by means for tensioning the flexible member}
19/02	. for interconverting rotary {or oscillating} motion and reciprocating motion	2019/0677	. . . {characterised by the means for fixing the flexible member to a drum}
19/025	. . {comprising a friction shaft}	2019/0681	. . . {characterised by an endless flexible member, i.e. the flexible member forming a closed loop}
19/04	. . comprising a rack	2019/0686	. . . . {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}
19/043	. . . {for converting reciprocating movement in a continuous rotary movement or <i>vice versa</i> , e.g. by opposite racks engaging intermittently for a part of the stroke}	2019/069	. . . {with means for generating two superposed movements, e.g. for driving a X-Y table}
2019/046	. . . {Facilitating the engagement or stopping of racks}	2019/0695	. . . {Generating pivoting movement of a joint}
19/06	. . comprising {flexible members, e.g. an} endless flexible member	19/08	. for interconverting rotary motion and oscillating motion
<b>WARNING</b> Groups <a href="#">F16H 19/0604</a> - <a href="#">F16H 19/0672</a> are not complete pending reclassification; see also this group		2019/085	. . {by using flexible members}
19/0604	. . . {with means to double or half the stroke of the reciprocating member}	<b>Gearing for conveying or converting motion by means of levers, links, or cams (combination of gearings of different types <a href="#">F16H 37/00</a>)</b>	
2019/0609	. . . {the reciprocating motion being created by drums with different diameters using a differential effect}	<b>21/00</b>	<b>Gearings comprising primarily only links or levers, with or without slides</b>
2019/0613	. . . {the flexible member being a toothed belt or chain engaging a rack}	21/02	. the movements of two or more independently-moving members being combined into a single movement
19/0618	. . . {the flexible member, e.g. cable, being wound on a drum or thread for creating axial movement parallel to the drum}	21/04	. Guiding mechanisms, e.g. for straight-line guidance ( <a href="#">for drawing-machines <a href="#">B43L</a></a> )
19/0622	. . . {for converting reciprocating movement into oscillating movement and <i>vice versa</i> , the reciprocating movement is perpendicular to the axis of oscillation}	21/06	. which can be made ineffective when desired
2019/0627	. . . . {the flexible member, e.g. a cable, being wound with one string to a drum and unwound with other string from the same or an other drum to create reciprocating movement of the flexible member}	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 ( <a href="#">adjustable cranks or eccentrics F16C 3/28</a> ; <a href="#">adjustable connecting-rods F16C 7/06</a> )	25/12	. . with reciprocation along the axis of rotation, e.g. gearings with helical grooves and automatic reversal, {or cams} ( <a href="#">screw mechanism without automatic reversal F16H 25/20</a> )
21/22	. . . . with one connecting-rod and one guided slide to each crank or eccentric	25/122	. . . {Gearings with helical grooves and automatic reversal}
21/24	. . . . . without further links or guides	25/125	. . . {having the cam on an end surface of the rotating element}
21/26	. . . . . with toggle action	2025/127	. . . {using electric solenoids for generating the reciprocating motion}
21/28	. . . . . with cams or additional guides	25/14	. . with reciprocation perpendicular to the axis of rotation ( <a href="#">F16H 21/36 takes precedence</a> )
21/30	. . . . . with members having rolling contact	25/16	. for interconverting rotary motion and oscillating motion
21/32	. . . . . with additional members comprising only pivoted links or arms	25/18	. for conveying or interconverting oscillating or reciprocating motions
21/34	. . . . with two or more connecting-rods to each crank or eccentric	25/183	. . {conveying only reciprocating motion, e.g. wedges}
21/36	. . . . without swinging connecting-rod, e.g. with epicyclic parallel motion, slot and crank motion	25/186	. . {with reciprocation along the axis of oscillation}
21/365	. . . . . {with planetary gearing having a ratio of 2:1 between sun gear and planet gear}	25/20	. . Screw mechanisms ( <a href="#">with automatic reversal F16H 25/12</a> )
21/38	. . . . with means for temporary energy accumulation, e.g. to overcome dead-centre positions	25/2003	. . . {with arrangements for taking up backlash ( <a href="#">F16H 25/2209 takes precedence</a> )}
21/40	. . for interconverting rotary motion and oscillating motion	25/2006	. . . . {with more than one nut or with nuts consisting of more than one bearing part}
21/42	. . . with adjustable throw	25/2009	. . . . {with radial preloading}
21/44	. . for conveying or interconverting oscillating or reciprocating motions	2025/2012	. . . . {using a spring member creating rotary torque for counter rotating the two nuts, e.g. a torsion bar}
21/46	. with movements in three dimensions	25/2015	. . . {Elements specially adapted for stopping actuators in the end position; Position sensing means}
21/48	. . for conveying rotary motions	25/2018	. . . {with both screw and nut being driven, i.e. screw and nut are both rotating}
21/50	. . for interconverting rotary motion and reciprocating motion ( <a href="#">F16H 23/00 takes precedence</a> )	25/2021	. . . {with means for avoiding overloading}
21/52	. . for interconverting rotary motion and oscillating motion	25/2025	. . . {with means to disengage the nut or screw from their counterpart; Means for connecting screw and nut for stopping reciprocating movement ( <a href="#">F16H 25/2015 takes precedence</a> )}
21/54	. . for conveying or interconverting oscillating or reciprocating motions	2025/2028	. . . {specially adapted for converting reciprocating motion into rotary motion, e.g. by using screw profile with high efficiency}
<b>23/00</b>	<b>Wobble-plate gearings; Oblique-crank gearings</b> <b>{(conveying rotary motion with toothed nutating gears F16H 1/321)}</b>	2025/2031	. . . {Actuator casings}
23/02	. with adjustment of throw by changing the position of the wobble-member ( <a href="#">F16H 29/04</a> , <a href="#">F16H 33/10 take precedence</a> )	2025/2034	. . . . {Extruded frame casings}
23/04	. with non-rotary wobble-members	2025/2037	. . . {Actuator supports or means for fixing piston end, e.g. flanges}
23/06	. . with sliding members hinged to reciprocating members	2025/204	. . . {Axial sliding means, i.e. for rotary support and axial guiding of nut or screw shaft}
23/08	. . connected to reciprocating members by connecting-rods	2025/2043	. . . {Screw mechanisms driving an oscillating lever, e.g. lever with perpendicular pivoting axis}
23/10	. with rotary wobble-plates with plane surfaces	2025/2046	. . . {with gears arranged perpendicular to screw shaft axis, e.g. helical gears engaging tangentially the screw shaft}
<b>25/00</b>	<b>Gearings comprising primarily only cams, cam-followers and screw-and-nut mechanisms</b>	25/205	. . . {comprising alternate power paths, e.g. for fail safe back-up}
25/02	. the movements of two or more independently moving members being combined into a single movement	2025/2053	. . . {Screws in parallel arrangement driven simultaneously with an output member moved by both screws}
25/04	. for conveying rotary motion	25/2056	. . . {Telescopic screws with at least three screw members in coaxial arrangement}
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 ( <a href="#">F16H 23/00 takes precedence</a> )		
25/10	. . with adjustable throw ( <a href="#">adjustable cams F16H 53/04</a> )		

