

B60K

ARRANGEMENT OR MOUNTING OF PROPULSION UNITS OR OF TRANSMISSIONS IN VEHICLES; ARRANGEMENT OR MOUNTING OF PLURAL DIVERSE PRIME-MOVERS IN VEHICLES; AUXILIARY DRIVES FOR VEHICLES; INSTRUMENTATION OR DASHBOARDS FOR VEHICLES; ARRANGEMENTS IN CONNECTION WITH COOLING, AIR INTAKE, GAS EXHAUST OR FUEL SUPPLY OF PROPULSION UNITS IN VEHICLES

Definition statement

This place covers:

Particular arrangements or mounting in vehicles of:

- Propulsion units or diverse prime movers (electrical, steam, internal-combustion, jet-propulsion, hybrid or other propulsion units),
- Transmissions.
- Diverse elements of propulsion units: cooling system, air intake or gas exhaust, fuel supply, element in connection with the power supply from force of nature (e.g. sun, wind),
- Auxiliary drives devices,
- Instrumentation or dashbord.

Relationships with other classification places

The following subject matters are not covered by this subclass:

- Subclass [B60B](#) and [B60C](#) embrace all vehicle wheels and tyres, except wheels for roller skates [A63C 17/22](#), wheels for model railway vehicles [A63H 19/22](#), and special adaptations of wheels or tyres for aircraft [B64C 25/36](#).
- Subclass [B60C](#) embraces the connection of valves to inflatable elastic bodies in general, and in this respect it is not limited to vehicles.
- Subclass [B60L](#) embraces certain electric equipment of all electrically-propelled vehicles.
- Subclass [B60M](#) embraces certain power supply for, but external to, any kind of electrically-propelled vehicle
- Subclass [B60R](#) embraces safety belts or body harnesses used in all types of land vehicles
- Subclass [B60S](#) is a residual group for servicing, cleaning, repairing, supporting or lifting of vehicles.
- Subclass [B60T](#) includes brake control systems of general applicability, and in this respect it is not limited to vehicles. It also includes rail-vehicle power-brake systems and some features of rail-vehicle brake systems

Conjoint control of different drive units are not any more in this subclass; they are classified in subclass [B60W](#).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Wheel chairs	A61G
Suspension	B60G
Cooling, heating, venting devices especially for passenger, these groups comprise also the devices which are used for conjoint climatisation for the passenger space and for other devices (like a battery for example).	B60H
Seats in a vehicle	B60N

Power driven steering	B62D 5/00
Dynamo electric machines	H02K

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Automatic control	Using control systems for automatizing or assisting, to a full- or partial extent, tasks associated with driving of the vehicle, e.g. those normally carried out by the driver or those necessary to control the motion of the vehicle.
Auxiliary equipment	A subsidiary or supplementary device of the propulsion, transmission or other units of the vehicle, e.g. a pump for supply of pressure for the control unit.
Conjoint Control	A programmed or condition-responsive automatic controller on-board the vehicle, embodying control logic for plural vehicle sub-units and sends control signals to actuators of two or more vehicle sub-units, so that the sub-units act together to solve a particular problem or in response to a particular driving condition.
Cruise control ACC	A system for automatically controlling vehicle speed, which may include additional functions e.g. control of distance between vehicles, so-called "Adaptive Cruise Control" (ACC).
Drive control system	An electronic system in a road vehicle for automatically controlling the movement of that vehicle in order to take certain actions.
Driving parameter	All input or output parameters of the road vehicle drive control systems, e.g. road specific parameters, driver or passenger related parameters, state variables of motion of the vehicle body or parameters related to the vehicle itself like load or weight of the vehicle
Hybrid vehicles HEV	Vehicles having two or more prime movers of more than one type for mutual or common propulsion, e.g. HEV: electrical and internal combustion motors, and that are either singularly or in combination used for propulsion of the vehicle.
Road vehicle	A motorised passenger vehicle normally under the control of a human driver for transportation on roads, e.g. an automobile, truck or bus
Drive-unit	Propulsion unit together with transmission, a "drive-unit" can additionally include the ultimate driven unit
Sub-Unit	One of the following vehicle systems: propulsion systems; clutch system; change-speed gearing system; system for distributing drive torque between front and rear axles; axle differential system; brake system; steering system or suspension system; energy storage means; fuel cells or other auxiliary equipments
Transmission	All propulsion parts linking propulsion units, e.g. engines, to ultimate propulsive elements, e.g. wheels
Vehicle	All vehicles except those restricted to one of the following types of vehicles: rail vehicles, waterborne vessels, aircraft, space vehicles, hand carts, cycles, animal-drawn vehicles, and sledges, which are covered by the relevant subclasses of B61 - B64 . Thus, the term "vehicle" includes:- vehicular characteristics which are common to more than one of the above listed types;- certain characteristics restricted to automobiles, road or cross-country trailers

B60K 1/00

Arrangement or mounting of electrical propulsion units ([B60K 7/00](#) takes precedence; arrangement or mounting of plural diverse prime-movers for mutual or common propulsion [B60K 6/00](#))

References

Limiting references

This place does not cover:

Arrangement or mounting of plural diverse prime-movers for mutual or common propulsion	B60K 6/00
Disposition of motor in, or adjacent to, traction wheel	B60K 7/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electric transmission arrangements	B60K 17/12
Four-wheel drive vehicles having fluid or electric motor for driving one or more wheels	B60K 17/356
Arrangement or mounting of propulsion-unit control devices in vehicles	B60K 26/00
Motor driven wheelchairs	A61G 5/04
Electric equipment or propulsion of electrically-propelled vehicles per se	B60L
Current-collectors for power supply lines of electrically-propelled vehicles	B60L 5/00
Methods, circuits or devices for controlling the traction-motor speed of electrically-propelled vehicles	B60L 15/00
Conjoint control of vehicle sub-units including control of electric propulsion units	B60W 10/08
Conjoint control system specially adapted for hybrid vehicles	B60W 20/00
Steering non-deflectable wheels by differentially driving ground-engaging elements on opposite vehicle sides	B62D 11/02
Superstructures for passenger vehicles	B62D 31/00
Dynamo-electric machines	H02K
Arrangements for handling mechanical energy structurally associated with dynamo-electric machines	H02K 7/00
Dynamo-electric machines with counter rotating rotors	H02K 16/005
Control of electric motors	H02P

B60K 1/04

of the electric storage means for propulsion

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cooling of the batteries using HVAC of the vehicle	B60H 1/00278
Safety devices for electric storage systems in electric vehicles	B60L 3/0046
Constructional details of batteries specially adapted for electric vehicles	B60L 50/64
Connecting elements for charging the batteries	B60L 53/00
Exchanging batteries for electrically-propelled vehicles	B60L 53/80
Arrangement of batteries specially adapted for vehicles and not otherwise provided for	B60R 16/04
Supplying batteries to, or removing batteries from, vehicles	B60S 5/06
Braking elements using wheel movement for accumulating energy, e.g. by driving air compressors	B60T 1/10
Floors or bottom sub-units	B62D 25/20
Electrochemical generators per se	H01M
Fuel cells	H01M 8/00
Heating of fuel cell	H01M 8/04007
Heating and cooling of batteries in general	H01M 10/60
Heating and cooling of batteries specially adapted for applications in vehicles	H01M 10/625
Housings or holders for batteries	H01M 50/20
Fixing of the housing of the batteries to the vehicle if the invention is on the housing of the batteries	H01M 50/249

Special rules of classification

If there exists a second prime mover, e.g. an internal combustion engine [ICE] or hydraulic accumulator, classification is additionally made in [B60K 6/00](#).

B60K 3/00

Arrangement or mounting of steam or gaseous-pressure propulsion units ([B60K 7/00](#) takes precedence; arrangement or mounting of plural diverse prime-movers for mutual or common propulsion [B60K 6/00](#))

Definition statement

This place covers:

This group comprises documents concerning the arrangement or mounting in the vehicle of the steam engine or gaseous-pressure propulsion. The engine per se is classified in [F01K](#), [F01B](#), [F02C](#).

References

Limiting references

This place does not cover:

Arrangement or mounting of plural diverse prime-movers for mutual or common propulsion	B60K 6/00
Disposition of motor in, or adjacent to, traction wheel	B60K 7/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of fluid gearing in vehicles	B60K 17/10
Arrangement or mounting of propulsion-unit control devices in vehicles	B60K 26/00
Engines using uniflow principle	F01B 17/00
Steam engines	F01B 17/04
Steam engine plants	F01K
Steam engine plants for driving vehicles	F01K 15/02
Gas turbine plants	F02C

B60K 5/00

Arrangement or mounting of internal-combustion or jet-propulsion units
([B60K 7/00](#) takes precedence; arrangement or mounting of plural diverse prime-movers for mutual or common propulsion [B60K 6/00](#))

Definition statement

This place covers:

This group comprises documents concerning the arrangement of an internal combustion motor in the vehicle. A damping means, rubber or the control of a damping means per se are classified in [F16F](#).

References

Limiting references

This place does not cover:

Arrangement or mounting of plural diverse prime-movers for mutual or common propulsion	B60K 6/00
Disposition of motor in, or adjacent to, traction wheel	B60K 7/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of propulsion-unit control devices in vehicles	B60K 26/00
Understructures of vehicles with resilient means for suspension	B62D 21/11
Understructures with impact absorbing front or rear frames	B62D 21/152
Internal-combustion piston engines; Combustion engines in general	F02B
Combinations of combustion engines with mechanical gearing	F02B 61/06

Springs; Shock absorbers; Means for damping vibration	F16F
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B60K 5/02

with the engine main axis, e.g. crankshaft axis, substantially in or parallel to the longitudinal centre line of the vehicle

Special rules of classification

This group is given only if the fact that the crankshaft axis is parallel to the longitudinal centre line of the vehicle is important for the invention.

B60K 5/04

with the engine main axis, e.g. crankshaft axis, transversely to the longitudinal centre line of the vehicle

Special rules of classification

This group is given only if the fact that the crankshaft axis is transversal to the longitudinal centre line of the vehicle is important for the invention.

B60K 5/06

with the engine main axis substantially vertical

Special rules of classification

This group is given only if the fact that the crankshaft axis is vertical is important for the invention.

B60K 6/00

Arrangement or mounting of plural diverse prime-movers for mutual or common propulsion, e.g. hybrid propulsion systems comprising electric motors and internal combustion engines

Definition statement

This place covers:

The arrangement and mounting of different prime-movers for common propulsion of a vehicle.

Hybrid propulsion systems comprising electrical and combustion engines.

Prime-movers comprising internal combustion motor and energy storing means.

Relationships with other classification places

[B60K 6/00](#) is the place where the layout and arrangement of hybrid propulsion systems is classified. The control of these systems is classified in groups [B60W 20/00](#) and [B60W 10/00](#) for the type of the controlled unit with additional classification symbol in this group when the type of hybrid propulsion system is of interest. Combustion engine features are classified per se in the relevant subclasses [F02B](#), [F02D](#), [F02N](#). Transmission or clutch features per se are classified in the relevant subclasses [F16H](#) or [F16D](#).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Disposition of motor in, or adjacent to, traction wheel	B60K 7/00
Arrangement of fluid gearing in vehicles	B60K 17/10
Arrangement of electric gearing in vehicles	B60K 17/12
Transmission arrangements for driving front and rear wheels, having fluid or electric motor, for driving one or more wheels	B60K 17/356
Arrangement or mounting of propulsion-unit control devices in vehicles	B60K 26/00
Electric propulsion with power supplied within the vehicle	B60L 50/00
Electric propulsion with power supplied within the vehicle using propulsion power supplied by engine-driven generators	B60L 50/10
Control systems specially adapted for hybrid vehicles	B60W 20/00
Vehicle propulsion control with common controlling member for different functions	B60W 30/18181
Prime movers comprising electric motors and ICE in a common engine block or housing	F02M 65/00
Electric motors or motor-generators used for starting the combustion engine	F02N 11/04
Electric motors for synchronising gearing	F16H 3/12
Mechanical gearings having orbital motion with secondary drive in order to vary speed continuously	F16H 3/72
Control of gear shifting per se	F16H 61/00
Control of hydrostatic gearing	F16H 61/40
Arrangements for handling mechanical energy structurally associated with the dynamo-electric machine	H02K 7/00
Dynamo-electric gears, i.e. dynamo-electric means for transmitting mechanical power from a driving shaft to a driven shaft and comprising structurally interrelated motor and generator parts	H02K 51/00

Special rules of classification

Whenever one or more specific aspects of subunits are concerned, classification should be given for each of the different subunit in [B60K 6/22](#) and a classification symbol should be added in the relevant place for the architecture [B60K 6/42](#) and also for the driveline architecture [B60K 6/50](#).

When classifying in one of groups [B60K 6/22](#), [B60K 6/42](#) or [B60K 6/50](#), further technical classification, which is considered to represent information of interest for search should be classified in the other subgroups of [B60K 6/00](#) to enable searching using combination of classification symbols. Where appropriate, classification symbols should be given for the architecture of the hybrid propulsion system in groups [B60K 6/42](#) - [B60K 6/485](#) and for the arrangement or kind of transmission units in groups [B60K 6/50](#) - [B60K 6/547](#).

The flywheel storing means are classified in [B60K 6/105](#) if the power transmission is mechanical and in [B60K 6/30](#) if the power transmission is purely electrical.

The power split transmission architecture [B60K 6/445](#) is to be classified also in [F16H 2037/0866](#) for distributing type, in [F16H 2037/088](#) for summing type and [F16H 2037/101](#) for parallel type,

[F16H 2037/102](#) or [F16H 2037/104](#) for crossed connections of several planetary sets, [F16H 2037/103](#) for Ravigneaux type.

