### CPC - COOPERATIVE PATENT CLASSIFICATION

**F** MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

*NOTE* omitted

**ENGINES OR PUMPS**

**F01** MACHINES OR ENGINES IN GENERAL; ENGINE PLANTS IN GENERAL; STEAM ENGINES

**F01L** CYCLICALLY OPERATING VALVES FOR MACHINES OR ENGINES (valves in general F16K)

### NOTES

1. Groups **F01L 1/00** - **F01L 13/00** cover only valve-gear or valve arrangements without provision for variable fluid distribution.
2. Valve gear or valve arrangements specially adapted for steam engines are covered by groups **F01L 15/00** - **F01L 35/00**.
3. Valve-gear arrangements specially adapted for machines or engines with variable working-fluid distribution are covered by groups **F01L 15/00** - **F01L 35/00**.
4. Attention is drawn to the notes preceding class F01, especially Note (3).
5. As regards the above-mentioned Note (3), attention is drawn to **F01B 3/10**, **F01B 15/06**, **F01C 21/18**, **F02B 53/06**, **F03C 1/08**, **F04B 1/18**, **F04B 7/00**, **F04B 39/08**, **F04B 39/10**, and **F04C 15/06**, **F04C 29/12**.

### WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
   - **F01L 31/20** covered by **F01L 31/08** - **F01L 31/18**
   - **F01L 31/22** covered by **F01L 31/08** - **F01L 31/18**
   - **F01L 31/24** covered by **F01L 31/08** - **F01L 31/18**

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

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### Valve-gear for internal combustion piston engines or for other machines or engines with positive working-fluid displacement

| 1/00 | Valve-gear or valve arrangements, e.g. lift-valve gear ([lift-valve and valve-seat assemblies per se](F01L 3/00): slide-valve gear F01L 5/00); actuated non-mechanically F01L 9/00; valve arrangements in working piston or piston rod F01L 11/00; modifications of valve-gear to facilitate reversing, braking, starting, changing compression ratio, or other specific operations F01L 13/00)
| 1/02 | Valve drive (transmitting-gear between valve drive and valve F01L 1/12)
| 1/02 | (Chain drive)
| 1/04 | (Belt drive)
| 1/06 | (Gear drive)
| 2001/028 | (Pre-assembled timing arrangement, e.g. located in a cassette)
| 1/04 | by means of cams, camshafts, cam discs, eccentrics or the like (F01L 1/10 takes precedence)
| 1/02 | (Cam discs)
| 1/04 | (Reciprocating cams)
| 1/06 | Camshafts
| 2001/0471 | (Assembled camshafts)

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### Valve-gear for internal combustion piston engines or for other machines or engines with positive working-fluid displacement

| 2001/0473 | . . . . [Composite camshafts, e.g. with cams or cam sleeve being able to move relative to the inner camshaft or a cam adjusting rod]
| 2001/0475 | . . . . [Hollow camshafts (F01L 2001/0473 takes precedence)]
| 2001/0476 | . . . . [Camshaft bearings]
| 2001/0478 | . . . . [Torque pulse compensated camshafts]
| 1/053 | . . . . overhead type
| 1/0532 | . . . . [the cams being directly in contact with the driven valve]
| 2001/0535 | . . . . [Single overhead camshafts [SOHC]]
| 2001/0537 | . . . . [Double overhead camshafts [DOHC]]
| 2001/054 | . . . . [Camshafts in cylinder block]
| 1/06 | . . . . the cams, or the like, rotating at a higher speed than that corresponding to the valve cycle, e.g. operating four-stroke engine valves directly from crankshaft
| 1/08 | . . . . Shape of cams
| 1/10 | . . . . by means of crank-or eccentric-driven rods ([F01L 1/044 takes precedence])
| 1/12 | . . . . Transmitting gear between valve drive and valve (simultaneously operating two or more valves F01L 1/26)
| 1/14 | . . . . Tappets (hydraulic tappets for automatically adjusting or compensating clearance F01L 1/24); Push rods
| 1/143 | . . . . [for use with overhead camshafts]
| 1/146 | . . . . [Push-rods]
| 1/16 | . . . . Silencing impact; Reducing wear
Valve-gear for internal combustion piston engines or for other machines or engines with positive working-fluid...