2025/2059	. . .	{Superposing movement by two coaxial screws, e.g. with opposite thread direction (telescopic screws with three screw members <a href="#">F16H 25/2056</a> )}	25/2285	. . . .	{with rings engaging the screw shaft with the inner perimeter, e.g. using inner rings of a ball bearing}
2025/2062	. . .	{Arrangements for driving the actuator}	25/229	. . . .	{Eccentric rings with their axis arranged substantially parallel to the screw shaft axis}
2025/2065	. . . .	{Manual back-up means for overriding motor control, e.g. hand operation in case of failure}	25/2295	. . . .	{Rings which are inclined or can pivot around an axis perpendicular to the screw shaft axis}
2025/2068	. . . .	{Means for returning linear actuator to zero position, e.g. upon occurrence of failure by using a spring}	25/24	. . .	Elements essential to such mechanisms, e.g. screws, nuts ( <a href="#">F16H 25/22</a> takes precedence)
2025/2071	. . . .	{Disconnecting drive source from the actuator, e.g. using clutches for release of drive connection during manual control}	25/2409	. . . .	{one of the threads being replaced by elements specially formed for engaging the screw or nut, e.g. pins, racks, toothed belts}
2025/2075	. . . .	{Coaxial drive motors}	25/2418	. . . .	{Screw seals, wipers, scrapers or the like}
2025/2078	. . . .	{the rotor being integrated with the nut body}	25/2427	. . . .	{one of the threads being replaced by a wire or stripmetal, e.g. spring}
2025/2081	. . . .	{Parallel arrangement of drive motor to screw axis}	2025/2436	. . . .	{Intermediate screw supports for reducing unsupported length of screw shaft}
2025/2084	. . . .	{Perpendicular arrangement of drive motor to screw axis}	2025/2445	. . . .	{Supports for compensating misalignment or offset between screw and nut}
2025/2087	. . . .	{using planetary gears}	25/2454	. . . .	{Brakes; Rotational locks}
2025/209	. . . .	{using worm gears}	2025/2463	. . . .	{using a wrap spring brake, i.e. a helical wind up spring for braking or locking}
2025/2093	. . . .	{using conical gears}	25/2472	. . . .	{Safety nuts}
2025/2096	. . . .	{using endless flexible members}	2025/2481	. . . .	{Special features for facilitating the manufacturing of spindles, nuts, or sleeves of screw devices}
25/22	. . .	with balls, rollers, or similar members between the co-operating parts; Elements essential to the use of such members	2025/249	. . . .	{Special materials or coatings for screws or nuts ( <a href="#">lubrication F16H 57/0497</a> )}
25/2204	. . . .	{with balls}	<b>Gearings with intermittently-driving member</b>		
25/2209	. . . .	{with arrangements for taking up backlash}	27/00	<b>Step-by-step mechanisms without freewheel members, e.g. Geneva driven (rotary gearings with cyclically-varying velocity ratio <a href="#">F16H 35/02</a>; impulse couplings <a href="#">F16D 5/00</a>; clockwork escapements <a href="#">G04B 15/00</a>)</b>	
25/2214	. . . .	{with elements for guiding the circulating balls}	27/02	. with at least one reciprocating or oscillating transmission member { ( <a href="#">F16H 27/04</a> takes precedence) }	
25/2219	. . . .	{Axially mounted end-deflectors}	27/04	. for converting continuous rotation into a step-by-step rotary movement	
25/2223	. . . .	{Cross over deflectors between adjacent thread turns, e.g. S-form deflectors connecting neighbouring threads}	27/045	. {Mechanism comprising a member with partially helical tracks}	
25/2228	. . . .	{the device for circulation forming a part of the screw member}	27/06	. Mechanisms with driving pins in driven slots, e.g. Geneva drives	
25/2233	. . . .	{with cages or means to hold the balls in position}	27/08	. with driving toothed gears with interrupted toothing	
25/2238	. . . .	{using ball spacers, i.e. spacers separating the balls, e.g. by forming a chain supporting the balls}	27/10	. obtained by means of disengageable transmission members, combined or not combined with mechanisms according to group <a href="#">F16H 27/06</a> or <a href="#">F16H 27/08</a>	
2025/2242	. . . .	{Thread profile of the screw or nut showing a pointed "gothic" arch in cross-section}	29/00	<b>Gearings for conveying rotary motion with intermittently-driving members, e.g. with freewheel action (freewheels <a href="#">F16D 41/00</a>; {Gearings for converting oscillating or reciprocating movement with freewheeling members or other intermittently-driving members into a rotary movement <a href="#">F16H 31/00</a>})</b>	
25/2247	. . . .	{with rollers}	29/02	. between one of the shafts and an oscillating of reciprocating intermediate member, not rotating with either of the shafts ( <a href="#">F16H 29/20</a> , <a href="#">F16H 29/22</a> take precedence)	
25/2252	. . . .	{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 ( <a href="#">planetary rollers F16H 25/2252</a> )}			
2025/2271	. . . .	{with means for guiding circulating rollers}			
2025/2276	. . . .	{using roller spacers, i.e. spacers separating the rollers, e.g. by forming a complete chain}			
2025/228	. . . .	{Screw mechanisms having rollers being supported by the screw shaft and engaging the nut}			



- 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 fly-wheels
- 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](#))}
- 35/00 Gearings or mechanisms with other special functional features**
- 2035/001 . {Gearings with eccentric mounted gears, e.g. for cyclically varying ratio}
- 2035/003 . {Gearings comprising pulleys or toothed members of non-circular shape, e.g. elliptical gears (harmonic drives with elliptical wave generators [F16H 49/001](#))}
- 2035/005 . {Gearings or mechanisms preventing back-driving (braking or locking of screw actuators [F16H 25/2454](#))}
- 2035/006 . {Gearings or mechanisms for stopping or limiting movement, e.g. stopping a movement after few turns (for linear screw actuators [F16H 25/2015](#))}
- 35/008 . {for variation of rotational phase relationship, e.g. angular relationship between input and output shaft (couplings [F16D 3/10](#))}
- 35/02 . for conveying rotary motion with cyclically varying velocity ratio (speed-changing mechanisms operating cyclically, [see](#) the appropriate groups)
- 35/06 . Gearings designed to allow relative movement between supports thereof without ill effects ([F16H 1/26](#), [F16H 1/48](#) take precedence; {mounting or supporting gearboxes [F16H 57/025](#)})
- 35/08 . for adjustment of members on moving parts from a stationary place
- 35/10 . Arrangements or devices for absorbing overload or preventing damage by overload ({for screw mechanisms [F16H 25/2021](#)}; couplings for transmitting rotation [F16D](#))
- 2035/103 . . {with drive interruption by structural failure of overload preventing means, e.g. using shear pins}
- 2035/106 . . {Monitoring of overload}
- 35/12 . Transmitting mechanisms with delayed effect (vibration- or shock-dampers in general [F16F](#))
- 35/14 . Mechanisms with only two stable positions, e.g. acting at definite angular positions
- 35/16 . Mechanisms for movements or movement relations conforming to mathematical formulae (devices in which computing operations are performed mechanically [G06G 3/00](#))
- 35/18 . 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}	37/084	. . . . . {at least one power path being a continuously variable transmission, i.e. CVT}
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}	37/0846	. . . . . {CVT using endless flexible members}
2037/026	. . . {CVT layouts with particular features of reversing gear, e.g. to achieve compact arrangement}	37/0853	. . . . . {CVT using friction between rotary members having a first member of uniform effective diameter cooperating with different parts of a second member}
37/027	. . {toothed gearing combined with a gear using endless flexible members for reversing rotary motion only}	37/086	. . . . . {CVT using two coaxial friction members cooperating with at least one intermediate friction member}
2037/028	. . {having two distinct forward drive ratios and one reverse drive ratio arranged in series with a continuously variable transmission unit}	2037/0866	. . . . . {Power split variators with distributing differentials, with the output of the CVT connected or connectable to the output shaft}
37/04	. . Combinations of toothed gearings only (F16H 37/06 takes precedence)	2037/0873	. . . . . {with switching, e.g. to change ranges}
37/041	. . . {for conveying rotary motion with constant gear ratio}	2037/088	. . . . . {Power split variators with summing differentials, with the input of the CVT connected or connectable to the input shaft}
<b>WARNING</b> This group is not complete pending a reorganisation; see also subgroups of <a href="#">F16H 1/00</a>		2037/0886	. . . . . {with switching means, e.g. to change ranges}
37/042	. . . {change gear transmissions in group arrangement}	2037/0893	. . . . . {characterised in the ratio of the continuously variable transmission is different from zero when the output shaft speed is zero}
37/043	. . . . {without gears having orbital motion}	37/10	. . . . at both ends of intermediate shafts (F16H 37/0806 takes precedence)
2037/044	. . . . . {comprising a separate gearing unit for shifting between forward or reverse}	2037/101	. . . . . {Power split variators with one differential at each end of the CVT}
2037/045	. . . . . {comprising a separate gearing unit for shifting between high and low ratio range}	2037/102	. . . . . {the input or output shaft of the transmission is connected or connectable to two or more differentials}
37/046	. . . . {with an additional planetary gear train, e.g. creep gear, overdrive}	2037/103	. . . . . {Power split variators with each end of the CVT connected or connectable to a Ravigneaux set}
2037/047	. . . {comprising one or more orbital gear sets coaxial with a first shaft and having more than one drive connection to a second shaft parallel to the first shaft}	2037/104	. . . . . {Power split variators with one end of the CVT connected or connectable to two or more differentials}
2037/048	. . . {Combinations of parallel shaft and orbital motion gearing, wherein the orbital motion gear has more than one connection with the parallel shaft gearing}	2037/105	. . . . . {characterised by number of modes or ranges, e.g. for compound gearing}
2037/049	. . . {Forward-reverse units with forward and reverse gears for achieving multiple forward and reverse gears, e.g. for working machines}	2037/106	. . . . . {with switching means to provide two variator modes or ranges}
37/06	. . with a plurality of driving or driven shafts; with arrangements for dividing torque between two or more intermediate shafts	2037/107	. . . . . {with switching means to provide three variator modes or ranges}
37/065	. . . {with a plurality of driving or driven shafts (F16H 37/08 takes precedence)}	2037/108	. . . . . {with switching means to provide four or more variator modes or ranges}
37/08	. . . with differential gearing	37/12	. Gearings comprising primarily toothed or friction gearing, links or levers, and cams, or members of at least two of these types (F16H 21/14, F16H 21/28, F16H 21/30 take precedence; toothed or friction gearing or cam gearing with only an additional lever or link, see the appropriate group for the main gearing)
37/0806	. . . . {with a plurality of driving or driven shafts}	37/122	. . {for interconverting rotary motion and oscillating motion}
37/0813	. . . . . {with only one input shaft (differentials for four wheel drive vehicles B60K 17/346)}	37/124	. . {for interconverting rotary motion and reciprocating motion}
37/082	. . . . . {and additional planetary reduction gears}	37/126	. . . {Guiding mechanism using levers combined with gearings for straight line output movement, e.g. by using gears or pulleys with ratio 2:1}
37/0826	. . . . . {with only one output shaft}		
37/0833	. . . . {with arrangements for dividing torque between two or more intermediate shafts, i.e. with two or more internal power paths (F16H 3/72 takes precedence)}		

- 2037/128 . . {Generating reciprocating motion by a planetary gear (ratio 2:1) using endless flexible members}
- 37/14 . . the movements of two or more independently-moving members being combined into a single movement {(screw mechanisms with both nut and screw being driven F16H 25/2018)}
- 37/16 . . with a driving or driven member which both rotates or oscillates on its axis and reciprocates