Use of the Indexing Code scheme is mandatory. When classifying in group [B60K 6/00](#) classification must also be made in groups [B60K 6/00](#) – [B60K 6/54](#) for additional features, in [B60Y 2200/00](#) for vehicle type, in [B60Y 2400/00](#) for special features in general, in [B60Y 2300/00](#) in order to identify the purpose and in [B60W 10/00](#) for multiple controlled sub-units and in [B60W 2510/00](#) - [B60W 2530/213](#) for controller input parameters and in [B60W 2710/00](#) - [B60W 2720/406](#) for the output target values.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

energy storing means	apparatus for storing propulsive energy and providing stored energy to drive the prime-mover or the ultimate propulsive elements, e.g. wheels
hybrid electric vehicle	vehicles having an electric prime-mover and a combustion engine, in which the electric prime-mover and the combustion engine either singly or in combination, drive the ultimate propulsive elements, e.g. wheels
motor-generator	an electric machine, such as a motor or a generator or a mechanical combination thereof, which can provide positive mechanical output force or torque and which can function at other times as an electric generator
prime-mover	a propulsion unit or source of motive power providing a mechanical output, e.g. via a rotating shaft

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

HEV	Hybrid electric vehicle
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B60K 6/20

the prime-movers consisting of electric motors and internal combustion engines, e.g. HEVs

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electric propulsion of vehicles with power supplied by engine-driven generators within the vehicle	B60L 50/10
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B60K 2006/381

{characterized by driveline brakes}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Transmission of prime-movers for changing ratio	B60K 6/54
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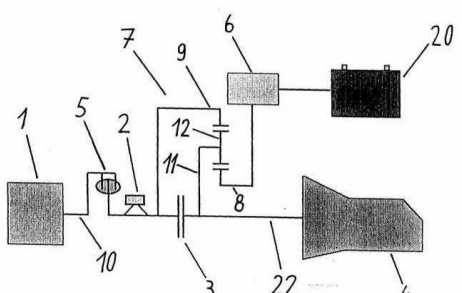
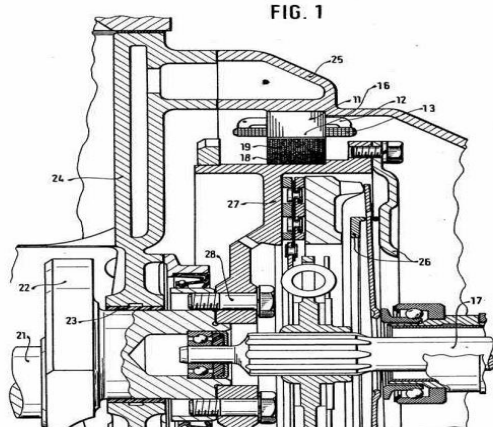
B60K 6/42

characterised by the architecture of the hybrid electric vehicle

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

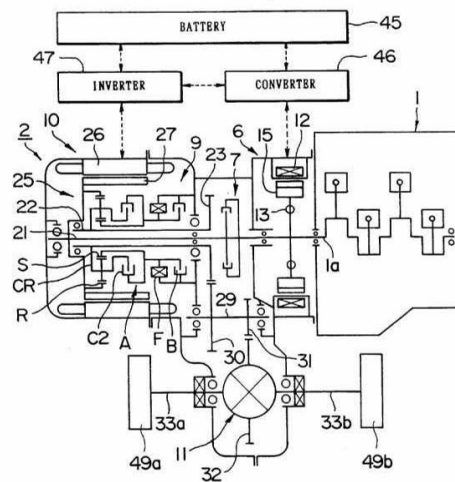
Series type or Range extender	<p>HEVs having at least two motor-generators in which the first motor-generator is mechanically connected for driving or braking the wheels supplied by a battery which power is mostly generated by the second motor-generator mechanically connected to the combustion engine. Example: The combustion engine is mechanically connected to a motor-generator. The combustion engine is not mechanically connected to the wheels. All the output energy of the combustion engine is converted to electrical energy. The energy is used to drive a second electric machine connected to the wheels and/or to charge the energy storing means. The second electric machine will be used as generator during braking. (US5214358, example also classified in B60K 6/30 for mechanical accumulators)</p>
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<p>Parallel type</p>	<p>HEVs having a single motor-generator in which both the combustion engine and the motor-generator can directly drive the wheels. Parallel type HEVs in which the motor-generator only assist the combustion engine and cannot drive the wheels alone are specially defined as 'motor assist type'. Therefore 'parallel type' is assigned to HEVs in which the motor generator can drive the wheels alone without the engine being connected to the wheels. Example: There is a single motor-generator and the combustion engine is mechanically connected to the motor-generator, via a clutch or via differential gearing. The motor-generator is also mechanically connected to the wheels. The vehicle is driven electrically by the motor-generator or mechanically by the engine or by both in combination. (EP941883)</p> 
<p>Motor-assist type</p>	<p>Parallel type HEV in which the motor-generator only assist the combustion engine and cannot drive the wheels alone. Example: The motor-generator is mechanically connected to the engine. There is no clutch or differential gearing between motor-generator and engine. The combustion engine is mechanically connected to the wheels. (FR2480042)</p> 
<p>Series-parallel type</p>	<p>HEV having at least two motor-generators, which include the functions of both the series type and the parallel type.</p>

Series-parallel switching type

Series-parallel type HEV in which the mode can be switched between series mode and parallel mode. Example: The combustion engine is directly connected to a first motor-generator. There is a second motor-generator mechanically connected to the wheels and a clutch between the two motor-generators. In the series mode the clutch will be disengaged and the second motor generator will drive the wheels by using the electric power generated by the first motor generator. In the parallel mode the clutch will be engaged and the engine directly drives the wheels with or without assistance by the motor generators. (US5513719)

FIG. 1



Differential gearing distribution type

Series-parallel type HEVs in which the combustion engine power is distributed or summed by a differential, e.g. a planetary gearing, to the first motor-generator and the wheels, and the electric power generated by the first motor-generator is used to drive the second motor-generator mechanically connected to either the wheels or the combustion engine. The series-mode energy flow path is established when the second motor-generator is driven by the electric power generated by the first motor-generator, while the parallel-mode energy flow path is established when the wheels are driven by both the combustion engine and the second motor-generator. Motor-generator currents are controlled to determine the energy flow path through the drive units. Example: The combustion engine is mechanically connected to a motor-generator via a first element of a differential gearing. A second motor-generator is connected to a second element of the differential gearing. The differential gearing also connects one or both of the motor-generators to the wheels. (US20010049570, example also classified in [F16H 2037/102](#))

Patent Application Publication Dec. 6, 2001 Sheet 2 of 23 US 2001/0049570 A1

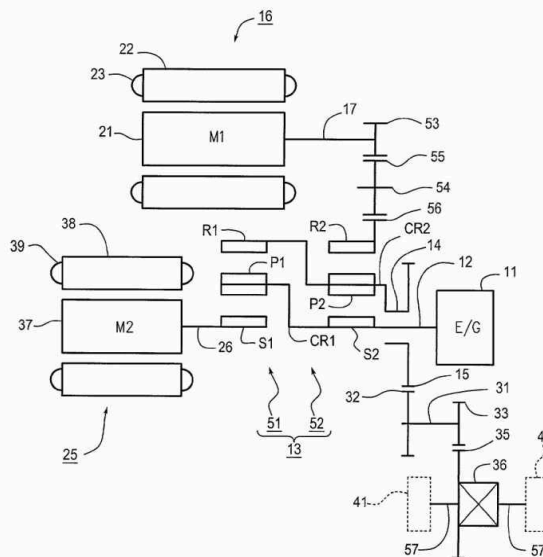
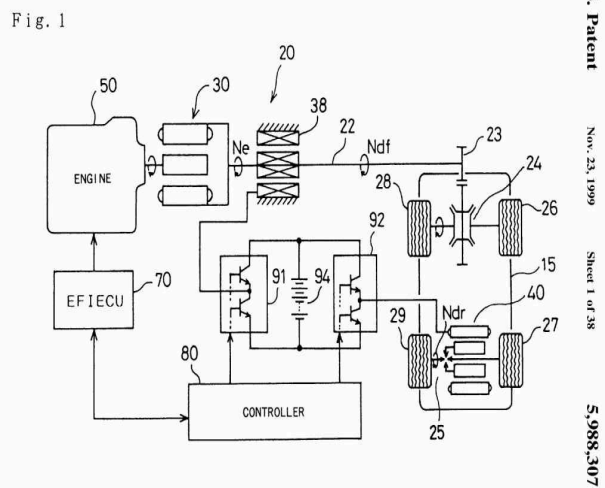


FIG. 2

Electrical distribution type	<p>Series-parallel type HEVs in which the engine power is distributed, using a first motor-generator which is specific as a double rotor-type motor-generator, into mechanical power for driving the wheels and electric power for driving a second motor-generator connected to either the wheels or the combustion engine. The series-mode energy flow path is established when the second motor-generator is driven by the electric power generated by the first motor-generator, while the parallel-mode energy flow path is established when the wheels are driven by both the combustion engine and the second motor-generator. Motor-generator currents are controlled to determine the energy flow path through the drive units.</p> <p>Example: The combustion engine shaft is mechanically connected to the inner rotor of a double-rotor type motor-generator. The outer rotor of the double-rotor type is connected to the second motor generator which is connected to the shaft driving the wheels.</p> <p>(US5988307)</p> 
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B60K 6/50

Architecture of the driveline characterised by arrangement or kind of transmission units

Definition statement

This place covers:

Particular arrangements of transmission units.

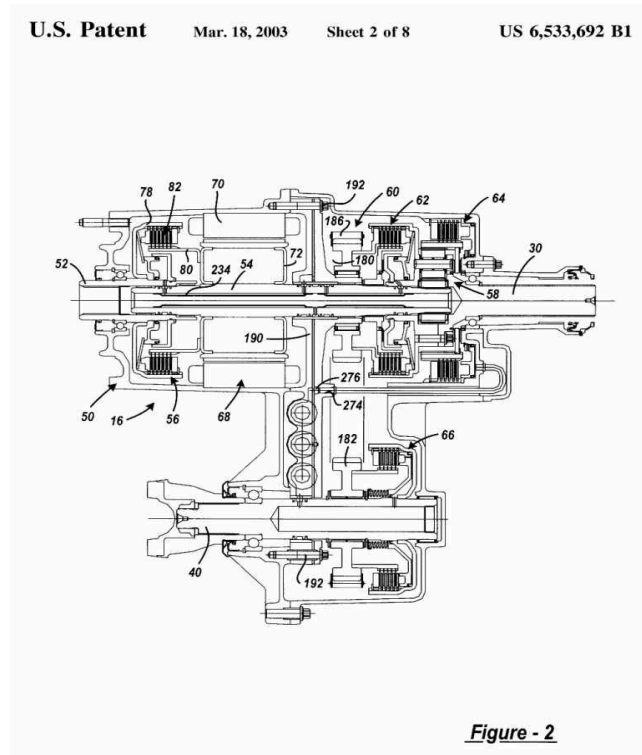
Kind or type of transmission units, e.g. CVT.

B60K 6/52

Driving a plurality of drive axles, e.g. four-wheel drive

Special rules of classification

If the invention information is related to the transfer gearing independent of the hybrid layout it will be also classified in [B60K 17/34](#). Example: US6533692

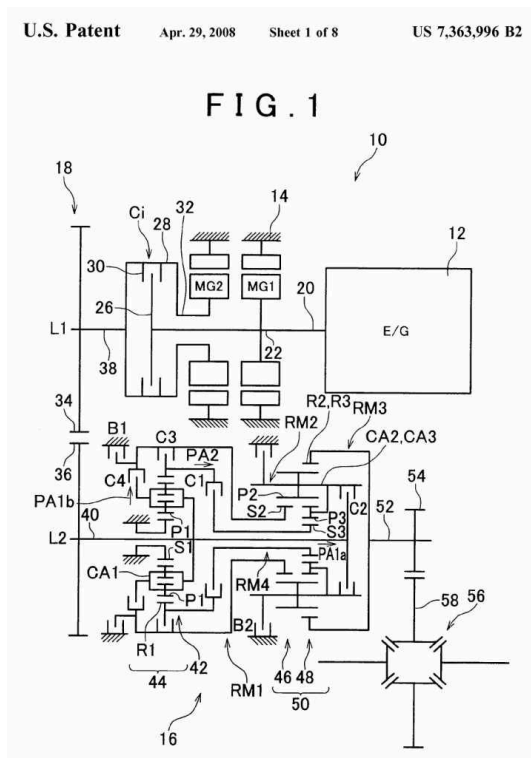


B60K 6/54

Transmission for changing ratio

Special rules of classification

The aspect of the transmission unit per se are to be classified in the relevant groups of subclass [F16H](#), for example if the invention is related to the Ravigneaux planetary set placed downstream of a power split electric transmission, the classification [F16H 3/666](#) is also given. Example: US7363996



B60K 7/00

Disposition of motor in, or adjacent to, traction wheel

Definition statement

This place covers:

Inventions related to a particular disposition of the motor regarding the wheel. The term "in, or adjacent to" means there is one motor driving one wheel (or dual wheels forming a unit) without a differential in between.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Arrangement or mounting of fluid or electric gearing in vehicles characterised by the motor of the fluid or electric gearing being disposed in, or adjacent to, traction wheel	B60K 17/14
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of electrical propulsion units in vehicles	B60K 1/00
One electric motor mounted directly on a propulsion axle for rotating right and left wheels of this axle, e.g. using a differential between the motors and the driven wheels	B60K 2001/001
Hybrid propulsion systems for vehicles	B60K 6/00
Arrangement in connection with cooling of propulsion units	B60K 11/00
Arrangement of transmission units disposed in or near the vehicle wheel	B60K 17/043
Arrangement or mounting of propulsion-unit control devices in vehicles	B60K 26/00
Wheelchairs	A61G 5/00
Roller-skates or skateboards with driving mechanisms	A63C 17/12
Resilient suspension	B60G 3/00
Electric equipment or propulsion of electrically propelled vehicles	B60L
Arrangements of braking elements	B60T 1/00
Steering linkages	B62D 7/00
Dynamo-electric machines (electric motors)	H02K

Special rules of classification

All documents showing in a schematic way a hybrid or electric vehicle having hub motors in the wheels should not be classified in this group. However, a code for additional information could be given.

Use of the Indexing Code scheme is mandatory for this main group. Additional information should be given in [B60K 17/043](#) if a transmission is used.

B60K 7/0007

{the motor being electric}

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Structural association of electro motor with clutches, brakes, gears, pulleys etc.	H02K 7/1163
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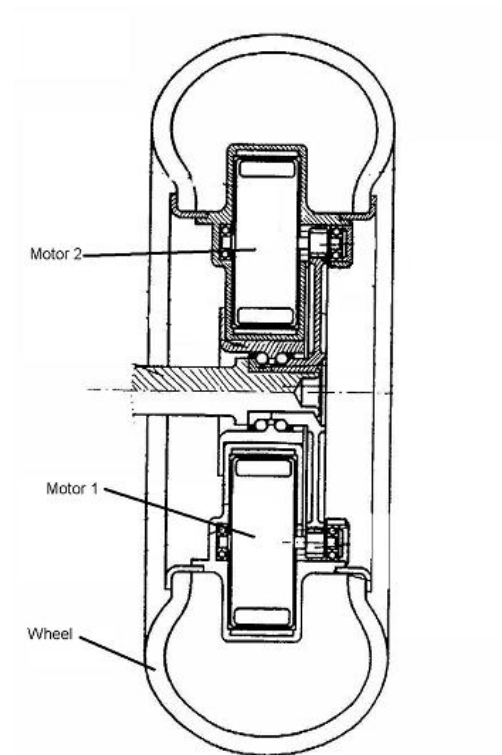
B60K 2007/003

{with two or more motors driving a single wheel}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.



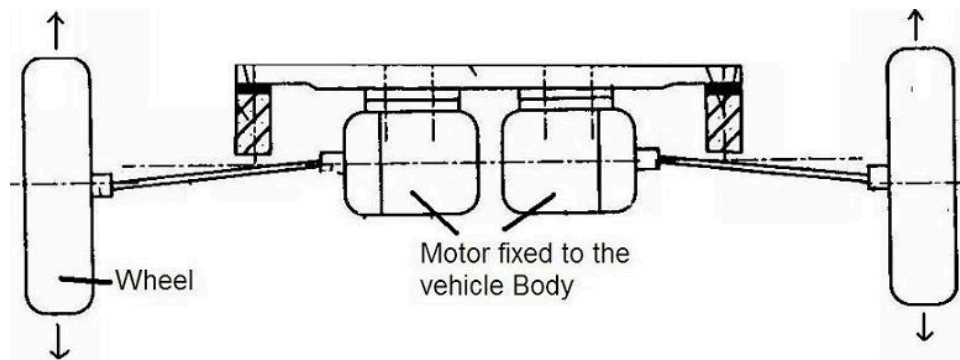
B60K 2007/0046

{the motor moving together with the vehicle body, i.e. moving independently from the wheel axle}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

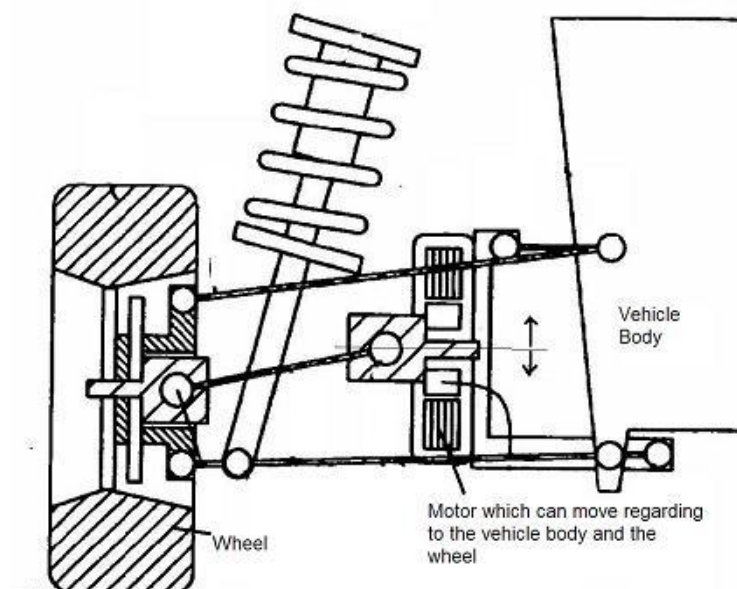
**B60K 2007/0053**

{the motor moving relative to the vehicle body and to the wheel axle}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.



