

CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

TRANSPORTING

B60 VEHICLES IN GENERAL

(NOTE omitted)

B60T VEHICLE BRAKE CONTROL SYSTEMS OR PARTS THEREOF; BRAKE CONTROL SYSTEMS OR PARTS THEREOF, IN GENERAL (electrodynamic brake systems for vehicle, in general [B60L](#); brakes per se, i.e. devices where braking effect occurs, including ultimate brake actuators, [F16D](#)); ARRANGEMENT OF BRAKING ELEMENTS ON VEHICLES IN GENERAL; PORTABLE DEVICES FOR PREVENTING UNWANTED MOVEMENT OF VEHICLES; VEHICLE MODIFICATIONS TO FACILITATE COOLING OF BRAKES

NOTE

In this subclass, the term "brake control systems" includes brake control systems for vehicles or of general applicability

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

B60T 8/20	covered by	B60T 8/18
B60T 8/22	covered by	B60T 8/18
B60T 8/60 - B60T 8/70	covered by	B60T 8/17
B60T 8/78 - B60T 8/84	covered by	B60T 8/17
B60T 13/122	covered by	B60T 13/147 , B60T 13/167
B60T 13/125	covered by	B60T 13/141
B60T 13/128	covered by	B60T 13/145 , B60T 13/165
B60T 13/13	covered by	B60T 13/146 , B60T 13/166
B60T 13/132	covered by	B60T 13/143 , B60T 13/162
B60T 13/135	covered by	B60T 13/144 , B60T 13/163
B60T 13/138	covered by	B60T 13/148 , B60T 13/168
B60T 13/60	covered by	B60T 13/58
B60T 15/06	covered by	B60T 15/04
B60T 15/08	covered by	B60T 15/04

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

1/00	Arrangements of braking elements, i.e. of those parts where braking effect occurs {specially for vehicles}	1/093	. . . in hydrostatic, i.e. positive displacement, retarders
1/005	. {by locking of wheel or transmission rotation}	1/10	. . by utilising wheel movement for accumulating energy, e.g. driving air compressors
1/02	. acting by retarding wheels	1/12	. acting otherwise than by retarding wheels, e.g. jet action
1/04	. . acting directly on tread	1/14	. . directly on road (portable devices, e.g. chocks B60T 3/00)
1/06	. . acting otherwise than on tread, e.g. employing rim, drum, disc, or transmission {or on double wheels}	1/16	. . by increasing air resistance, e.g. flaps
1/062	. . . {acting on transmission parts}	3/00	Portable devices for preventing unwanted movement of vehicles, e.g. chocks
1/065	. . . {employing disc (B60T 1/062 takes precedence)}	5/00	Vehicle modifications to facilitate cooling of brakes
1/067	. . . {employing drum (B60T 1/062 takes precedence)}		
1/08	. . using fluid or powdered medium	<u>Brake control systems or parts thereof</u>	
1/087	. . . in hydrodynamic, i.e. non-positive displacement, retarders	7/00	Brake-action initiating means
		7/02	. for personal initiation
		7/04	. . foot actuated