1/18 . . . Rocking arms or levers
1/181 . . . [Centre pivot rocking arms]
1/182 . . . [the rocking arm being pivoted about an individual fulcrum, i.e. not about a common shaft]
1/183 . . . . . . [of the boat type]
1/185 . . . . . . [Overhead end-pivot rocking arms]
2001/186 . . . [Split rocking arms, e.g. rocker arms having two articulated parts and means for varying the relative position of these parts or for selectively connecting the parts to move in unison]
2001/187 . . . . . . [Clips, e.g. for retaining rocker arm on pivot]
2001/188 . . . . . . [Fulcrums at upper surface]
1/20 . . . Adjusting or compensating clearance
1/205 . . . . . . [by means of shims or the like]
1/22 . . . automatically, e.g. mechanically
1/24 . . . by fluid means, e.g. hydraulically
1/2405 . . . . . . [by means of a hydraulic adjusting device located between the cylinder head and rocker arm]
1/2411 . . . . . . [by means of a hydraulic adjusting device located between the valve stem and rocker arm]
1/2416 . . . . . . [by means of a hydraulic adjusting device attached to an articulated rocker]
1/2422 . . . . . . [by means or a hydraulic adjusting device located between the push rod and rocker arm]
2001/2427 . . . . . . [by means of an hydraulic adjusting device located between cam and push rod]
2001/2433 . . . . . . [Self contained, e.g. sealed hydraulic lash adjusters]
2001/2438 . . . . . . [with means permitting forced opening of check valve]
2001/2444 . . . . . . [Details relating to the hydraulic feeding circuit, e.g. lifter oil manifold assembly [LOMA]]
1/245 . . . Hydraulic tappets
1/25 . . . . . . between cam and valve stem
1/252 . . . . . . [for side-valve engines]
1/255 . . . . . . between cam and rocker arm
2001/256 . . . . . . [between cam and push rod]
1/26 . . . characterised by the provision of two or more valves operated simultaneously by same transmitting-gear; peculiar to machines or engines with more than two lift-valves per cylinder (with coaxial valves F01L 1/28)
1/262 . . . . . . [with valve stems disposed radially from a centre which is substantially the centre of curvature of the upper wall surface of a combustion chamber (F01L 1/265 takes precedence)]
1/265 . . . . . . [peculiar to machines or engines with three or more intake valves per cylinder]
1/267 . . . . . . [with means for varying the timing or the lift of the valves]
1/28 . . . characterised by the provision of coaxial valves; characterised by the provision of valves cooperating with both intake and exhaust ports
1/285 . . . . . . [Coaxial intake and exhaust valves]
1/30 . . . characterised by the provision of positively opened and closed valves, i.e. desmodromic valves
1/32 . . . characterised by the provision of means for rotating lift valves, e.g. to diminish wear
1/34 . . . . characterised by the provision of means for changing the timing of the valves without changing the duration of opening [and without affecting the magnitude of the valve lift]
1/344 . . . . changing the angular relationship between crankshaft and camshaft, e.g. using helicoidal gear
1/34403 . . . . . . [using helically teethed sleeve or gear moving axially between crankshaft and camshaft]
1/34406 . . . . . . [the helically teethed sleeve being located in the camshaft driving pulley]
1/34409 . . . . . . [by torque-responsive means]
1/34413 . . . . . . [using composite camshafts, e.g. with cams being able to move relative to the camshaft]
1/34416 . . . . . . [using twisted cams]
1/3442 . . . . . . [using hydraulic chambers with variable volume to transmit the rotating force]
2001/34423 . . . . . . [Details relating to the hydraulic feeding circuit]
2001/34426 . . . . . . [Oil control valves]
2001/3443 . . . . . . [Solenoid driven oil control valves]
2001/34433 . . . . . . [Location oil control valves]
2001/34436 . . . . . . [Features or method for avoiding malfunction due to foreign matters in oil]
2001/3444 . . . . . . [Oil filters]
2001/34443 . . . . . . [Cleaning control of oil control valves]
2001/34446 . . . . . . [Fluid accumulators for the feeding circuit]
2001/3445 . . . . . . [Details relating to the hydraulic means for changing the angular relationship]
2001/34453 . . . . . . [Locking means between driving and driven members]
2001/34456 . . . . . . [Locking in only one position]
2001/34459 . . . . . . [Locking in multiple positions]
2001/34463 . . . . . . [Locking position intermediate between most retarded and most advanced positions]
2001/34466 . . . . . . [with multiple locking devices]
2001/34469 . . . . . . [Lock movement parallel to camshaft axis]
2001/34473 . . . . . . [Lock movement perpendicular to camshaft axis]
2001/34476 . . . . . . [Restrict range locking means]
2001/34479 . . . . . . [Sealing of phaser devices]
2001/34483 . . . . . . [Phaser return springs]
2001/34486 . . . . . . [Location and number of the means for changing the angular relationship]
2001/34489 . . . . . . [Two phasers on one camshaft]
2001/34493 . . . . . . [Dual independent phasing system [DIPS]]
2001/34496 . . . . . . [Two phasers on different camshafts]
1/348 . . . . . . by means acting on timing belts or chains
1/352 . . . . . . using bevel or epicyclic gear
2001/3521 . . . . . . [Harmonic drive of flexpline type]
2001/3522 . . . . . . [with electromagnetic brake]
1/356 . . . . making the angular relationship oscillate, e.g. non-homokinetic drive]
1/36 . . . . peculiar to machines or engines of specific type other than four-stroke cycle
1/38 . . . . for engines with other than four-stroke cycle, e.g. with two-stroke cycle (F01L 1/26, F01L 1/28 take precedence)
Valve-gear for internal combustion piston engines or for other machines or engines with positive working-fluid...