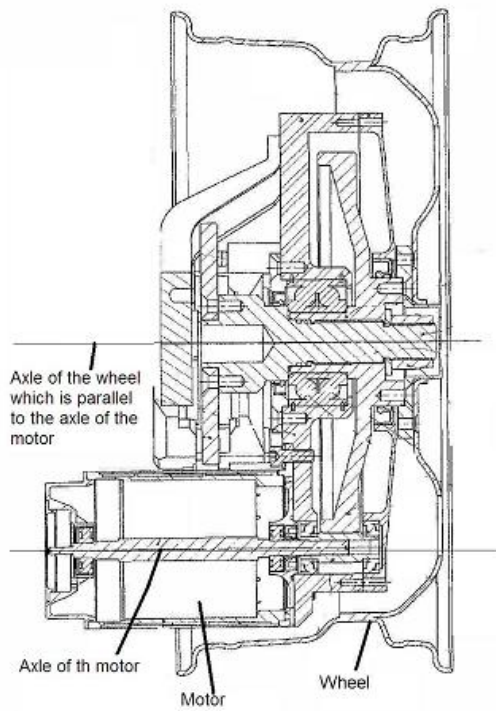
B60K 2007/0061

{the motor axle being parallel to the wheel axle}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.



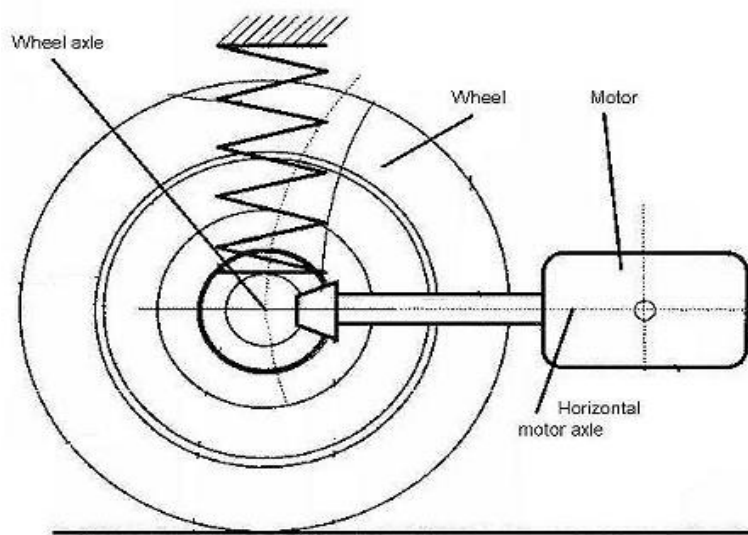
B60K 2007/0076

{the motor axle being horizontal}

Definition statement

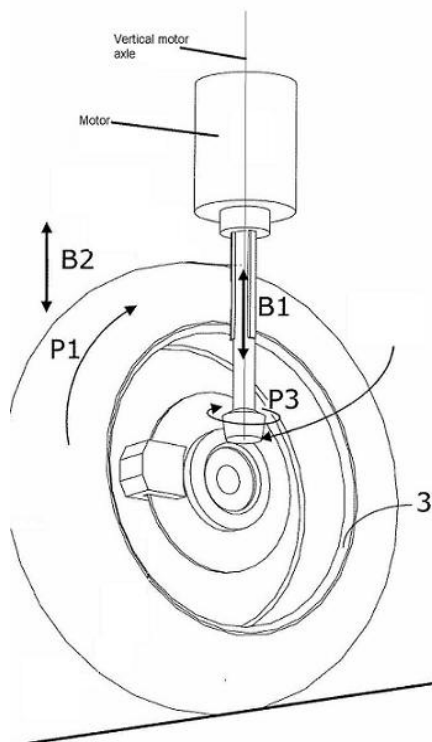
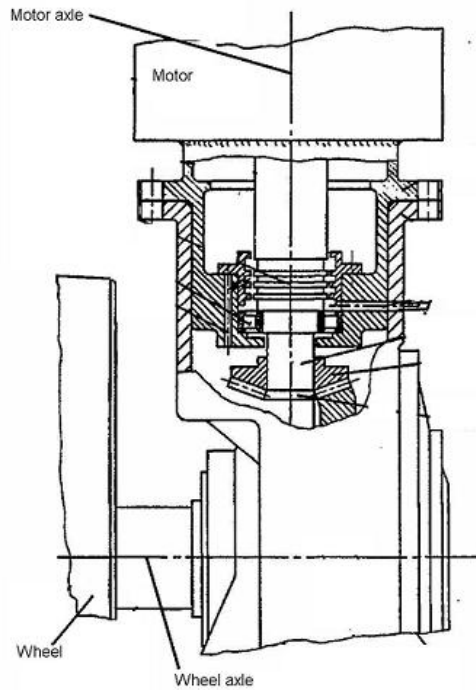
This place covers:

Illustrative example of subject matter classified in this group.



B60K 2007/0084**{the motor axle being vertical}****Definition statement***This place covers:*

Illustrative examples of subject matter classified in this group.



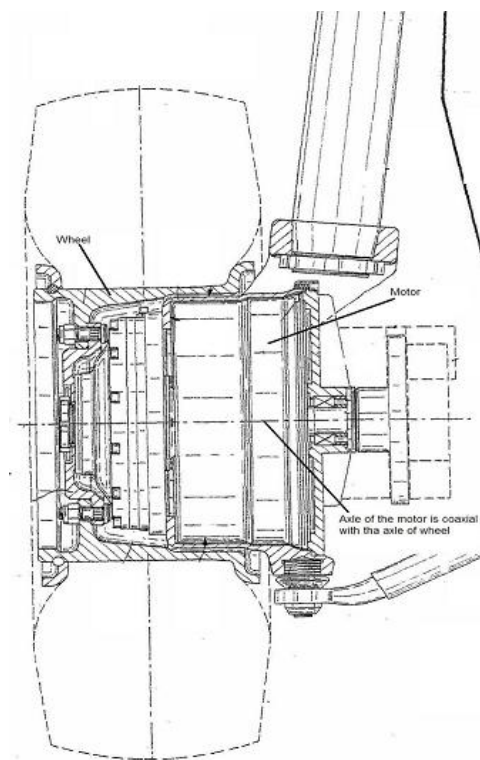
B60K 2007/0092

{the motor axle being coaxial to the wheel axle}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

**References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of electrical propulsion units	B60K 1/00
One motor mounted directly on a propulsion axle for rotating right and left wheels of this axle (for example using a differential between the motors and the driven wheels).	B60K 2001/001
Hybrid vehicles	B60K 6/00
Arrangement in connection of cooling a propulsion unit	B60K 11/00
Transmission disposed in or adjacent the vehicle wheel	B60K 17/043
Wheelchairs	A61G 5/00
Resilient suspensions	B60G 3/00
Electric equipment or propulsion of electrically propelled vehicles	B60L
Arrangements of braking elements	B60T 1/00
Steering linkages	B62D 7/00
Dynamo electric machines (electric motors)	H02K

Special rules of classification

Use of the Indexing Code scheme is mandatory for this main group. Addition information should be given in [B60K 17/043](#) if a transmission is used.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

In, or adjacent to	there is one motor to drive one wheel (or one dual wheels). No differential therebetween.
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B60K 8/00

Arrangement or mounting of propulsion units not provided for in one of main groups [B60K 1/00](#) - [B60K 7/00](#)

Definition statement

This place covers:

These groups comprise documents concerning the arrangement of a motor in a vehicle. The drive motor per se should be classified elsewhere.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of propulsion-unit control devices in vehicles	B60K 26/00
Hot gas displacement engines, use of waste heat of combustion engines	F02G
Spring, weight inertia or like motors	F03G

B60K 11/00

Arrangement in connection with cooling of propulsion units

Definition statement

This place covers:

Documents concerning the arrangement in connection with cooling of the propulsion units in the vehicle.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement in connection with combustion air intake or exhaust of propulsion units in vehicles	B60K 13/00
Arrangement of heating devices for passenger or goods spaces of vehicles	B60H
Cooling devices for passenger or goods spaces of vehicles characterised by the arrangement or the type of heat exchanger, e.g. condenser or evaporator	B60H 1/3227

Methods or circuit arrangements for cooling batteries, specially adapted for electric vehicles	B60L 58/26
Methods or circuit arrangements for cooling fuel cells, specially adapted for electric vehicles	B60L 58/33
Insulating elements for vehicles, e.g. for sound insulation	B60R 13/08
Cooling of internal combustion engines	F01P
Arrangements or mounting of liquid-to-air heat-exchangers for cooling of machines or engines other than in vehicles	F01P 3/18
Guiding or ducting cooling air to, or from, ducted fans	F01P 5/06
Guiding or ducting cooling air to, or from, liquid-to-air heat exchangers	F01P 11/10
Filtering, cooling or silencing cooling air	F01P 11/12
Non-positive-displacement pumps, e.g. ventilators or fans	F04D
Details of radiators	F28F
Arrangements for cooling or ventilating dynamoelectric machines	H02K 9/00

B60K 11/02**with liquid cooling****Definition statement**

This place covers:

These groups comprise an arrangement whereby the element to be cooled (for example the motor) is cooled by liquid.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Air inlets for cooling of propulsion units; Shutters or blinds therefor	B60K 11/08
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B60K 11/04**Arrangement or mounting of radiators, radiator shutters, or radiator blinds****Definition statement**

This place covers:

- Mounting or arrangement of radiators;
- Radiator shutters or blinds mounted directly on the radiator.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Air inlets for cooling of propulsion units in vehicles; Shutters or blinds therefor	B60K 11/08
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Adjustable shutters or blinds for air inlets for cooling of propulsion units in vehicles	B60K 11/085
Arrangement in connection with combustion air intake or gas exhaust of propulsion units in vehicles	B60K 13/00
Arrangements or mounting of liquid-to-air heat-exchangers	F01P 3/18
Details of heat-exchange and heat-transfer apparatus, of general application	F28F

Special rules of classification

Invention classification is given only when the fixing part is on the vehicle. When the fixing part is on the radiator, see groups [F01P 3/18](#) or [F28F](#).

B60K 11/06

with air cooling

Definition statement

This place covers:

These groups comprise an arrangement whereby the element to be cooled (for example the motor) is cooled by air. The way the air is ducted to a radiator (air to liquid heat exchanger) is therefore classified in groups [B60K 11/02](#) or [B60K 11/08](#).

B60K 11/08

Air inlets for cooling; Shutters or blinds therefor

Definition statement

This place covers:

Also air guiding walls in the air inlet passage.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of radiator shutters or radiator blinds, e.g. mounted directly on the radiator	B60K 11/04
Guiding or ducting cooling air to, or from, liquid to air heat exchangers	F01P 11/10

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

air inlet	space between the car body opening to the radiator
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B60K 11/085**{with adjustable shutters or blinds}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Controlling of coolant flow for engines by throttling amount of air flowing to heat exchanger	F01P 7/10
Air flow control member (e.g. louvres, grilles or flaps) in air conditioning apparatus	F24F 13/08
Using more than one tilting member	F24F 13/1413
With parallel lamellae	F24F 13/15

B60K 13/00**Arrangement in connection with combustion air intake or gas exhaust of propulsion units****Definition statement***This place covers:*

Arrangement in the vehicle of combustion air intake or gas exhaust of propulsion unit.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Removing snow or ice from roads or like surfaces by application of heat	E01H 5/10
Exhaust silencers or exhaust apparatus for internal-combustion engines	F01N
Adding substances to exhaust gas	F01N 2610/00
Supplying combustion engines with combustible mixtures or constituents thereof	F02M
Combustion-air cleaners, air intakes, intake silencers, or induction systems specially adapted for, or arranged on, internal-combustion engines	F02M 35/00
Pipes in general	F16L
Noise absorbing hangers or supports for pipes or pipe systems	F16L 55/035

B60K 13/02**concerning intake****Definition statement***This place covers:*

This group comprises for example arrangement of air intake in the car body and the arrangements made in the vehicle between the air intake to the air cleaner.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Bumpers	B60R 19/00
Intercoolers	F02B 29/04
Combustion-air cleaners, air intakes, intake silencers or induction systems for internal-combustion engines	F02M 35/00
Combustion-air filters for internal-combustion engines	F02M 35/024
Arrangement of the air intake system in the engine compartment	F02M 35/161

B60K 13/04

concerning exhaust

Definition statement

This place covers:

Specific arrangement in the vehicle of exhaust element or structure used to fasten exhaust element to a vehicle if the invention is on the vehicle side (special adaptation of the vehicle structure) and not on the exhaust side.

Fixing element of the exhaust mounted on the vehicle frame and not on the exhaust apparatus, e.g. fixing bracket adapted to vehicle frame.

Arrangement of urea tanks in vehicles.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Exhaust silencers or exhaust apparatus for internal-combustion engines	F01N
Exhaust or silencing apparatus characterised by having thermal insulation	F01N 13/14
Exhaust or silencing apparatus characterised by means for fixing exhaust pipes or devices to vehicle bodies	F01N 13/1822

Special rules of classification

"Fixing means for the exhaust manifold or exhaust pipes to the vehicle body" are not classified in [B60K 13/04](#) but in [F01N 13/1805](#). These groups only comprise arrangement of the vehicle frame for mounting the exhaust, like for example, a specific fixing bracket on the vehicle frame. Further examples of documents classified in [B60K 13/04](#) could be a pipe or a urea tank extending through a specific area in the vehicle.