**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 sub-atmospheric 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
- 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 B60W 10/02, B60W 10/10 {and B60W 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}	2048/085	. . . {characterised by shafts or gear carriers for orbital gears}
2045/0247	. . . {having a turbine with hydrodynamic damping means}	2048/087	. . . {characterised by the pinion gears, e.g. their type or arrangement}
2045/0252	. . . {having a damper arranged on input side of the lock-up clutch}	48/10	. . . with orbital spur gears
2045/0257	. . . {having a pump adapted for use as a secondary mass of the damping system}	2048/102	. . . {with spur gears engaging face gears}
2045/0263	. . . {the damper comprising a pendulum}	2048/104	. . . {characterised by two ring gears}
2045/0268	. . . {the damper comprising a gearing}	2048/106	. . . {characterised by two sun gears}
2045/0273	. . {characterised by the type of the friction surface of the lock-up clutch}	2048/108	. . . {characterised by intermeshing orbital gears, i.e. at least two intermeshing orbital gears}
2045/0278	. . . {comprising only two co-acting friction surfaces}	48/11	. . . having intermeshing planet gears
2045/0284	. . . {Multiple disk type lock-up clutch}	48/12	. without gears having orbital motion
2045/0289	. . . {Details of friction surfaces of the lock-up clutch}	48/14	. . with cams
2045/0294	. . . {Single disk type lock-up clutch, i.e. using a single disc engaged between friction members}	48/142	. . . {consisting of linked clutches using axially movable inter-engaging parts}
<b>47/00</b>	<b>Combinations of mechanical gearing with fluid clutches or fluid gearing (conjoint control of driveline clutches and change-speed gearing in vehicles B60W 10/02 and B60W 10/10)</b>	48/145	. . . . {with friction clutching members}
47/02	. the fluid gearing being of the volumetric type	48/147	. . . {with driven cam followers or balls engaging two opposite cams}
2047/025	. . {the fluid gearing comprising a plurality of pumps or motors}	48/16	. . with freewheels
47/04	. . the mechanical gearing being of the type with members having orbital motion	48/18	. . with fluid gearing
2047/045	. . . {the fluid gearing comprising a plurality of pumps or motors}	48/19	. . consisting of two linked clutches
47/06	. the fluid gearing being of the hydrokinetic type	48/20	. Arrangements for suppressing or influencing the differential action, e.g. locking devices
47/065	. . {the mechanical gearing being of the friction or endless flexible member type}	2048/201	. . {with means directly braking the orbital gears}
47/07	. . using two or more power-transmitting fluid circuits ({F16H 47/065, } F16H 47/10 take precedence)	2048/202	. . {using freewheel clutches}
47/08	. . the mechanical gearing being of the type with members having orbital motion ({F16H 47/065 takes precedence})	2048/204	. . {Control of arrangements for suppressing differential actions}
47/085	. . . {with at least two mechanical connections between the hydraulic device and the mechanical transmissions}	2048/205	. . . {using the steering as a control parameter}
47/10	. . . using two or more power-transmitting fluid circuits	2048/207	. . . {using torque sensors}
47/12	. . . the members with orbital motion having vanes interacting with the fluid	2048/208	. . . {using flywheels}
<b>48/00</b>	<b>Differential gearings (cooling or lubricating of differential gearing F16H 57/04)</b>	48/22	. . using friction clutches or brakes
	<b>NOTE</b>	48/24	. . using positive clutches or brakes
	When classifying in this main group, in the absence of an indication to the contrary, classification is made in all appropriate places.	48/26	. . using fluid action, e.g. viscous clutches
2048/02	. {Transfer gears for influencing drive between outputs}	2048/265	. . . {with a fluid throttling means}
2048/04	. . {having unequal torque transfer between two outputs}	48/27	. . using internally-actuatable fluid pressure, e.g. internal pump types
48/05	. Multiple interconnected differential sets	48/28	. . using self-locking gears or self-braking gears
48/06	. with gears having orbital motion	2048/282	. . . {using the axial movement of axially movable bevel gears}
48/08	. . comprising bevel gears	48/285	. . . with self-braking intermeshing gears having parallel axes and having worms or helical teeth
2048/082	. . . {characterised by the arrangement of output shafts}	48/29	. . . with self-braking intermeshing gears having perpendicular arranged axes and having worms or helical teeth
		48/295	. . using multiple means for force boosting
		48/30	. . using externally-actuatable 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
		2048/362	. . {using a continuously variable transmission}
		2048/364	. . {using electric or hydraulic motors}
		2048/366	. . {using additional non-orbital gears in combination with clutches or brakes}
		2048/368	. . {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 flexsplines 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 flexsplines, 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 . . . . {Skewed-shaft arrangement of the toothed members, i.e. 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 55/0833](#), [F16H 55/084](#) take precedence)}
- 55/0853 . . . {Skewed-shaft arrangement of the toothed members ([F16H 55/082](#), [F16H 55/0826](#), [F16H 55/0833](#), [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}
  
- 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 arranged 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 35/00](#))}
- 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 7/0829](#); toothed members with construction providing vibration damping [F16H 55/14](#); reducing vibrations or noise of the gearbox casing [F16H 57/028](#); 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 57/021 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 2055/175](#))}
- 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 ([detecting transmission failures F16H 2057/018](#))}
- 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
- 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}
- 2057/02008 . . {characterised by specific dividing lines or planes of the gear case}
- 2057/02013 . . {Extension units for gearboxes, e.g. additional units attached to a main gear}
- 2057/02017 . . {characterised by special features related to the manufacturing of the gear case, e.g. special adaptations for casting}
- 2057/02021 . . {with means for adjusting alignment}
- 2057/02026 . . {Connection of auxiliaries with a gear case; Mounting of auxiliaries on the gearbox}
- 2057/0203 . . {the gearbox is associated or combined with a crank case of an engine}
- 2057/02034 . . {Gearboxes combined or connected with electric machines ([structural association with electric machines H02K 7/116](#))}
- 2057/02039 . . {Gearboxes for particular applications}
- 2057/02043 . . . {for vehicle transmissions}

- 2057/02047 . . . . {Automatic transmissions}
- 2057/02052 . . . . {Axle units; Transfer casings for four wheel drive}
- 2057/02056 . . . . {for utility vehicles, e.g. tractors or agricultural machines}
- 2057/0206 . . . . {for commercial vehicles, e.g. buses or trucks}
- 2057/02065 . . . . {for motorcycles or squads}
- 2057/02069 . . . {for industrial applications}
- 2057/02073 . . . . {Reduction gearboxes for industry}
- 2057/02078 . . . {for wind turbines}
- 2057/02082 . . . {for application in vehicles other than propelling, e.g. adjustment of parts}
- 2057/02086 . . {Measures for reducing size of gearbox, e.g. for creating a more compact transmission casing}
- 2057/02091 . . {Measures for reducing weight of gearbox (by using particular materials [F16H 57/032](#))}
- 2057/02095 . . {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
- 2057/0213 . . . {Support of worm gear shafts}
- 2057/0216 . . . {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](#))
- 2057/0221 . . . . {Axial adjustment}
- 2057/0222 . . . . {Lateral adjustment}
- 2057/0224 . . . . {using eccentric bushes}
- 2057/0225 . . . . {with means for adjusting alignment}
- 2057/0227 . . . . {Assembly method measuring first tolerances or position and selecting mating parts accordingly, e.g. special sized shims for transmission bearings}
- 2057/0228 . . . . {Mounting with rough tolerances and fine adjustment after assembly}
- 57/023 . . Mounting or installation of gears or shafts in the gearbox casing, e.g. methods or means for assembly
- 2057/0235 . . . {specially adapted to allow easy accessibility and repair (using repair kits [F16H 2057/0068](#))}
- 57/025 . . Support of transmission casing, e.g. torque arms, or attachment to other devices (mounting of transmissions in vehicles [B60K 17/00](#))
- 57/027 . . Means for venting gearboxes, e.g. air breathers
- 57/028 . . characterised by means for reducing vibration or noise
- 57/029 . . characterised by means for sealing the gearbox casing, e.g. to improve air-tightness
- 57/03 . . characterised by means for reinforcing gearboxes, e.g. ribs
- 57/031 . . characterised by covers or lids for gearboxes
- 57/032 . . characterised by the materials used
- 2057/0325 . . {Moulded casings made from plastic}
- 57/033 . . Series gearboxes, e.g. gearboxes based on the same design being available in different size or gearboxes using a combination of several standardised units
- 2057/0335 . . . {Series transmissions of modular design, e.g. providing for different transmission ratios or power ranges}
- 57/035 . . Gearboxes for transmissions with endless flexible members
- 57/037 . . Gearboxes for accommodating differential gearings (rotating cases for differential gearings [F16H 48/40](#))
- 57/038 . . Gearboxes for accommodating bevel gears ([F16H 57/037](#) takes precedence)
- 57/039 . . Gearboxes for accommodating worm gears
- 57/04 . . Features relating to lubrication or cooling {or heating} ({in hydrokinetic gearing [F16H 41/30](#); } control of lubrication or cooling in hydrostatic gearing [F16H 61/4165](#))
- 57/0401 . . {using different fluids, e.g. a traction fluid for traction gearing and a lubricant for bearings or reduction gears}
- 57/0402 . . {Cleaning of lubricants, e.g. filters or magnets}
- 57/0404 . . . {Lubricant filters}
- 57/0405 . . {Monitoring quality of lubricant or hydraulic fluids}
- 57/0406 . . {Absorption elements for lubricants, e.g. oil felts}
- 57/0408 . . {Exchange or filling of transmission lubricant (filling or draining lubricant of or from machines or engines [F01M 11/04](#); servicing, maintaining, repairing, or refitting of vehicles [B60S 5/00](#))}
- 57/0409 . . {characterised by the problem to increase efficiency, e.g. by reducing splash losses}
- 57/041 . . {Coatings or solid lubricants, e.g. antiseize layers or pastes}
- 57/0412 . . {Cooling or heating; Control of temperature}
- 57/0413 . . . {Controlled cooling or heating of lubricant; Temperature control therefor}
- 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 57/0458](#))}
- 57/0457 . . {Splash lubrication ([characterised by the problem reducing losses, e.g. splash losses F16H 57/0409](#))}
- 57/0458 . . {Oil-mist or spray lubrication; Means to reduce foam formation ([lubrication by injection F16H 57/0456](#); [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 57/0476](#))}
- 57/0476 . . . {Electric machines and gearing, i.e. joint lubrication or cooling or heating thereof}
- 57/0478 . . . {Synchromesh 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 gearing with members having orbital motion
- 57/082 . . {Planet carriers}
- 2057/085 . . {Bearings for orbital gears}
- 2057/087 . . {Arrangement and support of friction devices in planetary gearings, e.g. support of clutch drums, stacked arrangements of friction devices ([see also arrangements for shifting planetary gears F16H 3/62, F16H 63/3026](#))}
- 57/10 . . Braking arrangements
- 57/12 . . Arrangements for adjusting or for taking-up backlash not provided for elsewhere
- 2057/121 . . {using parallel torque paths and means to twist the two path against each other}
- 2057/122 . . . {by using two independent drive sources, e.g. electric motors}
- 2057/123 . . {using electric control means}
- 2057/125 . . {Adjustment of backlash during mounting or assembly of gearing}
- 2057/126 . . {Self-adjusting during operation, e.g. by a spring}
- 2057/127 . . . {using springs}
- 2057/128 . . {using axial positioning of gear wheel with addendum modification on gear width, i.e. backlash is compensated by axial positioning of a slightly conical gear wheel}