- 7/042 . . . {by electrical means, e.g. using travel or force sensors}
- 7/045 . . . {with locking and release means, e.g. providing parking brake application}
- 7/047 {Hand-actuated release means}
- 7/06 . . . Disposition of pedal
- 7/065 {with means to prevent injuries in case of collision (for vehicle pedals in general by moving them from an operative to an out-of-the way position [B60R 21/09](#))}
- 7/08 . . hand actuated
- 7/085 . . . {by electrical means, e.g. travel, force sensors}
- 7/10 . . . Disposition of hand control
- 7/101 {by means of a pull rod}
- 7/102 {by means of a tilting lever}
- 7/104 {with a locking mechanism}
- 7/105 {the lock being released by means of a push button}
- 7/107 {with electrical power assistance}
- 7/108 {with mechanisms to take up slack in the linkage to the brakes}
- 7/12 . . for automatic initiation; for initiation not subject to will of driver or passenger {(limiting speed of vehicles other than rail vehicles [B60K 31/00](#))}
- 7/122 . . {for locking of reverse movement}
- 7/124 . . {Brakes for railway vehicles coming into operation in case of accident, derailment or damage of rolling stock or superstructure (self-acting brakes in general [F16D 59/00](#))}
- 7/126 . . {Brakes for railway vehicles coming into operation in case of exceeding a predetermined speed (self-acting brakes in general [F16D 59/00](#))}
- 7/128 . . {Self-acting brakes of different types for railway vehicles ([B60T 7/12](#) takes precedence; self-acting brakes in general [F16D 59/00](#))}
- 7/14 . . operated upon collapse of driver (deadman's devices for electrically propelled vehicles [B60L 3/02](#))
- 7/16 . . operated by remote control, i.e. initiating means not mounted on vehicle
- 7/18 . . . operated by wayside apparatus
- 7/20 . . specially for trailers, e.g. in case of uncoupling of {or overrunning by} trailer (inertia-actuated overrun brakes [B60T 13/08](#))
- 7/203 . . . {with automatic brake release or reduction in case of reverse travel, e.g. by means of mechanisms mounted on the draw bar}
- 7/206 {by means of mechanisms mounted on trailer drum brakes}
- 7/22 . . initiated by contact of vehicle, e.g. bumper, with an external object, e.g. another vehicle {, or by means of contactless obstacle detectors mounted on the vehicle}
- 8/00 Arrangements for adjusting wheel-braking force to meet varying vehicular or ground-surface conditions, e.g. limiting or varying distribution of braking force (by changing number of effective brake cylinders in power brake systems [B60T 17/10](#))**
- 8/17 . . Using electrical or electronic regulation means to control braking {(detecting or indicating faulty operation [B60T 8/885](#))}
- 8/1701 . . {Braking or traction control means specially adapted for particular types of vehicles (for vehicles having more than one drive axle [B60T 8/1769](#))}
- 8/1703 . . . {for aircrafts}
- 8/1705 . . . {for rail vehicles}
- 8/1706 . . . {for single-track vehicles, e.g. motorcycles}
- 8/1708 . . . {for lorries or tractor-trailer combinations}
- 8/171 . . Detecting parameters used in the regulation; Measuring values used in the regulation
- 8/172 . . Determining control parameters used in the regulation, e.g. by calculations involving measured or detected parameters {([B60T 8/17551](#) takes precedence)}
- 8/1725 . . . {Using tyre sensors, e.g. Sidewall Torsion sensors [SWT] (for tyre pressure and temperature detection [B60C 23/00](#))}
- 8/173 . . Eliminating or reducing the effect of unwanted signals, e.g. due to vibrations or electrical noise
- 8/174 . . characterised by using special control logic, e.g. fuzzy logic {, neural computing}
- 8/175 . . Brake regulation specially adapted to prevent excessive wheel spin during vehicle acceleration, e.g. for traction control (safety devices for propulsion unit control responsive to, or preventing, skidding of wheels [B60K 28/16](#))
- 8/1755 . . Brake regulation specially adapted to control the stability of the vehicle, e.g. taking into account yaw rate or transverse acceleration in a curve (road vehicle drive control systems for control of driving stability otherwise than by controlling a particular sub-unit [B60W 30/02](#))
- 8/17551 . . . {determining control parameters related to vehicle stability used in the regulation, e.g. by calculations involving measured or detected parameters}
- 8/17552 . . . {responsive to the tire sideslip angle or the vehicle body slip angle}
- 8/17554 . . . {specially adapted for enhancing stability around the vehicles longitudinal axle, i.e. roll-over prevention (road vehicle drive control systems for roll-over prevention otherwise than by controlling a particular sub-unit [B60W 30/04](#))}
- 8/17555 . . . {specially adapted for enhancing driver or passenger comfort, e.g. soft intervention or pre-actuation strategies}
- 8/17557 . . . {specially adapted for lane departure prevention (road vehicle drive control systems for lane keeping otherwise than by controlling a particular sub-unit [B60W 30/12](#))}
- 8/17558 . . . {specially adapted for collision avoidance or collision mitigation (road vehicle drive control systems for collision avoidance otherwise than by controlling a particular sub-unit [B60W 30/09](#))}
- 8/176 . . Brake regulation specially adapted to prevent excessive wheel slip during vehicle deceleration, e.g. ABS ([B60T 8/1755](#) takes precedence)
- 8/1761 . . . responsive to wheel or brake dynamics, e.g. wheel slip, wheel acceleration or rate of change of brake fluid pressure
- 8/17613 {based on analogue circuits or digital circuits comprised of discrete electronic elements}
- 8/17616 {Microprocessor-based systems}