B60K 13/06

using structural parts of the vehicle as ducts, e.g. frame parts

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

A specific form of the carroserie to duct the air in an air intake	B62D
Understructure forming fluid or electrical conduit means	B62D 21/17
Superstructure	B62D 25/00
Floor or bottom sub- units	B62D 25/20

B60K 15/00

Arrangement in connection with fuel supply of combustion engines {or other fuel consuming energy converters, e.g. fuel cells}; Mounting or construction of fuel tanks

Definition statement

This place covers:

Arrangement of tanks in connection with fuel supply of combustion engines, as well as the arrangement of gas tanks in vehicles.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Arrangement in connection with exhaust of propulsion units in vehicles, e.g. of urea tanks	B60K 13/04
Tank vehicles	B60P 3/22
Fuel tanks specially adapted for motorcycles	B62J 35/00
Tanks for aircraft	B64D 37/02
Tanks for storage or transport	B65D
Apparatus or devices for transferring liquids from bulk storage containers or reservoirs into vehicles	B67D 7/00
Tanks for the supply of substances, e.g. urea, to exhaust gases	F01N 2610/1406
Controlling the feeding of liquid fuel from storage containers to carburettors or fuel-injection apparatus	F02D 33/003
Supplying combustion engine with combustible mixtures or constituent thereof	F02M
Apparatus or systems for feeding liquid fuel from storage containers to carburettors or fuel-injection apparatus	F02M 37/00
Valves in general	F16K
Vessels for containing or storing compressed, liquefied or solidified gases	F17C
Indicating or measuring liquid level	G01F 23/00

Fuel cells	H01M 8/00
Reactant storage and supply for fuel cells	H01M 8/04201

B60K 15/01

Arrangement of fuel conduits

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Injection moulding	B29C 45/00
Chassis forming fluid conduit means	B62D 21/17
Pipes in general and connection thereof	F16L

B60K 15/03

Fuel tanks

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement in connection with exhaust of propulsion units in vehicles, e.g. of urea tanks	B60K 13/04
Chassis comprising fluid storage compartment	B62D 21/16
Selective catalytic reduction [SCR]	F01N 3/2066
Tanks for the supply of substances, e.g. urea, to exhaust gases	F01N 2610/1406
Constructional details; Manufacturing or assembly of elements of fuel system; Materials therefor	F02M 37/0011
Details of the fuel feeding system related to multiple separate fuel tanks	F02M 37/0088
Details of the fuel feeding system related to saddle tanks	F02M 37/0094
Armoured vehicle	F41H

B60K 15/03006

{Gas tanks ([B60K 15/07](#) takes precedence)}

References

Limiting references

This place does not cover:

Of gas tanks	B60K 15/07
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Engines characterised by operating on gaseous fuels; Plants including such engines	F02B 43/00
Controlling engines characterised by their use of non-liquid fuels, pluralities of fuels, or non-fuel substances added to the combustible mixtures	F02D 19/00
Apparatus for supplying engines with non-liquid fuels, e.g. gaseous fuels stored in liquid form	F02M 21/00
Vessels for containing or storing compressed, liquefied or solidified gases; fixed capacity gas holders	F17C
Pressure vessels, gas tank	F17C 1/00
Pipe-line systems for liquid gas	F17D 1/08

B60K 2015/03118

{Multiple tanks, i.e. two or more separate tanks}

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Supplementary interior tanks inside the fuel tank	B60K 2015/03105
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B60K 15/03177

{made of non-metallic material, e.g. plastics, or of a combination of non-metallic and metallic material ([B60K 15/03006](#) takes precedence)}

References**Limiting references**

This place does not cover:

Gas tanks	B60K 15/03006
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Blow moulding	B29C 49/00
Blow moulding with insert	B29C 49/20
For specific joining process	B29C 65/00
Welding	B29C 65/02
Riveting	B29C 65/60
Joining elements to hollow article	B29C 65/7802
Shaping techniques and joining techniques together	B29C 69/00
For layered tanks	B32B 27/00

Special rules of classification

Specific fabrication process should be classified in [B29C](#) or [B32B](#).

B60K 2015/0319

{with electronic systems, e.g. for controlling fuelling or venting}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control systems for LPG tanks	B60K 2015/03013
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B60K 2015/03434

{for preventing theft of fuel}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Filter caps for fuel tanks provided with a lock	B60K 15/0409
Locking means for the inlet cover of fuel tank	B60K 2015/0561

B60K 15/035

characterised by venting means

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Engine-pertinent apparatus for adding fuel vapours drawn from engine fuel reservoir to combustion air or fuel-air mixture	F02M 25/08
Valves	F16K
Arrangements for preventing explosion of gas bottles	F17C 13/12

B60K 15/03504

{adapted to avoid loss of fuel or fuel vapour, e.g. with vapour recovery systems}

References

Limiting references

This place does not cover:

Adding fuel vapours drawn from engine fuel reservoir	F02M 25/08
Judging failure of purge control system	F02M 25/0809

Arrangement of valves controlling the admission of fuel vapour to an engine, e.g. valve being disposed between fuel tank or absorption canister and intake manifold	F02M 25/0836
Details of the absorption canister	F02M 25/0854
Details of the fuel vapour pipes or conduits	F02M 25/0872
Layout of the fuel vapour installation	F02M 25/089

B60K 15/03519

{Valve arrangements in the vent line}

References

Limiting references

This place does not cover:

Arrangement of valves controlling the admission of fuel vapour to an engine, e.g. valve being disposed between fuel tank or absorption canister and intake manifold	F02M 25/0836
Details of the fuel vapour pipes or conduits	F02M 25/0872
Layout of the fuel vapour installation	F02M 25/089

B60K 2015/03542

{Mounting of the venting means}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Mounting of venting tubes	B60K 2015/03528
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B60K 15/04

Tank inlets ([B60K 15/077](#) takes precedence)

References

Limiting references

This place does not cover:

With means modifying or controlling distribution or motion of fuel	B60K 15/077
Inlet and filling arrangements for urea tanks	F01N 2610/1413

Informative references

Attention is drawn to the following places, which may be of interest for search:

Filters rigidly mounted on reservoirs or tanks	B01D 35/027
Manufacturing process	B29C , B32B

Supplying fuel to vehicle	B60S 5/02
Arrangements for controlling, indicating registering quantity or price of liquid transferred	B67D 7/08

B60K 15/0406

{Filler caps for fuel tanks}

Definition statement

This place covers:

Filler caps is the detachable/movable cap at the end of the inlet pipe.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Closure caps for liquid coolant	F01P 11/0209
Sealing in general	F16J 15/00

Special rules of classification

A flap/baffle/trap door inside of the pipe is not considered as been a filler cap and should be classified in [B60K 15/04](#)

B60K 15/0409

{Provided with a lock}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Lock in general	E05B
Electrically actuated locks	E05B 47/0001
For fuel inlet covers of vehicle	E05B 83/34

B60K 15/05

Inlet covers

Definition statement

This place covers:

Details of the inlet covers and inlet box

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Superstructure sub-units with access opening having movable or removable closures	B62D 25/24
Superstructure sub-units with access or drainage openings having movable or removable closures	B62D 25/24
Lock in general	E05B
Electrically actuated locks	E05B 47/0001
For fuel inlet covers of vehicle	E05B 83/34
(for fuel inlet covers)	E05B 83/34
Hinges or pivots for doors in general	E05D 7/00

B60K 2015/0515

{Arrangements for closing or opening of inlet cover}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Locking means for the inlet cover	B60K 2015/0561
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B60K 15/06

characterised by fuel reserve systems

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Filtering elements in the tanks	B01D 35/027
Fuel tanks specially adapted for motor cycles	B62J 35/00
Feeding apparatus for carburettors with multiple separate fuel tanks	F02M 37/0088
Mounting of pumps on fuel tank	F02M 37/103
The pump being installed in a sub tank	F02M 37/106
Apparatus for feeding liquid fuel to the carburettors with a main and auxiliary pump	F02M 37/18

B60K 15/061**{with level control}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Controlling the feeding of liquid fuel from the tank to the carburettors	F02D 33/003
Devices of the fuel feeding system inside the tank other than pumps or filter	F02M 37/0082
Measuring liquid level	G01F 23/00

B60K 15/063**Arrangement of tanks****Definition statement***This place covers:*

In particular tanks having a specific position in the vehicle

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Arrangement of the urea tank in the vehicle	B60K 13/04
Understructure having a fluid storage compartment	B62D 21/16
Floor and bottom sub units of the superstructure of the vehicle	B62D 25/20
Urea Tank	F01N 2610/148
Engine working with a plurality of fuel	F02D 19/06

B60K 15/07**of gas tanks****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Mounting arrangements for vessels	F17C 13/08
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B60K 15/073

Tank construction specially adapted to the vehicle ([B60K 15/077](#) takes precedence)

Definition statement

This place covers:

Fuel container shape designed to fit framework

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Tanks specially adapted for motor cycles	B62J 35/00
Saddle tanks in feeding apparatus for the carburettors	F02M 37/0094

B60K 15/077

with means modifying or controlling distribution or motion of fuel, e.g. to prevent noise, surge, splash or fuel starvation

Definition statement

This place covers:

Container including devices to influence the motion or distribution of the fuel, e.g. swirl pots or fuel level control between dual tanks.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Anti-slosh devices in large containers	B65D 90/52
Details on the fuel return circuit	F02M 37/0052
Feeding by a liquid fuel driven jet pump	F02M 37/025
Submerged in fuel, e.g. in reservoir	F02M 37/10
Mounting pumps on fuel tanks	F02M 37/103
The pump being installed in a sub-tank	F02M 37/106
Feeding apparatus characterized by main and auxiliary pump	F02M 37/18

B60K 2015/0772

{Floats in the fuel tank}

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Float valves; Floats therefor	B60K 2015/03289
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B60K 15/10**concerning gas-producing plants****Definition statement**

This place covers:

Plants mounted in the vehicle and used for producing gas for the propulsion of the vehicle.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Electric vehicles using power supplied by batteries or fuel cells	B60L 50/50
Production of gases containing carbon monoxide and hydrogen from solid carbonaceous materials by partial oxidation processes involving oxygen or steam	C10J
Engine plants characterised by the engines using gaseous fuel generated in the plant from solid fuel, e.g. wood	F02B 43/08
Fuel cells	H01M 8/00
Structural combinations of fuel cells with other electrochemical devices	H01M 16/003

B60K 16/00

Arrangements in connection with power supply of propulsion units in vehicles from forces of nature, e.g. sun or wind (electric propulsion with power supply from forces of nature, e.g. sun or wind, [B60L 8/00](#); wind motors specially adapted for installation on vehicles [F03D 9/32](#))

References**Limiting references**

This place does not cover:

Electric propulsion with power supply from forces of nature, e.g. sun or wind	B60L 8/00
Wind motors specially adapted for installation on vehicles	F03D 9/32

Informative references

Attention is drawn to the following places, which may be of interest for search:

Rider propulsion of wheeled vehicle with additional power source comprising solar cells	B62M 6/85
Marine propulsion by wind motors driving water-engaging propulsive elements	B63H 13/00
Alleged perpetua mobilia using hydrostatic thrust	F03B 17/04
Wind motors	F03D
Controlling wind motors	F03D 7/00
Alleged perpetua mobilia with mechanical-power-producing mechanisms	F03G 7/10

Circuit arrangements for charging batteries comprising light sensitive cells	H02J 7/35
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B60K 17/00

Arrangement or mounting of transmissions in vehicles

Definition statement

This place covers:

This group is given only if there is a specific arrangement/mounting of the transmission in the vehicle. The different elements of the transmission per se are classified elsewhere and should not be classified in [B60K 17/00](#) (e.g. [F16H](#) gearings, [F16D](#) clutches). Even the connection between the elements is to be classified elsewhere in most of the cases (see, for example, [H02K 7/10](#) structural association of electric machines with clutches, brakes, gears).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of control devices for vehicle transmissions	B60K 23/00
Torque-transmitting wheel axles	B60B 35/12
Vehicle suspension arrangements	B60G
Conjoin control of propulsion units	B60W 30/18
Steering of deflectable wheels	B62D 9/00
Steering non-deflectable wheels using gearings with differential power outputs on opposite sides	B62D 11/10
Understructures	B62D 21/00
Endless track vehicles	B62D 55/00
Assembling motor vehicles by joining sub-units or components, the components being engines, clutches or transmissions, with respect to the body shell or other sub-units or components	B62D 65/10
Combinations of combustion engines with mechanical gearing	F02B 61/06
Clutches	F16D
Suppression of vibrations	F16F
Gearing	F16H

B60K 17/02

characterised by arrangement, location, or kind of clutch

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Braking elements acting on transmission parts	B60T 1/062
Control of drivelines clutches and change speed gearing speed in vehicles	B60W 10/02 , B60W 10/10

Steering non deflectable wheels using brakes or clutches as main steering effecting means	B62D 11/08
Vehicles with variable number of ground engaging wheels	B62D 61/12
Clutches per se, e.g. construction thereof; Control of clutches	F16D
Clutches with interengaging parts	F16D 11/00
Friction clutches	F16D 13/00
Fluid actuated clutches	F16D 25/00
Magnetically actuated clutches	F16D 27/00
Automatic clutches	F16D 43/00

B60K 17/04

characterised by arrangement, location or kind of gearing

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of plural diverse prime-movers for mutual or common propulsion, e.g. hybrid propulsion systems	B60K 6/00
Hybrid electric vehicles characterised by the transmission gearings	B60K 6/36
Hybrid electric vehicles characterised by the assembly or relative disposition of components	B60K 6/40
Architecture of the driveline in hybrid electric vehicles	B60K 6/50
Arrangement of propulsion on amphibious vehicle	B60F 3/0007
Electric equipment or propulsion of electrically-propelled vehicles per se	B60L
Combinations of mechanical gearings	F16H 37/00
Combinations of mechanical gearing with fluid gearing	F16H 47/00
Gearboxes; Mounting gearing therein	F16H 57/02
Support of gearboxes, e.g. torque arms, or attachment to other devices	F16H 57/025
Gearboxes using a combination of several standardised units	F16H 57/033
Features relating to lubrication or cooling of gearing	F16H 57/04

B60K 17/043

{Transmission unit disposed in on near the vehicle wheel, or between the differential gear unit and the wheel}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Motor arranged in or near the wheels	B60K 7/00
Suspension	B60G

Brake	B60T
Steering linkage	B62D 7/00
Structural association of electric machines with clutches brakes, gears, pulleys or mechanical starter	H02K 7/10
Association of electric motors with gears	H02K 7/116
Counter rotating rotors of electric machines	H02K 16/005

Special rules of classification

Code for additional information [B60K 17/043](#) is systematically given for documents classified in group [B60K 7/00](#) having a transmission gear between motor and vehicle wheel.

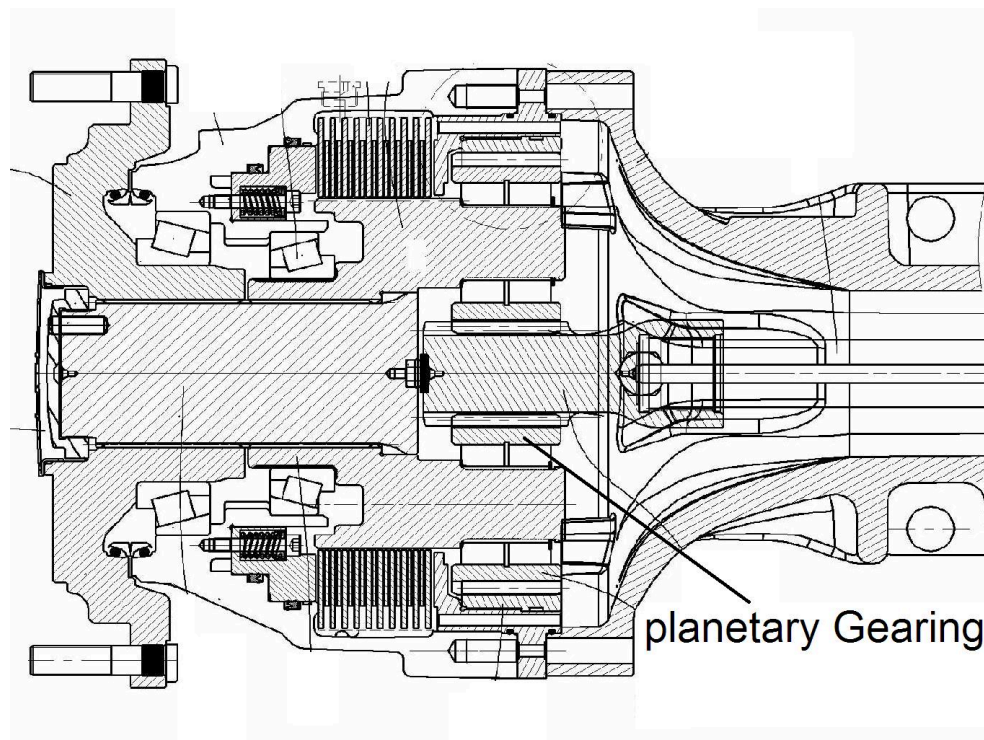
B60K 17/046

{with planetary gearing having orbital motion}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group:



References

Limiting references

This place does not cover:

Gearings with gears having orbital motion	F16H 1/00
Gearing with variable gear ratio using gear having orbital motion	F16H 3/44
Lubrication/cooling of planetary gearings	F16H 57/0482

B60K 17/06

of change-speed gearing ([B60K 17/10](#) - [B60K 17/16](#) take precedence)

References**Limiting references**

This place does not cover:

of fluid gearing	B60K 17/10
of differential gearing	B60K 17/16
Gearing with variable gear ratio	F16H 3/00