### 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:



- "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;
  - "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 mechanism" means the mechanism which includes the final output element;
  - "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}
4. Combinations of features individually covered by group [F16H 61/00](#) and one or both of groups [F16H 59/00](#) and [F16H 63/00](#) are classified in group [F16H 61/00](#).
  5. Combinations of features individually covered by groups [F16H 59/00](#) and [F16H 63/00](#) are classified in group [F16H 63/00](#).
  6. When classifying in groups [F16H 59/00](#) - [F16H 63/00](#), control inputs or types of gearing, which are not identified by the preceding notes concerning combinations, and which are considered to represent information of interest for search, may also be classified. Such non-obligatory classification should be given as "additional information", e.g. selected from subgroup [F16H 61/66](#) 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}
- 2059/0291 . . {comprising safety means for preventing injuries in case of accidents}
- 2059/0295 . . {with mechanisms to return lever to neutral or datum position, e.g. by return springs}
- 59/04 . . Ratio selector apparatus
- 59/041 . . . {consisting of a final output mechanism, e.g. ratio selector being directly linked to a shiftfork}
- 59/042 . . . {comprising a final actuating mechanism (multiple final output mechanism in a gearbox [F16H 63/08](#))}
- 59/044 . . . {consisting of electrical switches or sensors (range selectors with electric switches or sensors [F16H 59/105](#))}
- 59/045 . . . {consisting of fluid valves}
- 2059/047 . . . {with essentially straight linear movement for gear selection, e.g. straight selection movement using detent mechanism for improving feeling (up-down shift by repeated movements [F16H 2059/0239](#))}
- 2059/048 . . . {with means for un-locking select or shift movement to allow access to reverse gear position (particular details of the lever handle [F16H 2059/0282](#))}
- 59/06 . . . the ratio being infinitely variable
- 2059/065 . . . . {Inching pedals for setting the ratio of an hydrostatic transmission}
- 59/08 . . Range selector apparatus
- 2059/081 . . . {using knops or discs for rotary range selection}
- 2059/082 . . . {with different modes}

2059/083	. . . . {Overdrive or overdrive cut-off}	59/50	. Inputs being a function of the status of the machine, e.g. position of doors or safety belts
2059/084	. . . . {Economy mode}	2059/503	. . {Axle-load distribution}
2059/085	. . . . {Power mode}	2059/506	. . {Wheel slip}
2059/086	. . . . {Adaptive mode, e.g. learning from the driver}	59/52	. . dependent on the weight of the machine, e.g. change in weight resulting from passengers boarding a bus
2059/087	. . . . {Winter mode, e.g. to start on snow or slippery surfaces}	2059/525	. . . {the machine undergoing additional towing load, e.g. by towing a trailer}
2059/088	. . . {Fast forward-reverse-sequence mode}	59/54	. . dependent on signals from the brakes, e.g. parking brakes
59/10	. . . comprising levers	59/56	. . dependent on signals from the main clutch
59/105	. . . . {consisting of electrical switches or sensors}	59/58	. . dependent on signals from the steering
59/12	. . . comprising push button devices	59/60	. Inputs being a function of ambient conditions
59/14	. Inputs being a function of torque or torque demand	2059/605	. . {Traffic stagnation information, e.g. traffic jams}
59/141	. . {of rate of change of torque or torque demand}	59/62	. . Atmospheric pressure
2059/142	. . {of driving resistance calculated from weight, slope, or the like}	59/64	. . Atmospheric temperature
2059/144	. . {characterised by change between positive and negative drive line torque, e.g. torque changes when switching between coasting and acceleration}	59/66	. . Road conditions, e.g. slope, slippery
2059/145	. . {being a function of power demand of auxiliary devices}	2059/663	. . . {Road slope}
2059/147	. . {Transmission input torque, e.g. measured or estimated engine torque}	2059/666	. . . {Determining road conditions by using vehicle location or position, e.g. from global navigation systems [GPS]}
2059/148	. . {Transmission output torque, e.g. measured or estimated torque at output drive shaft}	59/68	. Inputs being a function of gearing status
59/16	. . Dynamometric measurement of torque	2059/6807	. . {Status of gear-change operation, e.g. clutch fully engaged}
59/18	. . dependent on the position of the accelerator pedal	2059/6815	. . {Post shift value of gearing, i.e. calculated or estimated parameters after shift is completed, e.g. estimated output torque after shift is performed}
2059/183	. . . {Rate of change of accelerator position, i.e. pedal or throttle change gradient}	2059/6823	. . {Sensing neutral state of the transmission}
2059/186	. . . {Coasting}	2059/683	. . {Sensing pressure in control systems or in fluid controlled devices, e.g. by pressure sensors (for hydrostatic transmissions <a href="#">F16H 2059/6861</a> )}
59/20	. . . Kickdown	2059/6838	. . {Sensing gearing status of hydrostatic transmissions}
59/22	. . . Idle position	2059/6846	. . . {the flow in hydrostatic transmissions circuits, e.g. high, low or differential pressures}
59/24	. . dependent on the throttle opening	2059/6853	. . . {the state of the transmission units, i.e. motor or pump capacity, e.g. for controlled shifting of range gear}
59/26	. . dependent on pressure	2059/6861	. . . {the pressures, e.g. high, low or differential pressures}
59/28	. . . Gasifier pressure in gas turbines	2059/6869	. . . {the pump speed}
59/30	. . . Intake manifold vacuum	2059/6876	. . . {the motor speed}
59/32	. . . Supercharger pressure in internal combustion engines	2059/6884	. . . {Sensing or calculating the pump torque}
59/34	. . dependent on fuel feed	2059/6892	. . . {Sensing or calculating the motor torque}
59/36	. Inputs being a function of speed	59/70	. . dependent on the ratio established
2059/363	. . {Rate of change of input shaft speed, e.g. of engine or motor shaft}	2059/702	. . . {Rate of change of gear ratio, e.g. for triggering clutch engagement}
2059/366	. . {Engine or motor speed}	2059/704	. . . {Monitoring gear ratio in CVT's}
59/38	. . of gearing elements	2059/706	. . . {Monitoring gear ratio in stepped transmissions, e.g. by calculating the ratio from input and output speed}
2059/385	. . . {Turbine speed}	2059/708	. . . {Sensing reverse gear, e.g. by a reverse gear switch}
59/40	. . . Output shaft speed	59/72	. . dependent on oil characteristics, e.g. temperature, viscosity
2059/405	. . . {Rate of change of output shaft speed or vehicle speed}	2059/725	. . . {Sensing or calculating temperature of friction devices, e.g. clutches to prevent overheating of friction linings}
59/42	. . . Input shaft speed	59/74	. Inputs being a function of engine parameters ( <a href="#">F16H 59/14</a> takes precedence)
2059/425	. . . . {Rate of change of input or turbine shaft speed}	2059/743	. . {using engine performance or power for control of gearing (transmission input torque <a href="#">F16H 2059/147</a> )}
59/44	. . dependent on machine speed of the machine, {e.g. the vehicle}		
2059/443	. . . {Detecting travel direction, e.g. the forward or reverse movement of the vehicle}		
2059/446	. . . {Detecting vehicle stop, i.e. the vehicle is at stand still, e.g. for engaging parking lock}		
59/46	. . dependent on a comparison between speeds		
2059/462	. . . {Detecting synchronisation, i.e. speed difference is approaching zero}		
2059/465	. . . {Detecting slip, e.g. clutch slip ratio}		
2059/467	. . . . {of torque converter}		
59/48	. Inputs being a function of acceleration		