F01L

1/40 . . . for engines with scavenging charge near top dead centre position, e.g. by overlapping inlet and exhaust time (scavenging aspects F02B)
1/42 . . . for machines or engines characterised by cylinder arrangements, e.g. star or fan
1/44 . . . Multiple-valve gear or arrangements, not provided for in preceding subgroups, e.g. with lift and different valves
1/443 . . . (comprising a lift valve and at least one rotary valve)
1/446 . . . (comprising a lift valve and at least one reed valve)
1/46 . . . Component parts, details, or accessories, not provided for in preceding subgroups
1/462 . . . (Valve return spring arrangements)
1/465 . . . . . (Pneumatic arrangements)
2001/467 . . . . . . (Lost motion springs)

3/00 Lift-valve, i.e. cut-off apparatus with closure members having at least a component of their opening and closing motion perpendicular to the closing faces; Parts or accessories thereof
3/02 . . . Selecting particular materials for valve-members or valve-seats; Valve-members or valve-seats composed of two or more materials
3/04 . . . Coated valve members or valve-seats
3/06 . . . Valve members or valve-seats with means for guiding or deflecting the medium controlled thereby, e.g. producing a rotary motion of the drawn-in cylinder charge (for rotating lift-valves F01L 1/32)
3/08 . . . Valves guides; Sealing of valve stem, e.g. sealing by lubricant
3/085 . . . . . (Valve cages)
3/10 . . . Connecting springs to valve members
2003/11 . . . . . . (Connecting valve members to rocker arm or tappet)
3/12 . . . Cooling of valves
3/14 . . . . . . by means of a liquid or solid coolant, e.g. sodium, in a closed chamber in a valve
3/16 . . . . . . by means of a fluid flowing through or along valve, e.g. air (for sealing only F01L 3/08)
3/18 . . . . . . Liquid cooling of valve
3/20 . . . Shapes or constructions of valve members, not provided for in preceding subgroups of this group
3/205 . . . . . . (Reed valves)
3/22 . . . Valve-seats not provided for in preceding subgroups of this group; Fixing of valve-seats
3/24 . . . Safety means or accessories, not provided for in preceding sub-groups of this group
2003/25 . . . . . . (Valve configurations in relation to engine)
2003/251 . . . . . . (Large number of valves, e.g. five or more)
2003/253 . . . . . . (configured parallel to piston axis)
2003/255 . . . . . . (configured other than parallel or symmetrical relative to piston axis)
2003/256 . . . . . . (configured other than perpendicular to camshaft axis)
2003/258 . . . . . . (opening away from cylinder)

5/00 Slide valve-gear or valve arrangements (with pure rotary or oscillatory movement F01L 7/00)
5/02 . . . with other than cylindrical, sleeve or part annularly shaped valves, e.g. with flat-type valves
5/04 . . . with cylindrical, sleeve, or part-annularly shaped valves
Valve-gear for internal combustion piston engines or for other machines or engines with positive working-fluid...