B60K 17/10

of fluid gearing

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of transmissions in vehicles characterised by arrangement, location or kind of clutch	B60K 17/02
Fluid or electric gearing in vehicles with motor being disposed in, or adjacent to, traction wheel	B60K 17/14
Positive-displacement machines for liquids; Pumps	F04B
Rotary-piston, or oscillating-piston, positive-displacement machines for liquids; Rotary-piston or oscillating-piston, positive-displacement pumps	F04C
Non-positive-displacement pumps	F04D
Pumping of fluid by direct contact of another fluid or by using inertia of fluid to be pumped	F04F
Rotary fluid gearing using pumps and motors of the volumetric type	F16H 39/00
Combinations of mechanical gearing with fluid clutches or fluid gearing	F16H 47/00
Control of hydrostatic gearing	F16H 61/40

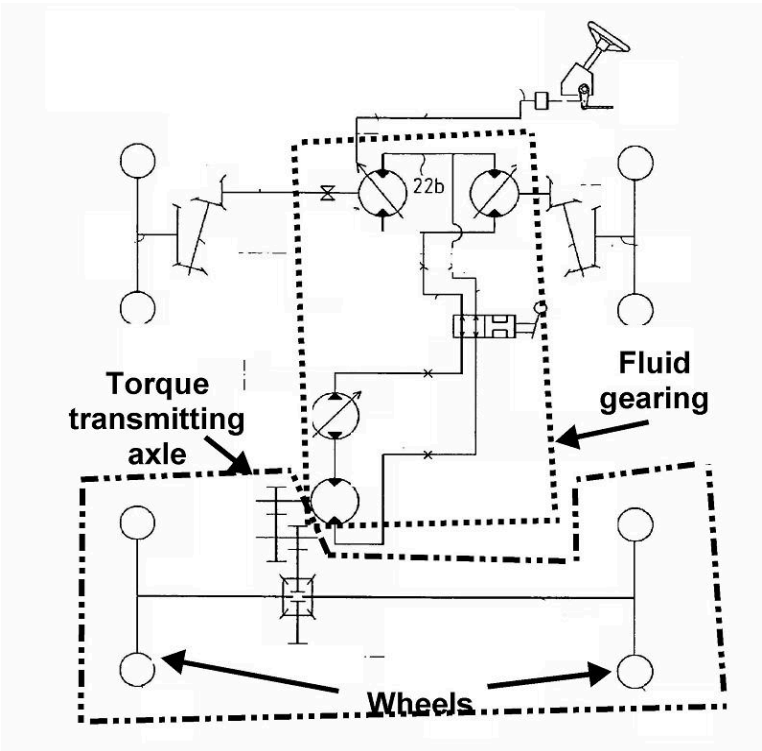
B60K 17/105

{Units comprising at least a part of the gearing and a torque-transmitting axle, e.g. transaxles ([B60K 17/14](#) takes precedence)}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.



References

Limiting references

This place does not cover:

The motor of fluid or electric gearing being disposed in or adjacent to traction wheel	B60K 17/14
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B60K 17/12

of electric gearing

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of electrical propulsion units in vehicles	B60K 1/00
Disposition of motor in, or adjacent to, traction wheel	B60K 7/00
Arrangement or mounting of transmissions in vehicles characterised by arrangement, location or kind of clutch	B60K 17/02

Fluid or electric gearing in vehicles with motor being disposed in, or adjacent to, traction wheel	B60K 17/14
Electric equipment or propulsion of electrically propelled vehicles	B60L
Electric device for safety purposes, monitoring variables on electric vehicles	B60L 3/00
Methods for controlling the speed/torque of electric vehicles	B60L 15/00
Electric propulsion with power supplied within the vehicle	B60L 50/00
Conjoint control including the control of electric propulsion units	B60W 10/08
Arrangements for non-automatic engine control initiation means, e.g. operator initiated, characterised by electric type control linkages (Drive-by-wire)	F02D 11/10
Dynamo-electric clutches; Dynamo-electric brakes	H02K 49/00
Dynamo-electric gears, i.e. dynamo-electric means for transmitting mechanical power from a driving shaft to a driven shaft and comprising structurally interrelated motor and generator parts	H02K 51/00

B60K 17/14

the motor of fluid or electric gearing being disposed in, or adjacent to, traction wheel

Definition statement

This place covers:

Electric or fluid gearing whereby the motor (electric or hydraulic) is disposed in or adjacent to the traction wheel. In these groups are in particular documents showing "electric or hydraulic differential".

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Disposition of motor in, or adjacent to, traction wheel	B60K 7/00
Arrangement or mounting of transmissions in vehicles for driving both front and rear wheels having fluid or electric motor, for driving one or more wheels	B60K 17/356
Steering non-deflectable wheels using gearings with differential power outputs on opposite sides, with additional power being supplied hydraulically to one side	B62D 11/18
Hydraulic motors	F03C
Rotary fluid gearing using pumps and motors of the volumetric type	F16H 39/00

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

in, or adjacent to	there is one motor driving one wheel (or dual wheels forming a unit) without a differential in between
--------------------	--

B60K 17/16**of differential gearing****Definition statement**

This place covers:

Arrangement of differential gearings in the vehicle.

References**Limiting references**

This place does not cover:

Central differential for front and rear wheels driving	B60K 17/348 , B60K 17/346
Mounting of ball or roller bearing, fixing them onto shaft or in housing	F16C 35/06
Universal joints	F16D 3/16
Differential gearing	F16H 48/00
Mechanical differentials gearings without member having orbital motion	F16H 48/12
Mounting or installation of gears in the gearbox casing	F16H 57/023
Housing for gearboxes with means for reducing vibrations	F16H 57/028
Gearboxes for accommodating differential gearings	F16H 57/037
Cooling/lubrication of differential gearings	F16H 57/0483
Electric motor structurally associated with gears	H02K 7/116

Informative references

Attention is drawn to the following places, which may be of interest for search:

Gearings per se	F16H
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Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Axle units with differential	rigid casings comprising wheel drive shafts, bearings therefore and a differential, e.g. casing made of pressed sheet metal (see also axle units B60B 35/00 , gearboxes with integrated axle drive).
Differential gearing	Differential or means having the same function

B60K 17/165

{provided between independent half axles ([B60K 17/18](#), [B60K 17/20](#) take precedence)}

Definition statement

This place covers:

More the arrangement of such a differential in the vehicle

References

Limiting references

This place does not cover:

Arrangement or mounting of transmissions in vehicles in which the differential movement is obtained by resilient means	B60K 17/18
Arrangement or mounting of transmissions in vehicles in which the differential movement is limited	B60K 17/20
Steering deflectable wheels with means for differentially distributing power on the deflectable wheels during cornering	B62D 9/00
Arrangement for suppressing or influencing the differential action, e.g. locking devices	F16H 48/20

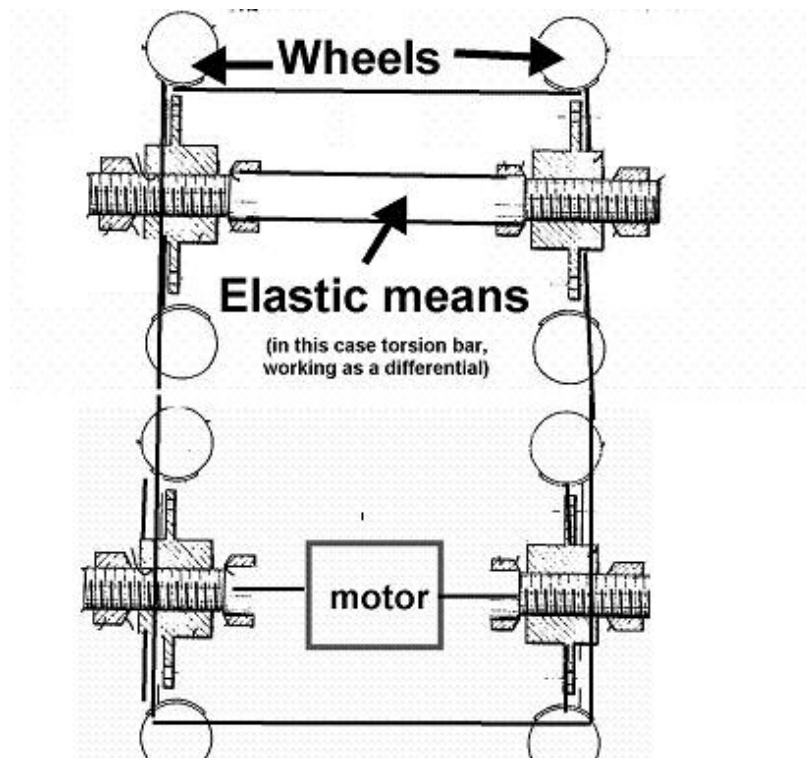
B60K 17/18

{in which the differential movement is obtained by resilient means}

Definition statement

This place covers:

Arrangement in the vehicle of differential means, whereby the difference of rotation speed between the two output shafts of the differential means is obtained using resilient means.



B60K 17/20**{in which the differential movement is limited}****References****Limiting references***This place does not cover:*

The transfer gear being a differential gear	B60K 17/346
Arrangement of control for differentials	B60K 23/04
Combinations of mechanical gearing having orbital motion with fluid clutches	F16H 47/08
Arrangement for suppressing or influencing the differential action, e.g. locking devices	F16H 48/20

Informative references*Attention is drawn to the following places, which may be of interest for search:*

Differentials with electric motor for torque vectoring per se	F16H 48/36
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B60K 17/22**characterised by arrangement, location, or type of main drive shafting, e.g. cardan shaft****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Torque transmitting axles for the wheels	B60B 35/12
Shafts	F16C
Shaft, axle	F16C 3/00
Bearings of crankshafts or connecting rod in general	F16C 9/00
Elastic or yielding bearings for exclusively rotary movement	F16C 27/00
Couplings for transmitting rotation	F16D
Suppression of vibration	F16F 15/00

B60K 17/26**characterised by arrangement, location, or type of freewheel device****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Arrangement of control for freewheels	B60K 23/06
Freewheels or freewheel clutches per se	F16D 41/00

Automatic clutches actuated entirely mechanically	F16D 43/02
Differential gearings without members having orbital motion	F16H 48/12

B60K 17/28

characterised by arrangement, location, or type of power take-off

Definition statement

This place covers:

Gearings comprising a power take off, which is for "extern" devices and not for other part of the vehicle like alternator, pump, fan for motor cooling etc.

References

Limiting references

This place does not cover:

Auxiliary drives from the transmission power take off (for example if the document describes a connection between the power take off shaft and the driven device	B60K 25/06
"Clutch-brake combinations" if it concerns the connection/disconnection of the power take off	F16D 67/02

Informative references

Attention is drawn to the following places, which may be of interest for search:

Auxiliary drives from the transmission power take-off if for example it is a connection between the power take-off shaft and the driven device	B60K 25/06
Tractors	B62D 49/00
Clutch-brake combinations if it concerns the connection disconnection of the power take off	F16D , F16D 67/02
Combination of mechanical gearing with fluid clutches or fluid gearings	F16H 47/00

B60K 17/30

the ultimate propulsive elements, e.g. ground wheels, being steerable

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Motor disposed in the wheels	B60K 7/00
Steering controls, i.e. means for initiating a change of direction of the vehicle	B62D 1/00
Steering linkage, Stub axles or their mounting	B62D 7/00
Steering knuckles; king pins	B62D 7/18
Universal joints	F16D 3/16

B60K 17/303

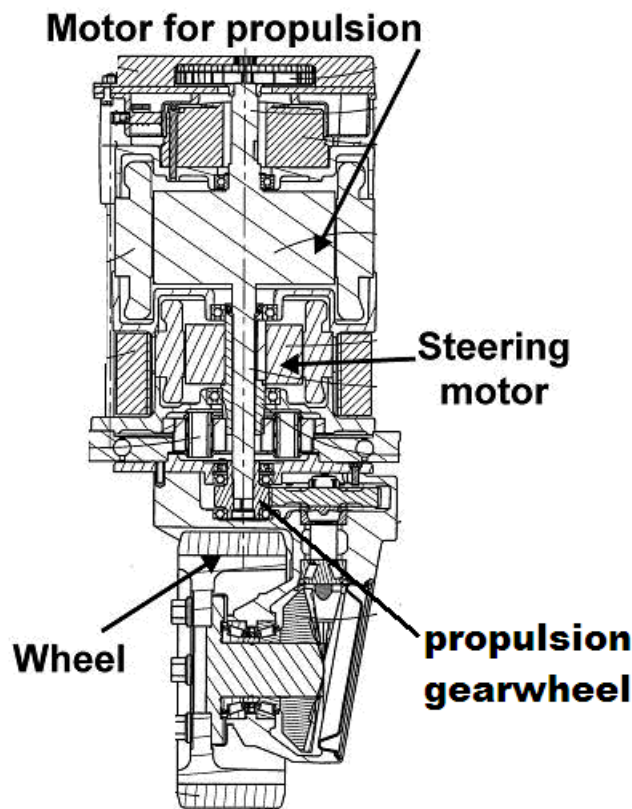
{with a gearwheel on the steering knuckle or kingpin axis}

Definition statement

This place covers:

The ultimate propulsive element is steerable and the propulsive gearwheel being located on the steering knuckle or arranged in line with the kingpin axis.

Illustrative example of subject matter classified in this group:



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Device for lifting or lowering bulky or heavy goods for loading and unloading purposes	B66F 9/00
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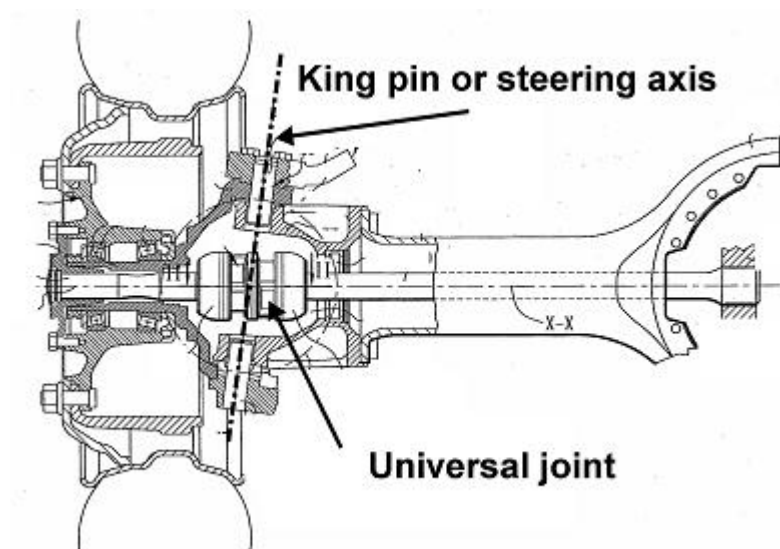
B60K 17/306

{with a universal joint in the axis of the steering knuckle}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.