2059/746	. . {Engine running state, e.g. on-off of ignition switch}	2061/0084	. . {Neural networks}
59/76	. . Number of cylinders operating	2061/0087	. . {Adaptive control, e.g. the control parameters adapted by learning}
59/78	. . Temperature	2061/009	. . {using formulas or mathematic relations for calculating parameters}
<b>61/00</b>	<b>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}</b>	2061/0093	. . {using models to estimate the state of the controlled object}
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}	2061/0096	. . {using a parameter map}
61/0006	. . {Special features of electronic control units}	61/02	. characterised by the signals used {(for shift actuators <a href="#">F16H 61/28</a> , for continuously variable gearings <a href="#">F16H 61/66</a> )}
61/0009	. . {Special features of hydraulic control units, e.g. valve plates or valve units}	<b>NOTES</b>	
2061/0012	. {Transmission control for optimising power output of driveline}	1. Control units where gearshift is controlled by an electric circuit, are classified in <a href="#">F16H 61/0202</a>	
2061/0015	. {Transmission control for optimising fuel consumptions}	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 <a href="#">F16H 61/0262</a> with indexing of the electric features	
2061/0018	. {Transmission control for optimising exhaust emissions}	61/0202	. . {the signals being electric ( <a href="#">F16H 61/04</a> takes precedence)}
61/0021	. {Generation or control of line pressure}	61/0204	. . . {for gearshift control, e.g. control functions for performing shifting or generation of shift signal}
61/0025	. . {Supply of control fluid; Pumps therefore}	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 <a href="#">F16H 61/2807</a> )}
61/0028	. . . {using a single pump driven by different power sources}	2061/0209	. . . . . {with independent solenoid valves modulating the pressure individually for each clutch or brake}
61/0031	. . . {using auxiliary pumps, e.g. pump driven by a different power source than the engine}	61/0211	. . . . . {characterised by low integration or small number of valves}
2061/0034	. . {Accumulators for fluid pressure supply; Control thereof}	61/0213	. . . . . {characterised by the method for generating shift signals}
2061/0037	. . {characterised by controlled fluid supply to lubrication circuits of the gearing ( <a href="#">see also lubrication control <a href="#">F16H 57/0446</a></a> )}	2061/0216	. . . . . {Calculation or estimation of post shift values for different gear ratios, e.g. by using engine performance tables}
2061/004	. {Venting trapped air from hydraulic systems ( <a href="#">venting of hydrostatic transmissions <a href="#">F16H 61/4174</a>; deaeration or removal of unsolved gas <a href="#">F15B 21/044</a></a> )}	2061/0218	. . . . . {Calculation or estimation of the available ratio range, i.e. possible gear ratios, e.g. for prompting a driver with a display}
2061/0043	. {Cleaning of hydraulic parts, e.g. removal of an orifice clogging}	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}
2061/0046	. {Details of fluid supply channels, e.g. within shafts, for supplying friction devices or transmission actuators with control fluid}	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}
2061/005	. {Supply of electric power, e.g. batteries for back up supply}	2061/0225	. . . . . {Modifying of shift maps by manual control, e.g. by learning values from the driver during manual shift mode}
2061/0053	. {Initializing the parameters of the controller}	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}
2061/0056	. {Powering down of the controller}	2061/023	. . . . . {Drive-off gear selection, i.e. optimising gear ratio for drive off of a vehicle}
61/0059	. {Braking of gear output shaft using simultaneous engagement of friction devices applied for different gear ratios}	2061/0232	. . . . . {Selecting ratios for bringing engine into a particular state, e.g. for fast warming up or for reducing exhaust emissions}
2061/0062	. {Modifying an existing transmission control from a manufacturer for improvement or adaptation, e.g. by replacing a valve or an electric part}	2061/0234	. . . . . {Adapting the ratios to special vehicle conditions}
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 ( <a href="#">testing of transmissions <a href="#">G01M 13/02</a></a> )}		
2061/0075	. {characterised by a particular control method}		
2061/0078	. . {Linear control, e.g. PID, state feedback or Kalman}		
2061/0081	. . {Fuzzy logic}		

2061/0237	. . . . .	{Selecting ratios for providing engine braking}	2061/0418	. . .	{by using different synchronisation devices simultaneously, e.g. for faster synchronisation}
2061/0239	. . . . .	{Selecting ratios for preventing or cancelling wheel slip}	2061/0422	. . .	{by an electric machine, e.g. by accelerating or braking the input shaft}
2061/0241	. . . . .	{Adapting the ratio to special transmission conditions, e.g. shifts during warming up phase of transmission when fluid viscosity is high}	2061/0425	. . .	{Bridging torque interruption}
2061/0244	. . . . .	{Adapting the automatic ratio to direct driver requests, e.g. manual shift signals or kick down}	2061/0429	. . .	{by torque supply with a clutch in parallel torque path}
61/0246	. . . .	{characterised by initiating reverse gearshift}	2061/0433	. . .	{by torque supply with an electric motor}
61/0248	. . .	{Control units where shifting is directly initiated by the driver, e.g. semi-automatic transmissions (generation of movements for final actuating mechanisms <a href="#">F16H 61/28</a> )}	61/0437	. . .	{by using electrical signals ( <a href="#">F16H 61/0403</a> and <a href="#">F16H 61/061</a> take precedence)}
61/0251	. . .	{Elements specially adapted for electric control units, e.g. valves for converting electrical signals to fluid signals}	2061/044	. . .	{when a freewheel device is disengaged or bridged}
2061/0253	. . . .	{Details of electro hydraulic valves, e.g. lands, ports, spools or springs}	2061/0444	. . .	{during fast shifting over two gearsteps, e.g. jumping from fourth to second gear}
2061/0255	. . . .	{Solenoid valve using PWM or duty-cycle control}	2061/0448	. . .	{using a particular sequence of gear ratios or friction members}
2061/0258	. . . .	{Proportional solenoid valve}	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}
2061/026	. . . .	{On-off solenoid valve}	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 <a href="#">F16H 2061/0451</a> )}
61/0262	. . .	{the signals being hydraulic ( <a href="#">F16H 61/04</a> takes precedence)}	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}
61/0265	. . .	{for gearshift control, e.g. control functions for performing shifting or generation of shift signals}	2061/0462	. . .	{by controlling slip rate during gear shift transition}
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 <a href="#">F16H 61/30</a> )}	2061/0466	. . .	{Smoothing shift shock by apply or release of band brake servos, e.g. overlap control of band brake and a clutch or <i>vice versa</i> }
61/0269	. . . . .	{characterised by low integration or small number of valves}	2061/047	. . .	{by preventing or solving a tooth but situation upon engagement failure due to misalignment of teeth}
61/0272	. . . .	{characterised by initiating reverse gearshift}	2061/0474	. . .	{by smoothing engagement of positive clutches; Methods or means for shock free engagement of dog clutches (for tooth but situations <a href="#">F16H 2061/047</a> )}
61/0274	. . .	{Control units where shifting is directly initiated by the driver, e.g. semi-automatic transmissions (generation of movements for final actuating mechanisms <a href="#">F16H 61/28</a> )}	2061/0477	. . .	{by suppression of excessive engine flare or turbine racing during shift transition (engine flare caused by lock-up release <a href="#">F16H 61/143</a> )}
61/0276	. . .	{Elements specially adapted for hydraulic control units, e.g. valves}	2061/0481	. . .	{during range shift from drive (D) or reverse (R) to neutral (N)}
2061/0279	. . . .	{Details of hydraulic valves, e.g. lands, ports, spools or springs}	2061/0485	. . .	{during range shift from neutral (N) to reverse (R)}
2061/0281	. . . .	{Rotary shift valves, e.g. with a rotary moveable spool for supply of fluid to different channels}	2061/0488	. . .	{during range shift from neutral (N) to drive (D)}
61/0283	. . . .	{Governor valves}	2061/0492	. . .	{for high engine torque, e.g. during acceleration or uphill driving}
61/0286	. . . .	{Manual valves}	2061/0496	. . .	{for low engine torque, e.g. during coasting, sailing or engine braking}
2061/0288	. . . .	{Relay valve, e.g. valve arranged between shift valve and servo}	61/06	. . .	by controlling rate of change of fluid pressure
61/029	. . . .	{Throttle valves}	61/061	. . .	{using electric control means}
61/0293	. . .	{the signals being purely mechanical}	2061/062	. . . .	{for controlling filling of clutches or brake servos, e.g. fill time, fill level or pressure during filling}
61/0295	. . .	{Automatic gear shift control, e.g. initiating shift by centrifugal forces}	2061/064	. . . .	{for calibration of pressure levels for friction members, e.g. by monitoring the speed change of transmission shafts}
61/0297	. . .	{Gear shift control where shifting is directly initiated by the driver, e.g. semi-automatic transmissions}	61/065	. . .	{using fluid control means}
61/04	. . .	Smoothing ratio shift	61/067	. . . .	{using an accumulator}
61/0403	. . .	{Synchronisation before shifting}	61/068	. . . .	{using an orifice control valve ( <a href="#">F16H 61/067</a> takes precedence)}
2061/0407	. . .	{by control of clutch in parallel torque path}			
2061/0411	. . .	{by control of shaft brakes}			
2061/0414	. . .	{by retarder control}			