7/18 . . Component parts, details, or accessories not provided for in preceding subgroups of this group

9/00 Valve-gear or valve arrangements actuated non-mechanically

9/02 . . by fluid means, e.g. hydraulic
9/021 . . (the action of a cam being transmitted to a valve by a fluid column, e.g. a fluid conduit)
9/023 . . [Hydraulic lifters, i.e. fluid chamber comprised between a piston actuated by a cam and a piston acting on a valve stem]
9/025 . . [the volume of the chamber being variable, e.g. for varying the lift or the timing of a valve]
9/026 . . [Pneumatic]

2009/028 . . [Boost means, i.e. means for increasing initial opening force of the valve]

9/04 . . by electric means
2009/0401 . . [Driving circuits therefor]
2009/0403 . . [Electromagnetic actuators comprising one coil]
2009/0405 . . [Electromagnetic actuators comprising two or more coils]
2009/0407 . . [The two coils being disposed coaxially to the armature shaft]
2009/0409 . . [The armature being articulated perpendicularly to the coils axes]
2009/0411 . . [Electromagnetic actuators using a rotary motor]
2009/0413 . . [Piezoelectric actuators]
2009/0415 . . [Moving coil actuators]
2009/0417 . . [Floating actuators for varying the valve stroke]
2009/0419 . . [Actuator position setting device, e.g. initial setting]
2009/0421 . . [Mixed arrangement with both mechanically and electromagnetically actuated valves]
2009/0423 . . [Electromagnetic actuators construction details]
2009/0425 . . [Shaft and armature construction]
2009/0426 . . [Arrangements for amplifying the armature stroke]
2009/0428 . . [Core and coil construction]
2009/043 . . [Casing construction]
2009/0432 . . [Biasing means]
2009/0434 . . [Helical springs]
2009/0436 . . [Two opposed springs for intermediate resting position of the armature]
2009/0438 . . [Torsion springs]
2009/044 . . [Pneumatic springs]
2009/0442 . . [Means for varying the spring bias]
2009/0444 . . [Means for connecting springs to valve or anchor]
2009/0446 . . [Latching means]
2009/0448 . . [using permanent magnet]
2009/0449 . . [Means for varying the air gap]
2009/0451 . . [Damping means]
2009/0453 . . [Means for counteracting cylinder pressure]
2009/0455 . . [Lash adjusting means]
2009/0457 . . [Actor cooling means]
2009/0459 . . [Means for facilitating assembly]
2009/0461 . . [Wiring]
2009/0463 . . [Connectors]
2009/0465 . . [Harnesses]
2009/0467 . . [Sensing means]
2009/0469 . . [Position sensors]
2009/0471 . . [Vibration sensors]

2009/0473 . . . . [Temperature sensors]
2009/0474 . . . . [Flux sensors]
2009/0476 . . . . [Spring force sensors]
2009/0478 . . . . [Electromagnetic actuators; Method of operation thereof]
2009/048 . . . . [Engine starting]
2009/0482 . . . . [in normal conditions]
2009/0484 . . . . [Cold start]
2009/0486 . . . . [Soft landing, e.g. applying braking current; Levitation of armature close to core surface]
2009/0488 . . . . [Fail safe, e.g. valve kept closed if not opening properly]
2009/049 . . . . [Determination of valve speed]
2009/0492 . . . . [Determination of valve timing during particular working conditions, e.g. deceleration]
2009/0494 . . . . [Engine stopping; Engine stall]
2009/0496 . . . . [relating to sticking duration]
2009/0498 . . . . [relating to gap between armature shaft and valve stem end]

11/00 Valve arrangements in working piston or piston-rod

11/02 . . . in piston
11/04 . . . operated by movement of connecting-rod
11/06 . . . operating oscillatory valve

13/00 Modifications of valve-gear to facilitate reversing, braking, starting, changing compression ratio, or other specific operations