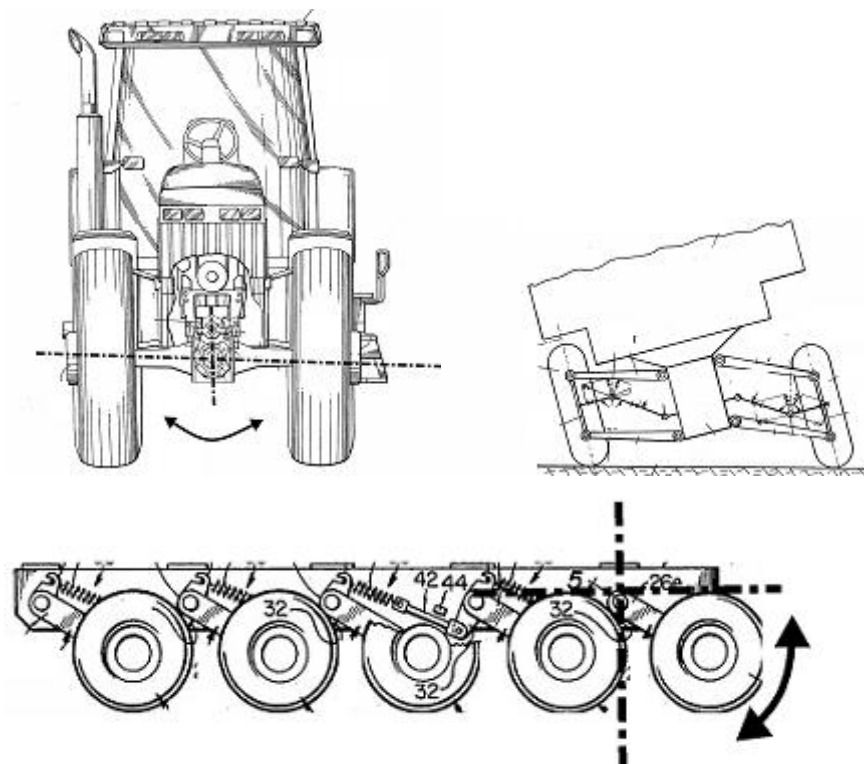
B60K 17/32

the ultimate propulsive elements, e.g. ground wheels, being rockable about a horizontal pivot

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

**References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Suspensions	B60G
Vehicles with more than four wheels	B62D 61/10

B60K 17/34

for driving both front and rear wheels, e.g. four wheel drive vehicles

Definition statement

This place covers:

In this particular case, all four-wheel transmissions per se are classified in these groups and not only the arrangement in the vehicle.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of control devices for changing number of driven wheels	B60K 23/08
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B60K 17/342

having a longitudinal, endless element, e.g. belt or chain, for transmitting drive to wheels

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement of propulsion means on amphibious vehicles	B60F 3/0007
Vehicles with more than four wheels	B62D 61/10

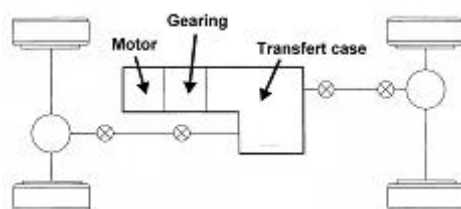
B60K 17/344

having a transfer gear

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.



References

Limiting references

This place does not cover:

Cooling or lubrication of gearing	F16H 57/04
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Clutches	F16D
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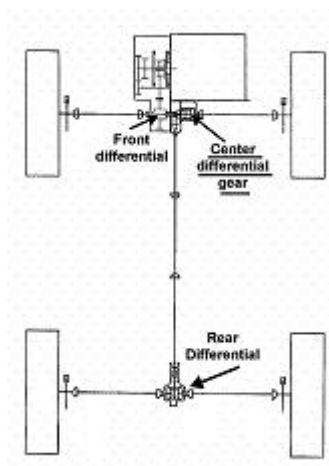
B60K 17/346

the transfer gear being a differential gear

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

**References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Combinations of mechanical gearings with differential gearings and a plurality of driven shafts and one input shaft	F16H 37/0813
Differential gearings per se	F16H 48/00
Cooling lubrication of differentials	F16H 57/0483

B60K 17/3462

{with means for changing distribution of torque between front and rear wheels}

Definition statement

This place covers:

Transfer gears using for example clutches or differentials with a locking device. The locking device or other means for changing distribution of torque are arranged inside the transfer gear box.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Arrangement of control devices for varying the torque distribution between the driven axles	B60K 23/0808
Arrangements for regulating the brake forces specially adapted for four-wheel drive vehicles	B60T 8/1769
Arrangements for suppressing or influencing the differential action per se	F16H 48/20

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

with	inside of the transfer gear box
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B60K 17/3465

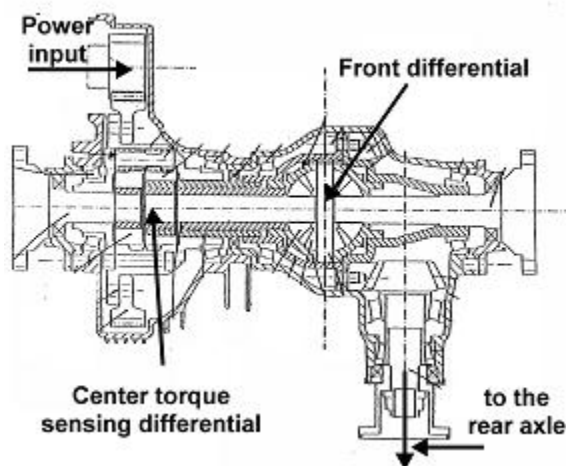
{self-actuated means, e.g. differential locked automatically by difference of speed}

Definition statement

This place covers:

Using typically viscous couplings (difference of speed) or torque sensing differentials arranged inside the transfer gear box.

Illustrative example:



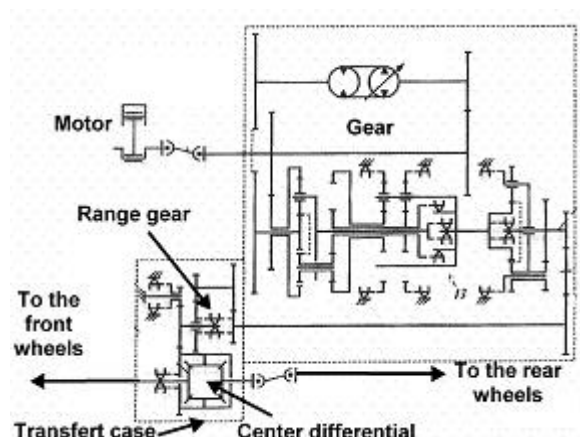
B60K 17/3467

{combined with a change speed gearing, e.g. range gear}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.

**References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Toothed gearings with variable gear ratio and having an orbital motion	F16H 3/44
--	---------------------------

B60K 17/348

having differential means for driving one set of wheels, e.g. the front, at one speed and the other set, e.g. the rear, at a different speed ([B60K 17/346](#) takes precedence)

References**Limiting references**

This place does not cover:

Arrangement of transmissions in vehicles for driving both front and rear wheels having a differential transfer gear	B60K 17/346
---	-----------------------------

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement of transmissions in vehicles for driving both front and rear wheels having a transfer gear	B60K 17/344
Arrangement of control devices for varying the torque distribution between the driven wheels	B60K 23/0808

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

differential means	means which permit the front and the rear axles to rotate at different speed like for example: clutches, viscous connecting means
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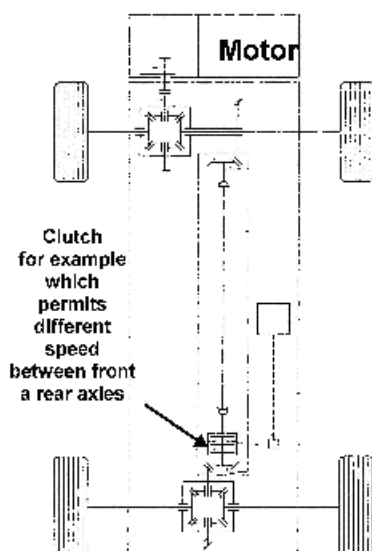
B60K 17/35

including arrangements for suppressing or influencing the power transfer, e.g. viscous clutches

Definition statement

This place covers:

Illustrative example of subject matter classified in this place:



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of transfer gears for driving both front and rear wheels	B60K 17/344
Transfer gears with means for changing the distribution of torque between front and rear wheels	B60K 17/3462
Arrangement of control devices for varying the torque distribution between driven axles	B60K 23/0808
Differential gearing with arrangements for suppressing or influencing the differential action, e.g. locking devices	F16H 48/20

B60K 17/3505

{with self-actuated means, e.g. by difference of speed}

Definition statement

This place covers:

Front and rear wheel driven vehicle comprising a particular self actuated arrangement for influencing the power transfert between the front and the rear wheels

References

Limiting references

This place does not cover:

Transfer gear with self actuating means for changing the distribution of torque between rear and front wheels	B60K 17/3465
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Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Self actuated	without using an external command. For example: one way clutch, viscous clutch
---------------	--

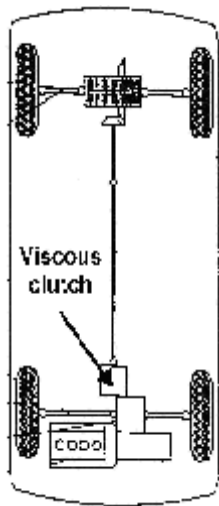
B60K 17/351

{comprising a viscous clutch}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.



References

Limiting references

This place does not cover:

Transfer case having self actuated means (if for example the viscous clutch is in the transfer case housing)	B60K 17/3465
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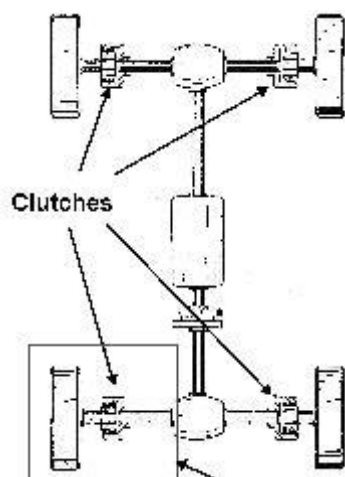
B60K 17/3515

{with a clutch adjacent to traction wheel, e.g. automatic wheel hub}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.



A driven wheel can be coupled independently.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Clutches	F16D
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Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Adjacent	between the wheel and the differential housing
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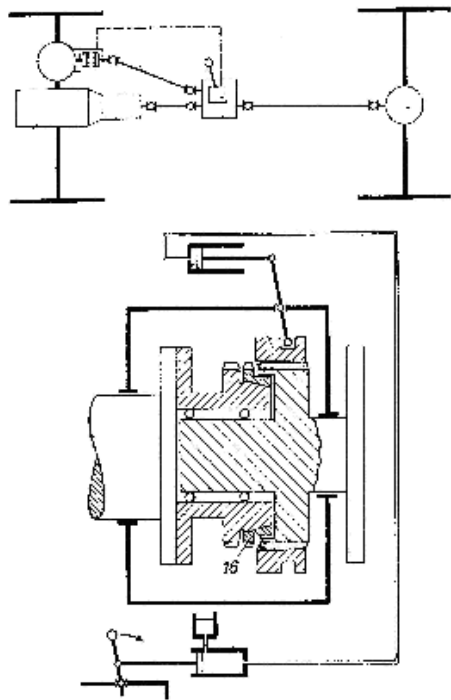
B60K 17/352

{manually operated}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Manually actuated mechanical control mechanisms	G05G 9/08
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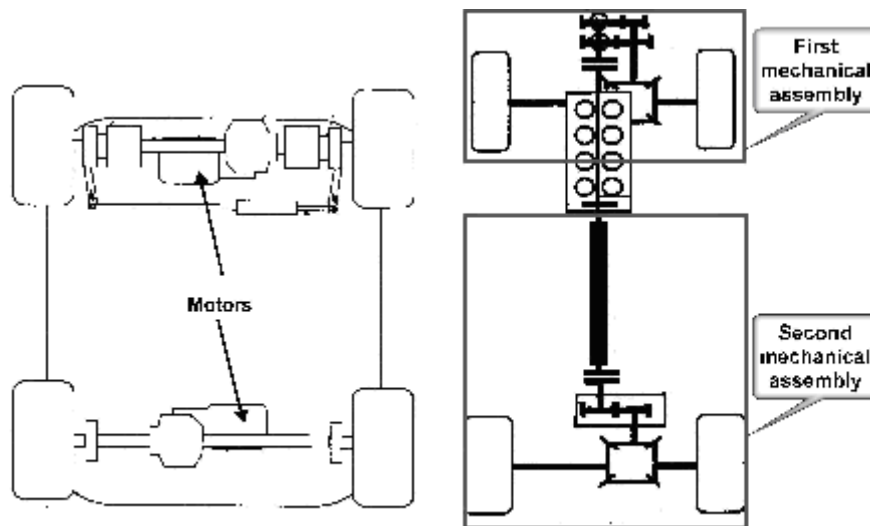
B60K 17/354

having separate mechanical assemblies for transmitting drive to the front or to the rear wheels or set of wheels

Definition statement

This place covers:

Illustrative examples of subject matter classified in this group.

**References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Hybrid vehicles comprising electric and combustion engines	B60K 6/20
Hybrid vehicles driving a plurality of drive axles e.g. four wheel drive	B60K 6/52
Conjoin control including the control of driveline clutches	B60W 10/02
Conjoin control including the control of propulsion units	B60W 10/04
Conjoin control for hybrid vehicle characterized by a method for conjointly controlling different sub units	B60W 20/00

B60K 17/356

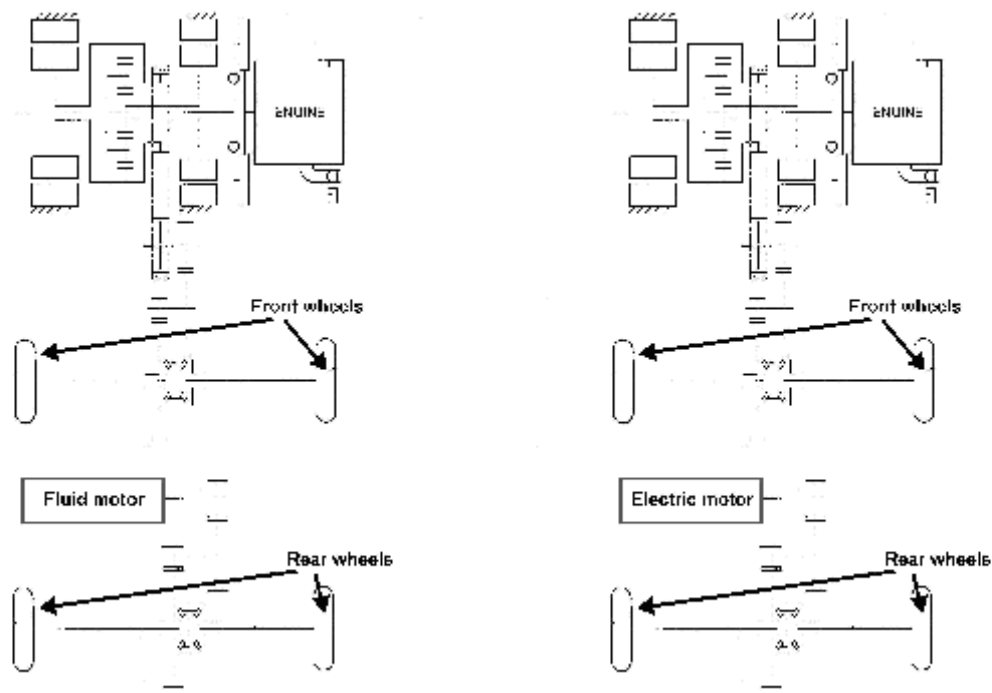
having fluid or electric motor, for driving one or more wheels

Definition statement

This place covers:

The transmissions which comprise a main assembly for transmitting power and furthermore a fluid or electric motor(s) for driving one or more wheels.