- 61/08 . . Timing control
  - 2061/085 . . . {Timing of auxilliary gear shifts}
  - 61/10 . Controlling shift hysteresis
  - 61/12 . Detecting malfunction or potential malfunction, e.g. fail safe ([in control of hydrostatic gearing F16H 61/4192](#)); {Circumventing or fixing failures}
  - 2061/1204 . . {for malfunction caused by simultaneous engagement of different ratios resulting in transmission lock state or tie-up condition ([lock state for braking F16H 61/0059](#))}
  - 2061/1208 . . {with diagnostic check cycles; Monitoring of failures}
  - 2061/1212 . . . {Plausibility checks; Counting means for repeated failures}
  - 2061/1216 . . . {Display or indication of detected failures}
  - 2061/122 . . {Avoiding failures by using redundant parts}
  - 2061/1224 . . {Adapting to failures or work around with other constraints, e.g. circumvention by avoiding use of failed parts}
  - 2061/1228 . . {Fixing failures by repairing failed parts, e.g. loosening a sticking valve}
  - 2061/1232 . . {Bringing the control into a predefined state, e.g. giving priority to particular actuators or gear ratios}
  - 2061/1236 . . . {using fail priority valves}
  - 2061/124 . . {Limiting the input power, torque or speed}
  - 2061/1244 . . {Keeping the current state}
  - 2061/1248 . . {Resuming normal operation}
  - 2061/1252 . . {Fail safe valves ([fail priority valves F16H 2061/1236](#))}
  - 2061/1256 . . {characterised by the parts or units where malfunctioning was assumed or detected}
  - 2061/126 . . . {the failing part is the controller}
  - 2061/1264 . . . . {Hydraulic parts of the controller, e.g. a sticking valve or clogged channel}
  - 2061/1268 . . . . {Electric parts of the controller, e.g. a defect solenoid, wiring or microprocessor}
  - 2061/1272 . . . {the failing part is a part of the final output mechanism, e.g. shift rods or forks}
  - 2061/1276 . . . {the failing part is a friction device, e.g. clutches or brakes}
  - 2061/128 . . . . {the main clutch}
  - 2061/1284 . . . {the failing part is a sensor}
  - 2061/1288 . . . {the failing part is an actuator}
  - 2061/1292 . . . {the failing part is the power supply, e.g. the electric power supply}
  - 2061/1296 . . . {the failing part is an electric machine forming part of the transmission}
  - 61/14 . Control of torque converter lock-up clutches
  - 61/141 . . {using means only actuated by centrifugal force}
  - 61/142 . . . {the means being hydraulic valves}
  - 61/143 . . {using electric control means}
  - 2061/145 . . . {for controlling slip, e.g. approaching target slip value}
  - 2061/146 . . . {for smoothing gear shift shock}
  - 2061/147 . . . {during engine braking, e.g. to attenuate gear clunk when torque direction is changed}
  - 61/148 . . {using mechanical control means}
  - 61/16 . 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](#))}
  - 2061/161 . . {by checking feasibility of shifts, i.e. determine if requested shift can be successfully completed and post shift values are in an acceptable range}
  - 2061/163 . . {Holding the gear for delaying gear shifts under unfavorable conditions, e.g. during cornering}
  - 2061/165 . . {Preventing reverse gear shifts if vehicle speed is too high for safe shifting}
  - 2061/166 . . {Preventing or initiating shifts for preventing stall or overspeed of engine}
  - 2061/168 . . {Forced shifts into neutral for safety reasons, e.g. in case of transmission failure or emergency braking}
  - 61/18 . Preventing unintentional or unsafe shift, {e.g. preventing manual shift from highest gear to reverse gear}
  - 2061/185 . . {Means, e.g. catches or interlocks, for preventing unintended shift into reverse gear}
  - 61/20 . Preventing gear creeping; {Transmission control during standstill, e.g. hill hold control}
  - 2061/202 . . {Active creep control for slow driving, e.g. by controlling clutch slip}
  - 2061/205 . . {Hill hold control, e.g. with torque converter or an friction device slightly engaged to keep vehicle stationary}
  - 2061/207 . . {by neutral control}
  - 61/21 . Providing engine brake control
  - 2061/213 . . {for emergency braking, e.g. for increasing brake power in emergency situations}
  - 2061/216 . . {by using exhaust brakes}
  - 61/22 . 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}](#))
  - 2061/223 . . {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}
  - 2061/226 . . {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](#))}
  - 61/24 . Providing feel, e.g. to enable selection
  - 2061/241 . . {Actuators providing feel or simulating a shift gate, i.e. with active force generation for providing counter forces for feed back}
  - 2061/242 . . {Mechanical shift gates or similar guiding means during selection and shifting}
  - 2061/243 . . {Cams or detent arrays for guiding and providing feel}
  - 2061/245 . . {Ramp contours for generating force threshold, e.g. cams or pushers for generating additional resistance for a reverse path}
  - 2061/246 . . {Additional mass or weight on shift linkage for improving feel}
  - 2061/247 . . {Detents for range selectors}
  - 2061/248 . . {with audible signals for providing selection or shift feed back}
  - 61/26 . Generation or transmission of movements for final actuating mechanisms
- NOTES**
1. The generation or transmission of movements comprising only the selector apparatus, is classified in group [F16H 59/00](#).

## F16H 61/26

(continued)