13/0005 . . . . [Deactivating valves]
13/0001 . . . . [Deactivating cylinders]
13/0015 . . . . [for optimising engine performances by modifying valve lift according to various working parameters, e.g. rotational speed, load, torque]
13/0021 . . . . [by modification of rocker arm ratio]
13/0026 . . . . [by means of an eccentric]
13/0031 . . . . [by modification of tappet or pushrod length]
13/0036 . . . . [the valves being driven by two or more cams with different shape, size or timing or a single cam profiled in axial and radial direction]
13/0042 . . . . [with cams being profiled in axial and radial direction]
13/0047 . . . . [the movement of the valves resulting from the sum of the simultaneous actions of at least two cams, the cams being independently variable in phase in respect of each other]
2013/0052 . . . . [with cams provided on an axially slideable sleeve]
13/0057 . . . . [by splitable or deformable cams]
13/0063 . . . . [by modification of cam contact point by displacing an intermediate lever or wedge-shaped intermediate element, e.g. Tourtelot]
2013/0068 . . . . [with an oscillating cam acting on the valve of the "BMW-Valvetronic" type]
2013/0073 . . . . [with an oscillating cam acting on the valve of the "Delphi" type]
2013/0078 . . . . [by modification of cam contact point by axially displacing the camshaft]
2013/0084 . . . . [by modification of cam contact point by radially displacing the camshaft]
2013/0089 . . . . [with means for delaying valve closing]
2013/0094 . . . . [with switchable clamp for keeping valve open]
Valve-gear for internal combustion piston engines or for other machines or engines with positive working-fluid...

Valve-gear or valve arrangements, e.g. with reciprocatory slide valves, specially for steam engine, or specially for other machines or engines with variable working-fluid distribution

NOTE

The groups under this guide heading do not fully embrace subject matter restricted to rotary, oscillatory, or lift-valve-gear or valve arrangements, classified in groups F01L 33/00 and F01L 35/00. However, the present groups do embrace the following subject-matter thereof; valves drives or means external to valves for adjustment during operation, tripping-gear, reversing-gear, use of pistons or piston-rods as valves or as valve-supporting elements, valve-gear or valve arrangements peculiar to free-piston machines or engines

15/00 Valve-gear or valve arrangements, e.g. with reciprocatory slide valves, other than provided for in groups F01L 17/00 - F01L 29/00 (valve drive or external valve-adjustment during operation, see the relevant groups, e.g. F01L 31/00; tripping-gear or tripping of valves F01L 31/00)

15/02 . with valves other than cylindrical, sleeve, or part-annularly-shaped, e.g. flat D-valves

15/04 . main valve being combined with auxiliary valve (of drag valve type F01L 15/10)

15/06 . . . of Meyer or Rider type, i.e. in which the expansion is varied at the expansion valve itself

15/08 . with cylindrical, sleeve, or part-annularly-shaped valves; Such main valves combined with auxiliary valves

15/10 . with main slide valve and auxiliary valve dragged thereby

15/12 . characterised by having means for effecting pressure equilibrium between two different cylinder spaces at idling

15/14 . Arrangements with several co-operating main valves, e.g. reciprocatory and rotary

15/16 . . with reciprocatory slide valves only

15/18 . Valves arrangements not provided for in preceding subgroups of this main group

15/20 . Component parts, details, or accessories, not provided for in preceding subgroups of this main group

17/00 Slide valve-gear or valve arrangements with cylindrical, sleeve, or part annularly-shaped valves surrounding working cylinder or piston

17/02 . Drive or adjustment during operation, peculiar thereto, e.g. for reciprocating and oscillating movements or for several valves one inside the other

19/00 Slide valve-gear or valve arrangements with reciprocatory and other movement of same valve, other than provided for in F01L 17/00, e.g. longitudinally of working cylinder and in cross direction

19/02 . Drive or adjustment during operation, peculiar thereto

21/00 Use of working pistons or pistons-rods as fluid-distributing valves or as valve-supporting elements, e.g. in free-piston machines

21/02 . Piston or piston-rod used as valve members (F01L 25/066 takes precedence)

21/04 . Valves arranged in or on piston or piston-rod

23/00 Valves controlled by impact by piston, e.g. in free-piston machines (F01L 25/063 takes precedence)

25/00 Drive, or adjustment during the operation, or distribution or expansion valves by non-mechanical means

25/02 . by fluid means

25/04 . . by working-fluid of machine or engine, e.g. free-piston machine

25/06 . . . Arrangements with main and auxiliary valves, at least one of them being fluid-driven

25/063 . . . . . [the auxiliary valve being actuated by the working motor-piston or piston-rod]

25/066 . . . . . . [piston or piston-rod being used as auxiliary valve]

25/08 . by electric or magnetic means

27/00 Distribution or expansion valve-gear peculiar to free-piston machines or engines and not provided for in F01L 21/00 - F01L 25/00