Illustrative examples of subject matter classified in this place:



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Prime movers comprising combustion engines and mechanical or fluid energy storing means	B60K 6/08
Hybrid vehicles comprising electric and combustion engines	B60K 6/20
Hybrid vehicles driving a plurality of drive axles, e.g. with four-wheel drive	B60K 6/52
Disposition of motor in, or adjacent to, traction wheel	B60K 7/00
Conjoint control of vehicle sub-units of different type or different function, including the control of driveline clutches	B60W 10/02
Conjoint control of vehicle sub-units of different type or different function, including control of propulsion units	B60W 10/04
Control systems specially adapted for hybrid vehicles	B60W 20/00

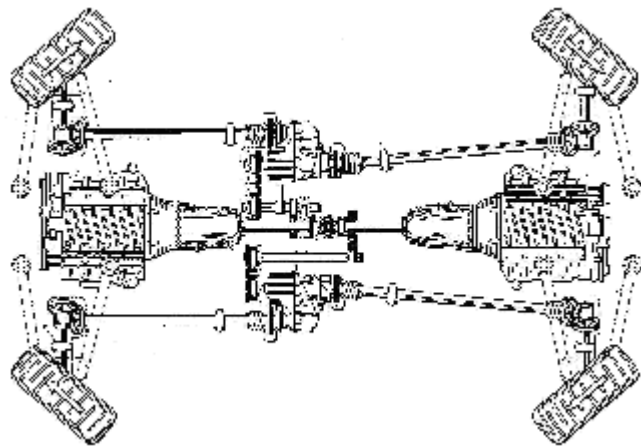
B60K 17/358

{all driven wheels being steerable}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Steering for trailer for centrally pivoted axles	B62D 13/00
Vehicles with more than four wheels	B62D 61/10

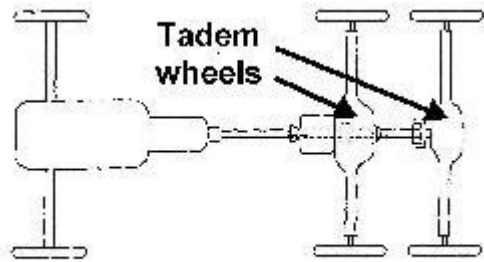
B60K 17/36

for driving tandem wheels

Definition statement

This place covers:

Illustrative example of subject matter classified in this group.



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Tractors comprising traction increasing arrangements	B62D 49/0621
Vehicles with more than four wheels	B62D 61/10

B60K 20/00

Arrangement or mounting of change-speed gearing control devices in vehicles

Definition statement

This place covers:

The arrangement in the vehicle of the change speed gearing control devices. The change speed control device per se is classified in [F16H 59/02](#).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Movable drivers' cabs characterised by special adaptations of vehicle control devices	B62D 33/073
Control inputs to change-speed- or reversing-gearings for conveying rotary motion	F16H 59/00
Selector apparatus to change-speed-, or reversing-gearings	F16H 59/02
Control functions within change-speed- or reversing-gearings for conveying rotary motion	F16H 61/00
Controlling members for hand actuation by pivoting movement in general, e.g. levers	G05G 1/04
Controlling members for hand actuation by rotary movement in general, e.g. hand wheels	G05G 1/08

B60K 20/02

of initiating means

Definition statement

This place covers:

Only the arrangement or mounting in the vehicle. The change speed gearing control devices per se are classified in [F16H 59/00](#).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Adaptation for additional use of the arm-rests of vehicle seats	B60N 2/79
Adaptation of the arm-rests of vehicle seats for electrical control, e.g. by using switches	B60N 2/797

Selector apparatus to change-speed-, or reversing-gearings	F16H 59/02
Selector apparatus for automatic transmissions with means for range selection and manual shifting	F16H 59/0204
Selector apparatus with means for suppression of vibrations or reduction of noise	F16H 59/0208
Constructional features of the selector lever, e.g. grip parts, mounting or manufacturing	F16H 59/0278
Ratio selector apparatus	F16H 59/04
Ratio selector apparatus consisting of electrical switches or sensors	F16H 59/044
Control devices or systems insofar as characterised by mechanical features only	G05G

B60K 23/00

Arrangement or mounting of control devices for vehicle transmissions, or parts thereof, not otherwise provided for

Definition statement

This place covers:

- Driver input members for controlling the main clutch comprising arrangements and mountings of pedals or paddles, clutch actuator transmission means of mechanical, electrical or hydraulic type and mounting of final actuators in the vehicle;
- Arrangements and mountings of automated clutch actuators using, e.g. mechanical, electromechanical or hydraulic means;
- Driver input members for controlling differential gearings comprising arrangements and mountings of levers, pedals or switches to lock a differential or to modify torque or speed distribution;
- Manual or automatic actuating means for locking or opening a freewheel device;
- Manual or automatic actuating means for switching from two to four-wheel drive;
- Automatic controllers for varying the torque distribution between axles, e.g. between the front and the rear wheels.

Relationships with other classification places

[B60K 23/00](#) concerns the mountings or arrangements of control units related to a particular sub-unit not otherwise provided for in [B60K](#).

The arrangements and mounting of input devices for change speed gearing are classified in [B60K 20/00](#).

The arrangements and mounting of input devices for propulsion units are classified in [B60K 26/00](#).

Vehicle drive control systems in general that are used for conjoint control and not related to a particular sub-unit are classified in [B60W 30/00](#).

Arrangement or mounting of gearings for driving both front and rear wheels [B60K 17/34](#).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement or mounting of clutches in vehicles	B60K 17/02
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Arrangement or mounting of differential gearing in vehicles	B60K 17/16
Arrangement or mounting of freewheel devices in vehicles	B60K 17/26
Control systems for conjoint control of vehicle sub-units of different type or different function comprising clutch units	B60W 10/02
Propulsion control with common controlling member for different functions, e.g. conjoint engine and clutch control member	B60W 30/18181
Steering non-deflectable wheels using gearings with differential power outputs on opposite sides	B62D 11/10
Movable drivers' cabs characterised by special adaptations of vehicle control devices	B62D 33/073
Couplings for transmitting rotation; Clutches; Brakes	F16D
Fluid actuated clutches	F16D 25/00
Freewheel clutches in general	F16D 41/00
Control devices for clutches per se	F16D 48/00
Gearing	F16H
Control functions within change-speed- or reversing-gearings in general	F16H 61/00
Control of hydrostatic transmissions	F16H 61/40
Controlling members for hand actuation by pivoting movement in general, e.g. levers	G05G 1/04
Controlling members for hand actuation by rotary movement in general, e.g. hand wheels	G05G 1/08
Controlling members actuated by foot in general	G05G 1/30

Special rules of classification

Use of the Indexing Code scheme is mandatory. When classifying in group [B60K 23/00](#) classification must also be made in groups [B60K 23/00](#) - [B60K 2023/0841](#) for special features of clutch control, in [B60Y 2400/00](#) for special features in general and in [B60Y 2300/00](#) in order to identify the purpose and in [B60W 10/00](#) for controlled sub-units [B60W 2510/00](#) - [B60W 2530/213](#) for controller input parameters and [B60W 2710/00](#) - [B60W 2720/406](#) for output target values.

B60K 2023/025

{Adjusting of clutch pedal positions}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Friction clutch adjustment for removing slack	F16D 13/75
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B60K 25/00

Auxiliary drives (arrangement of tyre-inflating pumps mounted on vehicles [B60C 23/10](#))

Definition statement

This place covers:

Drives for auxiliaries, including input power source, transmission and auxiliary output.

The driving power source is determinant for the subgroup and is either:

- directly from an engine shaft: [B60K 25/02](#);
- from static or dynamic pressure or vacuum, developed by the engine: [B60K 25/04](#);
- from a transmission power take-off, PTO shaft: [B60K 25/06](#);
- from a ground wheel, e.g. engaging the wheel tread or rim: [B60K 25/08](#);
- directly from oscillating movements due to vehicle running motion: [B60K 25/10](#).

The drives are of any transmission type: belts, chains, gear trains, hydrostatic transmissions or electric transmissions using alternators/motors connected to a battery.

Auxiliary are all kind of vehicle auxiliaries as:

- Pumps for steering servos;
- Pumps for any hydraulic actuators for onboard implements;
- Compressors for air conditioning;
- Vacuum pumps for braking assistance;
- Alternators or generators.

Relationships with other classification places

[B60K 25/00](#) concerns the mountings of auxiliary drives; the control of the auxiliary units is classified in the subclasses related to the particular auxiliary unit, as for example air conditioning.

The generator/motors drivingly connected to the engine crankshaft and driving also the vehicle are classified in subgroup [B60K 6/485](#) for electric motor assisted hybrid vehicles.

References

Limiting references

This place does not cover:

Arrangement of tyre-inflating pumps mounted on vehicles	B60C 23/10
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements in connection with power supply of propulsion units in vehicles from forces of nature, e.g. sun or wind	B60K 16/00
Arrangement, location or type of power take-off in vehicles	B60K 17/28
Driving arrangements for vehicle air-conditioning systems	B60H 1/00421
Arrangements of pumps or compressors for control devices of brake systems	B60T 17/02
Pumps for power assisted steering	B62D 5/063

Engines characterised by the arrangement of auxiliary apparatus not being otherwise provided for	F02B 67/00
Starting of engines by means of electric motors, the motors being associated with current generators	F02N 11/04

Special rules of classification

When classifying in group [B60K 25/00](#), classification can also be made in codes for additional information:

- in [B60K 25/00](#) - [B60K 25/10](#) for additional information;
- in [B60Y 2400/00](#) for special features in general;
- in [B60Y 2200/00](#) for the vehicle types;
- in [B60Y 2300/00](#) in order to identify the purpose;
- in [B60W 10/00](#) for the type of controlled particular sub-unit, and further;
- in [B60W 2510/00](#) - [B60W 2530/213](#) for controller input parameters;
- in [B60W 2710/00](#) - [B60W 2720/406](#) for output target values.

B60K 25/06

from the transmission power take-off

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangement, location or type of power take-off in vehicles	B60K 17/28
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B60K 25/10

directly from oscillating movements due to vehicle running motion, e.g. suspension movement

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Resilient suspensions having dampers accumulating utilisable energy, e.g. compressing air	B60G 13/14
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B60K 26/00

Arrangement or mounting of propulsion-unit control devices in vehicles

Definition statement

This place covers:

- Driver input members for controlling the propulsion unit, prime movers comprising arrangements and mountings of accelerator pedals or paddles;
- Throttle or fuel injection actuator transmission means of mechanical, electrical or hydraulic type and mounting of control input devices in the vehicle;

Definition statement

- Arrangements and mountings of automatised actuators using actuating means, e.g. electromechanical or hydraulic, secondary throttles and drive by wire engine controls;
- Driver input members for controlling electric drive motors in electric vehicles;
- Haptic driver feedback in pedal or increasing pedal force in case of dangerous driving conditions;
- Electrical transmission means between accelerator pedals and propulsion units.

Relationships with other classification places

[B60K 26/00](#) concerns the mountings of control units related to propulsion units of vehicles.

The operator initiation means for internal combustion engines control in general are classified in [F02D 11/00](#).

The arrangements and mounting of clutch control input devices, e.g. arrangement or mounting of pedals for clutches are classified in [B60K 23/00](#).

Vehicle drive control systems in general that are used for conjoint control and not related to a particular sub-unit are classified in [B60W 30/00](#).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Human control setting devices for electrically propelled vehicles	B60L 15/00
Control systems for hybrid vehicles	B60W 20/00
Propulsion control with common controlling member for different functions, e.g. common control member for engine and brake control	B60W 30/18181
Movable drivers' cabs characterised by special adaptations of vehicle control devices	B62D 33/073
Arrangements for, or adaptations to, operator-initiated engine control	F02D 11/00
Accelerator pedal transfer functions to engine controllers	F02D 11/105
Electrical control of supply of combustible mixture or its constituents	F02D 41/00
Circuits for controlling automatic idle-start-stop of engines	F02N 11/0814
Ratio selector apparatus, the ratio being infinitely variable	F16H 59/06
Control of hydrostatic gearing	F16H 61/40
Controlling members for hand actuation by pivoting movement in general, e.g. levers	G05G 1/04
Controlling members for hand actuation by rotary movement in general, e.g. hand wheels	G05G 1/08
Controlling members by foot in general	G05G 1/30

Special rules of classification

Use of the Indexing Code scheme is mandatory. When classifying in group [B60K 26/00](#) classification must also be made in groups under [B60K 26/00](#) for additional features of accelerator, in [B60Y 2400/00](#) for special features in general, in [B60Y 2300/00](#) in order to identify the purpose and in [B60W 10/00](#) for the multiple controlled sub-units and in [B60W 2510/00](#) - [B60W 2530/213](#) for controller input parameters and [B60W 2710/00](#) - [B60W 2720/406](#) for the output target values.

B60K 28/00

Safety devices for propulsion-unit control, specially adapted for, or arranged in, vehicles, e.g. preventing fuel supply or ignition in the event of potentially dangerous conditions (electric safety devices on electrically-propelled vehicles [B60L 3/00](#))

Definition statement

This place covers:

The arrangements and mountings of safety systems responsive to:

- conditions relating to the driver, as presence or incapacity;
- conditions relating to the vehicle, as doors or cargo;
- skidding of the wheels;

for inhibiting the vehicle driving connection by acting on a single particular sub-unit:

- cutting ignition or fuel supply;
- switching off the battery;
- reducing engine torque;
- opening a clutch or other driving connection;
- sending a signal to the exterior.

Relationships with other classification places

[B60K 28/00](#) is the place where the layout and arrangement of safety systems will be classified.

The conjoint control of these systems will be classified in subclass [B60W 10/00](#) for the type of the controlled unit with additional classification symbol in [B60W 30/00](#) for the purpose. Combustion engine features per se are classified in the relevant subclasses [F02B](#), [F02D](#), [F02N](#). Transmission or clutch features per se are classified in the relevant subclasses [F16H](#) or [F16D](#).

References

Limiting references

This place does not cover:

Electric safety devices on electrically-propelled vehicles	B60L 3/00
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Control of airbags or occupant passive safety systems	B60R 21/01
Brake control systems for vehicle drive stability control of vehicle	B60T 8/1755
Arrangements responsive to a speed condition, e.g. acceleration or deceleration for adjusting wheel breaking force	B60T 8/32
Road vehicle drive control systems for purposes not related to the control of a particular sub-unit	B60W 30/00
Driving stability by controlling multiple propulsion units	B60W 30/02
Active safety systems predicting or avoiding probable or impending collision by taking automatic action	B60W 30/08
Propulsion control with conjoint control of two or more sub-units for wheel slip	B60W 30/18172

Means for informing the driver, warning the driver or prompting a driver intervention	B60W 50/08
Limiting control by the driver depending on vehicle state, e.g. interlocking means for the control input for preventing unsafe operation	B60W 50/12
Drive control systems specially adapted for autonomous road vehicles	B60W 60/00
Preventing wheel slippage by reducing power in rail vehicles	B61C 15/00
Alarms for ensuring the safety of persons, anti-dozing alarms	G08B 21/00

Special rules of classification

Use of the Indexing Code scheme is mandatory. When classifying in group [B60K 28/00](#) classification must also be made in groups [B60K 28/00](#) - [B60K 2028/003](#) for additional features of safety control, in [B60Y 2400/00](#) for special features in general, in [B60Y 2300/00](#) in order to identify the purpose and in [B60W 10/00](#) for multiple particular sub-units and in [B60W 2510/00](#) - [B60W 2530/213](#) for controller input parameters and in [B60W 2710/00](#) - [B60W 2720/406](#) for the output target values.

B60K 28/16

responsive to, or preventing, spinning or skidding of wheels

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Brake control systems for vehicle drive stability	B60T 8/1755
Arrangements for adjusting wheel-braking force responsive to a speed condition	B60T 8/32
Control of vehicle driving stability not related to the control of a particular sub-unit	B60W 30/02
Preventing wheel slippage by reducing power in rail vehicles	B61C 15/12

B60K 31/00

Vehicle fittings, acting on a single sub-unit only, for automatically controlling vehicle speed, i.e. preventing speed from exceeding an arbitrarily established velocity or maintaining speed at a particular velocity, as selected by the vehicle operator

Definition statement

This place covers:

- Control systems for cruise control or speed limiting control of any particular single vehicle sub-unit;
- Control systems of a single vehicle sub-unit for adaptive cruise control [ACC] or for controlling distance between vehicles, in particular distance from a host vehicle to a preceding vehicle;
- Driver inputs to the cruise control systems comprising switches or levers for setting a target or reference vehicle speed;
- Control methods for controlling a single sub-unit or algorithms therefore for: selecting a target vehicle; detecting a distance and/or a speed of a target vehicle and comparing to a reference distance; setting or adapting the reference distance according to driving conditions; releasing or inhibiting the speed control, for example, in case of brake pedal actuation and resuming the speed control;

Definition statement

- Servomechanisms of electric, hydraulic or mechanical type to regulate the vehicle speed;
- Target outputs (analogue or digital) to the controller of a particular sub-unit to regulate a vehicle speed;
- Interactions with the driver, displaying target speeds, warning in case of excessive speeds.