2. The generation or transmission of movements, when part of the final output mechanisms, is classified in group [F16H 63/00](#).
- 61/28 . . with at least one movement of the final actuating mechanism being caused by a non-mechanical force, e.g. power-assisted
- 61/2807 . . . {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](#))}
- 61/2815 . . . . {with a control using only relays and switches}
- 2061/2823 . . . {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}
- 2061/283 . . . {Adjustment or calibration of actuator positions, e.g. neutral position}
- 2061/2838 . . . {Arrangements with single drive motor for selecting and shifting movements, i.e. one motor used for generating both movements}
- 2061/2846 . . . {Arrangements of actuators for enabling jump shifting for skipping of gear ratios}
- 2061/2853 . . . {Electromagnetic solenoids}
- 2061/2861 . . . {Linear motors}
- 2061/2869 . . . {Cam or crank gearing}
- 2061/2876 . . . {Racks}
- 2061/2884 . . . {Screw-nut devices}
- 2061/2892 . . . {other gears, e.g. worm gears, for transmitting rotary motion to the output mechanism}
- 61/30 . . . Hydraulic {or pneumatic} motors {or related fluid control means} therefor
- 2061/301 . . . . {for power assistance, i.e. servos with follow up action}
- 2061/302 . . . . . {with variable force amplification, e.g. force is depending on selected gear or on actuator force (non-linear amplification)}
- 2061/304 . . . . {using telemotors, i.e. systems with master cylinder and linked shift actuator without external pressure source}
- 2061/305 . . . . {Accumulators for fluid supply to the servo motors, or control thereof}
- 2061/307 . . . . {Actuators with three defined positions, i.e. three position servos}
- 2061/308 . . . . {Modular hydraulic shift units, i.e. preassembled actuator units for select and shift movements adapted for being mounted on transmission casing}
- 61/32 . . . Electric motors {actuators or related electrical control means} therefor
- 2061/323 . . . . {for power assistance, i.e. servos with follow up action}
- 2061/326 . . . . {Actuators for range selection, i.e. actuators for controlling the range selector or the manual range valve in the transmission}
- 61/34 . . comprising two mechanisms, one for the preselection movement, and one for the shifting movement ([F16H 61/36](#) takes precedence)
- 61/36 . . with at least one movement being transmitted by a cable
- 61/38 . Control of exclusively fluid gearing
- 61/40 . . hydrostatic ([involving modification of the gearing](#) [F16H 39/02](#), [F16H 39/04](#))
- 61/4008 . . . Control of circuit pressure
- 61/4017 . . . . Control of high pressure, e.g. avoiding excess pressure by a relief valve
- 61/4026 . . . . Control of low pressure
- 61/4035 . . . Control of circuit flow
- 61/4043 . . . Control of a bypass valve
- 61/4052 . . . . by using a variable restriction, e.g. an orifice valve
- 61/4061 . . . 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](#))
- 61/4069 . . . Valves related to the control of neutral, e.g. shut off valves ([zero tilt rotation holding means](#) [F16H 61/439](#))
- 61/4078 . . . Fluid exchange between hydrostatic circuits and external sources or consumers
- 61/4096 . . . . with pressure accumulators
- 61/4104 . . . . Flushing, e.g. by using flushing valves or by connection to exhaust
- 61/4131 . . . . Fluid exchange by aspiration from reservoirs, e.g. sump
- 61/4139 . . . . Replenishing or scavenging pumps, e.g. auxiliary charge pumps
- 61/4148 . . . Open loop circuits
- 61/4157 . . . Control of braking, e.g. preventing pump over-speeding when motor acts as a pump
- 61/4165 . . . Control of cooling or lubricating
- 61/4174 . . . Control of venting, e.g. removing trapped air
- 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 ( <a href="#">hydrostatic differentials F16H 48/18</a> )	2061/6616	. . . .	{the shifting of the transmission being manually controlled}
61/46	. . .	Automatic regulation in accordance with output requirements	2061/6617	. . .	{Manual control of CVTs while continuously varying the ratio}
61/461	. . . .	{not involving a variation of the output capacity of the main pumps or motors}	2061/6618	. . .	{Protecting CVTs against overload by limiting clutch capacity, e.g. torque fuse}
61/462	. . . .	for achieving a target speed ratio	61/662	. .	with endless flexible means
61/465	. . . .	for achieving a target input speed	2061/66204	. . .	{Control for modifying the ratio control characteristic}
61/468	. . . .	for achieving a target input torque	2061/66209	. . . .	{dependent on ambient conditions}
61/47	. . . .	for achieving a target output speed	2061/66213	. . . .	{dependent on driver's choice}
61/472	. . . .	for achieving a target output torque	2061/66218	. . . .	{dependent on control input parameters other than ambient conditions or driver's choice}
61/475	. . . .	for achieving a target power, e.g. input power or output power	2061/66222	. . . .	{the ratio is varied in order to reduce surface wear of belt or pulley}
61/478	. . . .	for preventing overload, e.g. high pressure limitation	61/66227	. . .	{controlling shifting exclusively as a function of speed and torque}
61/48	. .	hydrodynamic	61/66231	. . .	{controlling shifting exclusively as a function of speed}
61/50	. . .	controlled by changing the flow, force, or reaction of the liquid in the working circuit, while maintaining a completely filled working circuit	61/66236	. . . .	{using electrical or electronical sensing or control means}
61/52	. . . .	by altering the position of blades	61/6624	. . . .	{using only hydraulical and mechanical sensing or control means}
61/54	. . . . .	by means of axially-shiftable blade runners	61/66245	. . . .	{using purely mechanical sensing or control means}
61/56	. . . . .	to change the blade angle	61/6625	. . .	{controlling shifting exclusively as a function of torque}
61/58	. . . .	by change of the mechanical connection of, or between, the runners	61/66254	. . .	{controlling of shifting being influenced by a signal derived from the engine and the main coupling}
61/60	. . . . .	exclusively by the use of freewheel clutches	61/66259	. . . .	{using electrical or electronical sensing or control means}
61/62	. . . . .	involving use of a speed-changing gearing or of a clutch in the connection between runners ( <a href="#">F16H 45/02</a> , <a href="#">F16H 61/60</a> take precedence)	61/66263	. . . .	{using only hydraulical and mechanical sensing or control means}
61/64	. . .	controlled by changing the amount of liquid in the working circuit	61/66268	. . . .	{using purely mechanical sensing or control means}
61/66	. .	specially adapted for continuously variable gearings ( <a href="#">F16H 61/38</a> takes precedence)	61/66272	. . .	{characterised by means for controlling the torque transmitting capability of the gearing}
2061/6601	. .	{with arrangements for dividing torque and shifting between different ranges}	2061/66277	. . . .	{by optimising the clamping force exerted on the endless flexible member}
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}	2061/66281	. . . .	{by increasing the line pressure at the occurrence of input torque peak}
2061/6603	. . .	{characterised by changing ratio in the mechanical gearing}	2061/66286	. . .	{Control for optimising pump efficiency}
2061/6604	. .	{Special control features generally applicable to continuously variable gearings}	2061/6629	. . .	{Detection of slip for determining level of wear}
2061/6605	. . .	{Control for completing downshift at hard braking}	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}
2061/6607	. . .	{Controls concerning lubrication or cooling ( <a href="#">lubrication features of friction gearings F16H 57/0487</a> )}	61/664	. .	Friction gearings
2061/6608	. . .	{Control of clutches, or brakes for forward-reverse shift}	2061/6641	. . .	{Control for modifying the ratio control characteristic}
2061/6609	. . .	{Control of clutches or brakes in torque split transmissions}	2061/6642	. . . .	{dependent on ambient conditions}
2061/661	. . . .	{Conjoint control of CVT and drive clutch}	2061/6643	. . . .	{dependent on driver's choice}
2061/6611	. . .	{Control to achieve a particular driver perception, e.g. for generating a shift shock sensation}	2061/6644	. . . .	{dependent on control input parameters other than ambient conditions or driver's choice}
2061/6612	. . . .	{for engine braking}	61/6645	. . .	{controlling shifting exclusively as a function of speed and torque}
2061/6614	. . .	{Control of ratio during dual or multiple pass shifting for enlarged ration coverage}	61/6646	. . .	{controlling shifting exclusively as a function of speed}
2061/6615	. . .	{Imitating a stepped transmissions}	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}	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}
61/6649	. . . {characterised by the means for controlling the torque transmitting capability of the gearing}	63/206	. . . . {the final output mechanisms being mounted coaxially on a single shaft, e.g. mono rail shift mechanism}
61/68	. specially adapted for stepped gearings	2063/208	. . . . {using two or more selecting fingers}
61/682	. . with interruption of drive	63/22	. . . . the final output mechanisms being simultaneously moved by the final actuating mechanism
61/684	. . without interruption of drive	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)}
61/686	. . . with orbital gears	63/26	. . . some of the movements of the final output mechanisms being caused by another final output mechanism
61/688	. . . with two inputs, e.g. selection of one of two torque-flow paths by clutches	63/28	. . two or more final actuating mechanisms moving the same final output mechanism {(Constructional features of the final output mechanisms F16H 63/30)}
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	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}
61/702	. . {using electric or electrohydraulic control means}	63/30	. . Constructional features of the final output mechanisms
61/705	. . {using hydraulic and mechanical control means}	63/3003	. . . {Band brake actuating mechanisms}
61/707	. . {using only mechanical control means}	2063/3006	. . . . {moved by a non-mechanical force}
<b>63/00</b>	<b>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}</b>	63/3009	. . . {the final output mechanisms having elements remote from the gearbox}
2063/005	. {Preassembled gear shift units for mounting on gear case (for hydraulic shift units F16H 2061/308)}	63/3013	. . . {the final output mechanism being characterised by linkages converting movement, e.g. into opposite direction by a pivoting lever linking two shift rods}
63/02	. Final output mechanisms therefor; Actuating means for the final output mechanisms	63/3016	. . . {Final output mechanisms varying the leverage or force ratio}
2063/025	. . {Final output mechanisms for double clutch transmissions}	63/302	. . . {Final output mechanisms for reversing}
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)}	63/3023	. . . {the final output mechanisms comprising elements moved by fluid pressure (band brake actuating mechanisms F16H 63/3003)}
63/06	. . . the final output mechanism having an indefinite number of positions	63/3026	. . . . {comprising friction clutches or brakes (band brake actuating mechanisms F16H 63/3003)}
63/062	. . . . {electric or electro-mechanical actuating means}	2063/303	. . . . . {the friction member is actuated and released by applying pressure to different fluid chambers}
63/065	. . . . {hydraulic actuating means}	2063/3033	. . . . . {the brake is actuated by springs and released by a fluid pressure}
63/067	. . . . {mechanical actuating means}	2063/3036	. . . . . {the clutch is actuated by springs and released by a fluid pressure}
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)}	63/304	. . . {the final output mechanisms comprising elements moved by electrical or magnetic force (band brake actuating mechanisms F16H 63/3003)}
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	63/3043	. . . . {comprising friction clutches or brakes}
63/12	. . . . two or more ways of movement occurring simultaneously	2063/3046	. . . . {using electromagnetic clutch for coupling gear wheel to shaft (friction clutches F16H 63/3043)}
63/14	. . . the final output mechanisms being successively actuated by repeated movement of the final actuating mechanism	2063/305	. . . . {using electromagnetic solenoids}
63/16	. . . the final output mechanisms being successively actuated by progressive movement of the final actuating mechanism	2063/3053	. . . . {using linear motors}
63/18	. . . . the final actuating mechanism comprising cams	2063/3056	. . . . {using cam or crank gearing}
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	2063/3059	. . . . {using racks}
2063/202	. . . . {using cam plates for selection or shifting, e.g. shift plates with recesses or grooves moved by a selector extension}	2063/3063	. . . . {using screw devices}
		2063/3066	. . . . {using worm gears}