27/02 . the machine or engine having rotary or oscillatory valves

27/04 . Delayed-action controls, e.g. of cataract or daphsot type

29/00 Reversing gear (equally usable for control of degree of working-fluid admission and reversing being of secondary-importance F01L 31/00)

29/02 . by displacing eccentric

29/04 . by links or guide rods

29/06 . by interchanging inlet and exhaust ports

29/08 . specially for rotary or oscillatory valves

29/10 . Details, e.g. drive

29/12 . . Powered reverse gear

31/00 Valve drive, valve adjustment during operation, or other valve control, not provided for in groups F01L 15/00 - F01L 29/00 (sensing elements measuring the variable or condition to be controlled or regulated F01B)
Valve-gear or valve arrangements, e.g. with reciprocating slide valves, specially for steam engine, or specially for...

31/02 . with tripping-gear (for oscillatory valves

31/04 . . with positively-driven trip levers

31/06 . with tripping-gear specially for oscillatory valves;

31/08 . Valve drive or valve adjustment, apart from tripping aspects; Positively-driven gear

31/10 . . the drive being effected by eccentrics

31/12 . . Valve adjustment by displacing eccentric

31/14 . . Valve adjustment by links or guide rods, e.g. in valve-gears with eccentric drive

31/16 . . the drive being effected by specific means other than eccentric, e.g. cams; Valve adjustment in connection with such drives

31/18 . . specially for rotary or oscillatory valves

**Rotary or oscillatory slide valve-gear or lift-valve-gear or such valve arrangements specially for steam engines or specially for other machines or engines with variable working-fluid distribution** (drive adjustment during operation, tripping-gear, reversing-gear, use of working pistons or piston-rods as valves or as valves-supporting elements, valve-gear or valve arrangements peculiar to free-piston machines or engines F01L 15/00 - F01L 31/00)

33/00 Rotary or oscillatory slide valve-gear or valve arrangements, specially adapted for machines or engines with variable fluid distribution (drive, adjustment during operation, tripping-gear, reversing-gear, use of working pistons or piston-rods as valves or as valve-supporting elements, valve-gear or valve arrangements peculiar to free-piston machines or engines F01L 15/00 - F01L 31/00)

33/02 . rotary

33/04 . oscillatory

35/00 Lift valve-gear or valve arrangements specially adapted for machines or engines with variable fluid distribution (drive, adjustment during operation, tripping-gear, reversing-gear, use of working pistons or piston-rods as valves or as valve-supporting elements, valve-gear or valve arrangements peculiar to free-piston machines or engines F01L 15/00 - F01L 31/00)

35/02 . Valves

35/04 . Arrangements of valves in the machine or engine, e.g. relative to working cylinder

2101/00 Using particular materials

2101/02 . Using ceramic materials

2103/00 Manufacturing of components used in valve arrangements

2103/01 . Tools for producing, mounting or adjusting, e.g. some part of the distribution

2103/02 . Initial camshaft settings

2105/00 Valve arrangements comprising rollers

2105/02 . Mounting of rollers

2107/00 Preventing the rotation of tappets

2109/00 Self-contained lash adjusters

2111/00 Differential gears located between crankshafts and camshafts for varying the timing of valves

2113/00 Rotary valve drives

2201/00 Electronic control systems; Apparatus or methods therefor

2250/00 Camshaft drives characterised by their transmission means

2710/00 Control of valve gear, speed or power

2740/00 Control of slide-valve gear; Control pistons

2800/00 Methods of operation using a variable valve timing mechanism

2810/00 Arrangements solving specific problems in relation with valve gears

2810/01 . Cooling
| 2810/02 | Lubrication |
| 2810/03 | Reducing vibration |
| 2810/04 | Reducing noise |
| 2810/05 | Related to pressure difference on both sides of a valve |

**2820/00 Details on specific features characterising valve gear arrangements**

| 2820/01 | Absolute values |
| 2820/02 | Formulas |
| 2820/03 | Auxiliary actuators |
| 2820/031 | Electromagnets |
| 2820/032 | Electric motors |
| 2820/033 | Hydraulic engines |
| 2820/034 | Pneumatic engines |
| 2820/035 | Centrifugal forces |
| 2820/04 | Sensors |
| 2820/041 | Camshafts position or phase sensors |
| 2820/042 | Crankshafts position |
| 2820/043 | Pressure |
| 2820/044 | Temperature |
| 2820/045 | Valve lift |