Relationships with other classification places

[B60K 31/00](#) concerns the vehicle speed controls related to a particular sub-unit, as for example engine or electrical drive motor or brakes, if the invention concerns a cruise control by acting on two or more sub-units as for example engine and brakes than it is classified in [B60W 30/14](#) which is the application-oriented place covering vehicle drive control systems in general that are not related to a particular sub-unit or used for conjoint control.

Detecting means in general (e.g. ultrasonic radars [G01S 7/00](#), TV cameras [H04N](#), rear view cameras [B60R 1/00](#), image processing, or measuring means) are covered by the classes [G01](#), [G06](#) or [H04](#) and their appropriate subclasses.

Human-computer interfaces, e.g. keyboards are classified in [G06F 3/00](#).

Displays in general are classified in [B60K 35/22](#).

Driver warnings in general are classified in [B60W 50/08](#).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control systems for conjoint control of vehicle sub-units of different type or different function	B60W 10/00
Cruise control using conjoint control of vehicle sub-units	B60W 30/14
Estimations or calculations of driving parameters for road vehicle drive systems that are used for purposes of cruise control	B60W 40/00
Controlling combustion engines	F02D
Controlling combustion engines, such controlling being peculiar to the devices driven thereby, the devices being other than parts or accessories essential to engine operation, e.g. controlling of engines by signals external thereto	F02D 29/00
Electrical control of supply of combustible mixture or its constituents	F02D 41/00
Control of hydrostatic transmissions for achieving a target output speed	F16H 61/47
Speedometers	G01P
Systems for controlling position, course, altitude or attitude of land, water, air or space vehicles	G05D 1/00
Systems for controlling speed	G05D 13/00
Traffic control systems for road vehicles	G08G 1/00
Anti-collision systems	G08G 1/16

Special rules of classification

Use of the Indexing Code scheme is mandatory. When classifying in group [B60K 31/00](#) classification must also be made in groups [B60K 31/00](#) - [B60K 31/185](#) for additional features of cruise control, in [B60Y 2400/00](#) for special features in general, in [B60Y 2300/00](#) in order to identify the purpose and

in [B60W 10/00](#) for the controlled sub-units and in [B60W 2510/00](#) - [B60W 2530/213](#) for controller input parameters and in [B60W 2710/00](#) - [B60W 2720/406](#) for the output target values.

B60K 35/00

Instruments specially adapted for vehicles; Arrangement of instruments in or on vehicles

Definition statement

This place covers:

Arrangements of instruments for and aspects of display of information in a vehicle. The main group is in particular directed to all instruments located in the dashboard (and surrounding areas like windscreen or centre console) indicating information to the driver or passengers.

This main group covers all instruments that are in a vehicle dashboard if they are defined by particular aspects in their relation to the vehicle dashboard (e.g. the way they are mounted) or at least to control or indicate vehicle functions.

Relationships with other classification places

This group covers vehicle instruments, as well as their details or auxiliary aspects such as controlling, data transfer or information handling concerning vehicle functions.

This group does not cover details or auxiliary aspects relating to non-vehicle functions, unless the instruments are specially adapted for their use in a vehicle.

[B60K 37/00](#) is directed to dashboards as such.

Whilst [B60K 35/00](#) is directed to the adaptation of instruments in a dashboard, [B62D 25/14](#) is related to the (internal) structure of the dashboard itself and to dashboards as superstructure sub units (e.g. dashboard structure, fixation).

Whilst [B60K 35/00](#) is directed to the adaptation of vehicle instruments to the dashboard, [B60R 11/00](#) is directed to mounting of electronic devices to dashboard (see in particular [B60R 2011/0005](#)).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Indicating over speed	B60K 31/00
Monitoring tyres	B60C 23/00
Display devices for vehicle air conditioning	B60H 1/00985
Arrangements or adaptations of lighting devices for vehicle interior	B60Q 3/00
Lighting for dashboard	B60Q 3/10
Arrangements for holding or mounting of radio sets, television sets, telephones or the like; Arrangement of controls thereof	B60R 11/02
Adaptations on rotatable parts of the steering wheel for accommodation of switches	B62D 1/046
Dashboard as superstructure	B62D 25/14
Arrangements or adaptations of instruments in aircraft	B64D 43/00
Measuring distances	G01C

Navigation	G01C 21/00
Devices specially adapted for navigation in a road network	G01C 21/26
Measuring combinations of speed and distance	G01C 23/00
Indicating measures values (analogue or digital)	G01D 7/00
Components of measuring arrangements	G01D 11/00
Components of indicators	G01D 13/00
Engine indicators	G01L
Measuring speed or acceleration	G01P
Head-up displays [HUD]	G02B 27/01
Input of data to computer	G06F 3/00
User interface programs, e.g. command shells, help systems, UIMS (interface arrangement	G06F 9/451
Remote windowing systems, e.g. X-windows; Or window cell phone displayed in vehicle display	G06F 9/452
Taximeters	G07B 13/00
Toll collection	G07B 15/00
Registering or indicating the working of vehicles	G07C 5/00
Traffic control systems for vehicles	G08G 1/00
Indicating arrangements for variable information in which the information is built-up on a support by selection or combination of individual elements	G09F 9/00
Mobile visual advertising	G09F 21/00
Accumulators combined with arrangements for measuring, testing or indicating the condition of cells, e.g. batteries with indicators	H01M 10/48
(Radio) receivers to be used in vehicles	H04B 1/082
Arrangements for broadcast, e.g. digital radio	H04H 20/00
Details of television systems	H04N 5/00

Special rules of classification

In this group it is desirable to add the Orthogonal Indexing Codes of [B60K 2360/00](#) – [B60K 2360/96](#).

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

HUD	head-up display
LED	light emitting diode
OLED	organic light emitting diode
LCD	Liquid crystal display
TFT	thin film transistor
VFD	vacuum fluorescent display

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "dashboard liner", "cladding" and "padding"
- "instrument cluster", "combined instrument" and "combi instrument"

B60K 35/10

Input arrangements, i.e. from user to vehicle, associated with vehicle functions or specially adapted therefor

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Input arrangements specially adapted for route navigation	G01C 21/36
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Control levers on arm rests	B60N 2/797
Arrangements of elements of electric circuits for voice control in vehicles	B60R 16/0373
Controlling members, e.g. knobs or handles, in general	G05G 1/00
Input arrangements or combined input and output arrangements for interaction between user and computer in general	G06F 3/01
Touch screens	G06F 3/0488
User interface programs, e.g. command shells, help systems or user interface management systems [UIMS]	G06F 9/451

Special rules of classification

In this group it is desirable to add the Orthogonal Indexing Codes of [B60K 2360/11](#) - [B60K 2360/149](#).

B60K 35/20

Output arrangements, i.e. from vehicle to user, associated with vehicle functions or specially adapted therefor

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Output arrangements specially adapted for route navigation	G01C 21/36
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Means for informing the driver, warning the driver or prompting a driver intervention as part of control systems for road vehicle drive control not related to the control of a particular sub-unit	B60W 50/14
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Special rules of classification

In this group it is desirable to add the Orthogonal Indexing Codes of [B60K 2360/151](#) - [B60K 2360/1526](#).

B60K 35/21

using visual output, e.g. blinking lights or matrix displays

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Control arrangements for varying the light intensity for dashboards	B60Q 3/16
Projection devices for colour picture display in television systems	H04N 9/31

B60K 35/215

characterised by the combination of multiple visual outputs, e.g. combined instruments with analogue meters and additional displays

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Combined instruments indicating more than one navigational value, e.g. for aircraft	G01C 23/00
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B60K 35/22

Display screens

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Indicating arrangements for variable information in which the information is built-up on a support by selection or combination of individual elements in general	G09F 9/00
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Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Display screens	Integrated or non-integrated screens on which information is displayed
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B60K 35/23

Head-up displays [HUD] (optical aspects of head-up displays [G02B 27/01](#))

Relationships with other classification places

[G02B 27/01](#) covers head-up displays as optical elements or optical systems as such.

Contrary thereto, this subgroup relates to head-up displays as vehicle instruments.

Classification of technical characteristics of the head-up display relating to the vehicle instrument function is therefore classified in this subgroup. Technical characteristics of subject-matter referring to both optical aspects as well as to a vehicle instrument function is classified in [G02B 27/01](#) as well as in this subgroup.

References

Limiting references

This place does not cover:

Optical aspects of head-up displays	G02B 27/01
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Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Head-up displays [HUD]	Substantially transparent displays that present information in one of the drivers' lines of sight to the outside of the vehicle
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B60K 35/235

with means for detecting the driver's gaze direction or eye points

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Instrument input by detecting viewing direction not otherwise provided for	B60K 2360/149
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B60K 35/28

characterised by the type of the output information, e.g. video entertainment or vehicle dynamics information; characterised by the purpose of the output information, e.g. for attracting the attention of the driver

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Selective content distribution in pictorial communication, e.g. interactive television or video on demand in general	H04N 21/00
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Special rules of classification

In this group it is desirable to add the Orthogonal Indexing Codes of [B60K 2360/16](#) - [B60K 2360/179](#).

B60K 35/29

Instruments characterised by the way in which information is handled, e.g. showing information on plural displays or prioritising information according to driving conditions

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Optical viewing arrangements in vehicles not otherwise provided for	B60R 1/00
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Special rules of classification

In this group it is desirable to add the Orthogonal Indexing Codes of [B60K 2360/18](#) - [B60K 2360/199](#).

B60K 35/40

Instruments specially adapted for improving the visibility thereof to the user, e.g. fogging prevention or anti-reflection arrangements

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Antiglare equipment associated with windows or windscreens	B60J 3/00
Optical viewing arrangements in vehicles not otherwise provided for	B60R 1/00
Cleaning windscreens, vehicle windows or optical devices of vehicles	B60S 1/02

B60K 35/50

Instruments characterised by their means of attachment to or integration in the vehicle ([B60K 35/231](#) takes precedence)

References

Limiting references

This place does not cover:

Head-up displays characterised by their arrangement or structure for integration into vehicles	B60K 35/231
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements for attaching the dashboard to the vehicle structure	B60K 37/10
Arrangements for holding or mounting radio sets, television sets or telephones	B60R 11/02
Devices for fastening or securing constructional elements or machine parts together	F16B
Arrangements of scales, pointers, lamps or acoustic indicators in automobile speedometers	G01P 1/07

Special rules of classification

In this group it is desirable to add the Orthogonal Indexing Codes of [B60K 2360/816](#) - [B60K 2360/834](#).

B60K 35/60

Instruments characterised by their location or relative disposition in or on vehicles (arrangements of lighting devices on dashboards [B60Q 3/10](#))

References

Limiting references

This place does not cover:

Arrangements of lighting devices on dashboards	B60Q 3/10
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Special rules of classification

In this group it is desirable to add the Orthogonal Indexing Codes of [B60K 2360/77](#) - [B60K 2360/797](#).

B60K 35/65

Instruments specially adapted for specific vehicle types or users, e.g. for left- or right-hand drive

Special rules of classification

In this group it is desirable to add the Orthogonal Indexing Codes of [B60K 2360/731](#) - [B60K 2360/741](#).

B60K 35/70

Instrument provisions for avoiding injuries to vehicle occupants in case of accidents

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Linings associated with the instrument panel or dashboard as occupant safety arrangement	B60R 21/045
Steering columns incorporating energy-absorbing arrangements, e.g. by being yieldable or collapsible	B62D 1/19
Shock-absorbers using plastic deformation of members in general	F16F 7/12

B60K 35/85

Arrangements for transferring vehicle- or driver-related data

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electric circuits for transmission of signals between vehicle parts or subsystems	B60R 16/023
Network arrangements or protocols for supporting network services specially for special-purpose networking environments, e.g. networks in vehicles	H04L 67/12
User interfaces specially adapted for cordless or mobile telephones	H04M 1/724
Wireless communication networks for vehicles	H04W 4/40

Special rules of classification

In this group it is desirable to add the Orthogonal Indexing Codes of [B60K 2360/583](#) - [B60K 2360/595](#).

B60K 35/90

Calibration of instruments, e.g. setting initial or reference parameters; Testing of instruments, e.g. detecting malfunction

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Testing static or dynamic balance of machines or structures in general	G01M
Arrangements for locating electric faults	G01R 31/00
Camera calibration by analysis of captured images in general	G06T 7/80

B60K 37/00

Dashboards (as road-vehicle superstructure sub-units [B62D 25/14](#))

Definition statement

This place covers:

The adaptation of instruments in a vehicle dashboard. The main group is in particular directed to the mechanical mounting of instruments to the dashboard or the electrical integration of such instruments in the dashboard (e.g. connection to vehicle bus system). A dashboard related aspects must be present in all cases.

Relationships with other classification places

[B60K 35/00](#) is the general home for documents comprising vehicle related aspects of indication devices.

[B60K 37/00](#) is directed to dashboards and their adaptation in relation to instruments.

[B62D 25/14](#) is related to the (internal) structure of the dashboard itself and to dashboards as superstructure sub units (e.g. dashboard structure, fixation).

[B60R 11/00](#) is directed to mounting of electronic devices to dashboard (see in particular [B60R 2011/0005](#)).

References

Limiting references

This place does not cover:

Dashboard as road vehicle superstructure subunits	B62D 25/14
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements or adaptations of lighting devices for vehicle interior	B60Q 3/00
Lighting for dashboard	B60Q 3/10
Arrangements for holding or mounting of radio sets, television sets, telephones or the like; Arrangement of controls thereof	B60R 11/02
Clips for joining vehicle mouldings or liners	B60R 13/0206
Instruments in airplanes	B64D 43/00
Navigation	G01C 21/00
Components of measuring arrangements	G01D 11/00
Head-up displays (HUD)	G02B 27/01
Input of data to computer	G06F 3/00
Taximeters	G07B 13/00
Toll collection	G07B 15/00
Connectors	H01R
Electronic switching	H03K
Touch switches	H03K 17/96
(Radio) receivers to be used in vehicles	H04B 1/082

Special rules of classification

In this main group it is desirable to add the Orthogonal Indexing Codes of [B60K 2360/40](#) - [B60K 2360/48](#), [B60K 2360/65](#) - [B60K 2360/6992](#) and [B60K 2360/84](#).

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

HUD	head-up display
LED	light emitting diode
OLED	organic light emitting diode
LCD	Liquid crystal display
TFT	thin film transistor
VFD	vacuum fluorescent display

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "dashboard liner", "cladding" and "padding"
- "instrument cluster", "combined instrument" and "combi instrument"

B60K 2360/149

Instrument input by detecting viewing direction not otherwise provided for

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Head-up displays with means for detecting the driver's gaze direction or eye points	B60K 35/235
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Special rules of classification

This indexing code covers all vehicle instruments input devices by detecting viewing direction excluding means for detecting the driver's gaze direction or eye points in head-up displays for which the main trunk symbol [B60K 35/235](#) is provided.

B60K 2360/40

Hardware adaptations for dashboards or instruments

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electric circuits specially adapted for vehicles and not otherwise provided for; Arrangement of elements of electric circuits specially adapted for vehicles and not otherwise provided for	B60R 16/00
Electric constitutive elements, e.g. wire harnesses or grommets	B60R 16/02

B60K 2360/583**Data transfer between instruments****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Electric circuits for transmission of signals between vehicle parts or subsystems	B60R 16/023
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B60K 2360/586**Wired data transfers****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Electric circuits for transmission of signals between vehicle parts or subsystems	B60R 16/023
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B60K 2360/589**Wireless data transfers****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Electric circuits for transmission of signals between vehicle parts or subsystems	B60R 16/023
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