63/3069	. . . {Interrelationship between two or more final output mechanisms ( <a href="#">interlocking devices F16H 63/36</a> )}	2063/423	. . . {Range indicators for automatic transmissions, e.g. showing selected range or mode}
2063/3073	. . . {final output mechanisms mounted on a single shaft}	2063/426	. . . {with means for advising the driver for proper shift action, e.g. prompting the driver with allowable selection range of ratios}
2063/3076	. . . {Selector shaft assembly, e.g. supporting, assembly or manufacturing of selector or shift shafts; Special details thereof}	63/44	. . Signals to the control unit of auxiliary gearing
2063/3079	. . . {Shift rod assembly, e.g. supporting, assembly or manufacturing of shift rails or rods; Special details thereof}	63/46	. . Signals to a clutch outside the gearbox
2063/3083	. . . {Shift finger arrangements, e.g. shape or attachment of shift fingers}	63/48	. . Signals to a parking brake {or parking lock; Control of parking locks or brakes being part of the transmission}
2063/3086	. . . {Shift head arrangements, e.g. forms or arrangements of shift heads for preselection or shifting}	63/483	. . . {Circuits for controlling engagement of parking locks or brakes}
2063/3089	. . . {Spring assisted shift, e.g. springs for accumulating energy of shift movement and release it when clutch teeth are aligned}	63/486	. . . {Common control of parking locks or brakes in the transmission and other parking brakes, e.g. wheel brakes}
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 ( <a href="#">fluid actuated clutches F16H 63/3026</a> ; <a href="#">electromagnetic clutches F16H 2063/3046</a> )}	63/50	. . Signals to an engine or motor
2063/3096	. . . {Sliding keys as final output elements; Details thereof}	63/502	. . . {for smoothing gear shifts}
63/32	. . . Gear shift yokes, {e.g. shift forks}	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}
2063/321	. . . {characterised by the interface between fork body and shift rod, e.g. fixing means, bushes, cams or pins}	2063/506	. . . {for engine torque resume after shift transition, e.g. a resume adapted to the driving style}
2063/322	. . . {characterised by catches or notches for moving the fork}	2063/508	. . . {for limiting transmission input torque, e.g. to prevent damage of transmission parts}
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}		
63/34	. . . Locking or disabling mechanisms		
63/3408	. . . {the locking mechanism being moved by the final actuating mechanism}		
63/3416	. . . {Parking lock mechanisms or brakes in the transmission}		
63/3425	. . . {characterised by pawls or wheels}		
63/3433	. . . {Details of latch mechanisms, e.g. for keeping pawls out of engagement}		
63/3441	. . . {Parking locks engaging axially}		
63/345	. . . {using friction brakes, e.g. a band brakes}		
63/3458	. . . {with electric actuating means, e.g. shift by wire}		
63/3466	. . . {using electric motors}		
63/3475	. . . {using solenoids}		
63/3483	. . . {with hydraulic actuating means}		
63/3491	. . . {Emergency release or engagement of parking locks or brakes}		
63/36	. . . Interlocking devices		
63/38	. . . Detents ( <a href="#">spring-loaded ball units for holding levers in a limited number of positions G05G 5/065</a> )}		
63/40	. . comprising signals other than signals for actuating the final output mechanisms		
63/42	. . Ratio indicator devices		
		<b>2200/00</b>	<b>Transmissions for multiple ratios</b>
		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
		2200/003	. . 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	2306/24	. Interruption of shift, e.g. if new shift is initiated during ongoing previous shift
2200/2023	. . . using a Ravigneaux set with 4 connections	2306/30	. characterised by the way or trajectory to a new ratio, e.g. by performing shift according to a particular algorithm or function ( <a href="#">determining the way or trajectory to a new ratio F16H 2302/00</a> )
2200/2025	. . . using a Ravigneaux set with 5 connections	2306/32	. Preparing the opening or release of the torque transmitting element
2200/2028	. . . using a Ravigneaux set with 6 connections	2306/36	. Filling the dead volume of actuators ( <a href="#">controlling filling of clutches or brake servos F16H 61/62</a> )
2200/203	. . characterised by the engaging friction means not of the freewheel type, e.g. friction clutches or brakes	2306/40	. Shifting activities
2200/2033	. . . with one engaging means	2306/42	. . Changing the input torque to the transmission
2200/2035	. . . with two engaging means	2306/44	. . Removing torque from current gears
2200/2038	. . . with three engaging means	2306/46	. . Uncoupling of current gear
2200/2041	. . . with four engaging means	2306/48	. . Synchronising of new gear
2200/2043	. . . with five engaging means	2306/50	. . Coupling of new gear
2200/2046	. . . with six engaging means	2306/52	. . Applying torque to new gears
2200/2048	. . . with seven engaging means	2306/54	. . Synchronizing engine speed to transmission input speed
2200/2051	. . . with eight engaging means		
2200/2053	. . . with nine engaging means	<b>2312/00</b>	<b>Driving activities</b>
2200/2056	. . . with ten engaging means	2312/02	. Driving off
2200/2058	. . . with eleven engaging means	2312/022	. . Preparing to drive off
2200/2061	. . . with twelve engaging means	2312/04	. Holding or hillholding
2200/2064	. . . using at least one positive clutch, e.g. dog clutch	2312/06	. Creeping
2200/2066	. . . using one freewheel mechanism	2312/08	. Rocking
2200/2069	. . . using two freewheel mechanism	2312/09	. Switching between forward and reverse ( <a href="#">rocking F16H 2312/08</a> )
2200/2071	. . . using three freewheel mechanism	2312/10	. Inching
2200/2074	. . . using four freewheel mechanism	2312/12	. Parking
2200/2076	. . . using at least five freewheel mechanism	2312/14	. Going to, or coming from standby operation, e.g. for engine start-stop operation at traffic lights
2200/2079	. . using freewheel type mechanisms, e.g. freewheel clutches	2312/16	. Coming to a halt
2200/2082	. . . one freewheel mechanisms	2312/18	. Strong or emergency braking
2200/2084	. . . two freewheel mechanisms	2312/20	. Start-up or shut-down
2200/2087	. . . three freewheel mechanisms		
2200/2089	. . . four freewheel mechanisms	<b>2342/00</b>	<b>Calibrating</b>
2200/2092	. . . at least five freewheel mechanisms	2342/02	. Calibrating shift or range movements
2200/2094	. . using positive clutches, e.g. dog clutches	2342/04	. Calibrating engagement of friction elements
2200/2097	. . comprising an orbital gear set member permanently connected to the housing, e.g. a sun wheel permanently connected to the housing	2342/042	. . Point of engagement
		2342/044	. . Torque transmitting capability
<b>2300/00</b>	<b>Determining of new ratio</b>	2342/06	. Determining which part to calibrate or timing of calibrations
2300/02	. Computing a new ratio	2342/10	. Calibrating valves
2300/14	. Selecting a state of operation, e.g. depending on two wheel or four wheel drive mode		
2300/18	. Determining the range	<b>2700/00</b>	<b>Transmission housings and mounting of transmission components therein; Cooling; Lubrification; Flexible suspensions, e.g. floating frames</b>
<b>2302/00</b>	<b>Determining the way or trajectory to new ratio, e.g. by determining speed, torque or time parameters for shift transition</b>	2700/02	. Transmissions, specially for working vehicles
2302/02	. Optimizing the way to the new ratio	2700/04	. . Starting devices or devices to start turning of shafts
2302/04	. Determining a modus for shifting ( <a href="#">selection of shift speed modus F16H 2059/0226</a> )	2700/06	. Protections for shifting mechanical transmissions
2302/06	. Determining timing parameters of shifting, e.g. start of shifting ( <a href="#">for smoothing gear shift F16H 61/08</a> )		
<b>2306/00</b>	<b>Shifting</b>	<b>2702/00</b>	<b>Combinations of two or more transmissions</b>
2306/14	. Skipping gear shift ( <a href="#">for smoothing gear shift F16H 2061/0444</a> )	2702/02	. Mechanical transmissions with planetary gearing combined with one or more other mechanical transmissions
2306/18	. Preparing coupling or engaging of future gear	2702/04	. . Combinations of a speed-change mechanism without planetary gearing with a differential for driving a vehicle drive axle
2306/20	. Timing of gear shifts ( <a href="#">for smoothing gear shift F16H 61/08</a> )	2702/06	. Combinations of transmissions with parallel force splitting paths having same output
2306/21	. . for auxiliary gear shifts ( <a href="#">for smoothing auxiliary gear shifts F16H 2061/085</a> )		
2306/22	. Swap shifting ( <a href="#">for smoothing gear shift F16H 2061/0451</a> )		

<b>2704/00</b>	<b>Control mechanisms and elements applying a mechanical movement</b>	<b>2714/00</b>	<b>Different types speed-changing mechanisms for toothed gearing</b>
2704/02	• Speed-change devices wherein the control lever actuates directly sliding gears pivoting around two non-parallel axis	2714/02	• only with toothed wheels remaining engaged
2704/04	• Speed-change devices with an intermediary mechanism placed between control member and actuator	2714/04	• with specially adapted devices
<b>2706/00</b>	<b>Rotary transmissions with mechanical energy accumulation and recovery without means for automatic selfregulation essentially based on spring action or inertia</b>	<b>2716/00</b>	<b>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</b>
<b>2708/00</b>	<b>Control devices for speed-changing geared mechanisms, e.g. specially adapted couplings for synchronising devices, devices to simplify control, control of auxiliary gearboxes</b>	2716/02	• the control being mechanical
2708/02	• only the toothed wheels remain engaged	2716/04	• the control being hydraulic or pneumatic
2708/04	• . the control being mechanical	2716/06	• . Circuits thereof
2708/06	• . the control being hydraulic or pneumatic	2716/08	• the control being electric
2708/08	• . the control being electric	2716/10	• only the toothed wheels may be disengaged, the control being mechanical
2708/10	• only the toothed wheels may be disengaged	2716/12	• with preselection system, mainly semi-automatic, e.g. with automatic preselection, but controlled at the intended moment, with force amplification
2708/12	• . the control being mechanical	2716/14	• . only with toothed wheels remaining engaged
2708/14	• . the control being hydraulic or pneumatic	<b>2718/00</b>	<b>Mechanisms for speed-change of planetary gearing, the speed change control being dependent on function parameters of the gearing</b>
2708/16	• wherein the gearing is not described or not essential	2718/02	• Control dependent on speed and torque, wherein only the toothed wheels remain engaged
2708/18	• . the control being mechanical	2718/04	• . the control being mechanical
2708/20	• . the control being hydraulic or pneumatic	2718/06	• . the control being hydraulic or pneumatic
2708/22	• . the control being electric	2718/08	• Control dependent on speed
2708/24	• with a preselection system, mainly semi-automatic, e.g. with automatic preselection, but controlled at the intended moment, with force amplification	2718/10	• . only the toothed wheels remain engaged
2708/26	• . only the toothed wheels remain engaged	2718/12	• . . the control being mechanical
2708/28	• . only the toothed wheels may be disengaged	2718/14	• . . the control being hydraulic or pneumatic
<b>2710/00</b>	<b>Control devices for speed-change mechanisms, the speed change control is dependent on function parameters of the gearing</b>	2718/16	• . . the control being electric
2710/02	• Control dependent on speed and torque, wherein only the toothed wheels remain engaged, control being mechanical	2718/18	• Control dependent on torque
2710/04	• Control dependent on speed	2718/20	• . only the toothed wheels remain engaged
2710/06	• . only the toothed wheels remain engaged	2718/22	• . . the control being mechanical
2710/08	• . . the control being mechanical	2718/24	• . . the control being hydraulic or pneumatic
2710/10	• . . the control being hydraulic or pneumatic	2718/26	• . . the control being electric
2710/12	• . . the control being electric	<b>2720/00</b>	<b>Different types of speed-change gear mechanisms</b>
2710/14	• Control dependent on speed, wherein only the toothed wheels may be disengaged, control being mechanical	2720/02	• Gears with a non-circular rolling curve or gears with special teeth
2710/16	• the gearing is not described or not essential	2720/04	• Combining a planetary speed-change gearing with a motor vehicle drive axle differential
2710/18	• . the control being mechanical		
2710/20	• . the control being hydraulic or pneumatic		
2710/22	• . the control being electric		
2710/24	• Control dependent on torque		
2710/26	• . wherein only the toothed wheels remain engaged, the control being mechanical		
<b>2712/00</b>	<b>Mechanisms for changing direction</b>		
2712/02	• Automatic control, e.g. for an alternating movement		
2712/04	• the control being hydraulic or pneumatic		
2712/06	• only with toothed wheels or friction wheels		
2712/08	• . only the toothed wheels may be disengaged		
2712/10	• . with a combination of engaged and disengageable toothed wheels		