- 8/1763 . . . responsive to the coefficient of friction between the wheels and the ground surface ([B60T 8/1764](#) takes precedence)
- 8/17633 {based on analogue circuits or digital circuits comprised of discrete electronic elements}
- 8/17636 {Microprocessor-based systems}
- 8/1764 . . . Regulation during travel on surface with different coefficients of friction, e.g. between left and right sides, mu-split {or between front and rear}
- 8/1766 . . . Proportioning of brake forces according to vehicle axle loads, e.g. front to rear of vehicle
- 8/1769 . . . specially adapted for vehicles having more than one driven axle, e.g. four-wheel drive vehicles
- 8/18 . . responsive to vehicle weight or load, e.g. load distribution ({using electrical circuitry on regulation means [B60T 8/17](#); } [B60T 8/30](#) takes precedence; responsive to weight and speed condition [B60T 8/58](#))
- NOTE**
- [B60T 8/1887](#) and [B60T 8/1893](#) take precedence over [B60T 8/1806](#) - [B60T 8/1881](#)
- 8/1806 . . {characterised by the calibration process or the means therefor}
- 8/1812 . . {characterised by the means for pressure reduction}
- 8/1818 . . . {Lever mechanism}
- 8/1825 . . . {Means for changing the diaphragm area submitted to pressure}
- 8/1831 . . . {pressure reducing or limiting valves}
- 8/1837 . . {characterised by the load-detecting arrangements}
- 8/1843 . . . {Arrangements for detecting air spring pressure}
- 8/185 . . . {Arrangements for detecting vehicle level}
- 8/1856 . . . {Arrangements for detecting suspension spring load ([B60T 8/1843](#) takes precedence)}
- 8/1862 {comprising sensors of the type providing a fluid output signal representing the load on the vehicle suspension}
- 8/1868 {comprising sensors of the type providing a mechanical output signal representing the load on the vehicle suspension}
- 8/1875 {comprising sensors of the type providing an electrical output signal representing the load on the vehicle suspension}
- 8/1881 . . {characterised by failure-responsive means}
- 8/1887 . . {especially adapted for tractor-trailer combinations}
- 8/1893 . . {especially adapted for railway vehicles}
- 8/24 . . responsive to vehicle inclination or change of direction, e.g. negotiating bends ({using electrical circuitry or regulation means [B60T 8/17](#))}
- 8/241 . . {Lateral vehicle inclination}
- 8/243 . . . {for roll-over protection}
- 8/245 . . {Longitudinal vehicle inclination}
- 8/246 . . {Change of direction}
- 8/248 . . {Trailer sway, e.g. for preventing jackknifing}
- 8/26 . . characterised by producing differential braking between front and rear wheels ({using electrical circuitry or regulation means [B60T 8/17](#))}
- 8/261 . . {specially adapted for use in motorcycles}
- 8/262 . . {using valves with stepped characteristics ([B60T 8/261](#), [B60T 8/266](#) take precedence)}
- 8/263 . . . {for pneumatic brake systems}
- 8/265 . . . {for hydraulic brake systems}
- 8/266 . . {using valves or actuators with external control means ([B60T 8/261](#) takes precedence)}
- 8/267 . . . {for hybrid systems with different kind of brakes on different axles}
- 8/268 . . . {using the valves of an ABS, ASR or ESP system}
- 8/28 . . responsive to deceleration ({[B60T 8/261](#), [B60T 8/262](#), [B60T 8/266](#) take precedence)}
- 8/282 . . . {using ball and ramp}
- 8/285 . . . {using horizontal moving mass}
- 8/287 . . . {using pendulums}
- 8/30 . . responsive to load ({[B60T 8/261](#), [B60T 8/262](#), [B60T 8/266](#) take precedence)}
- 8/303 . . . {using pneumatic valves}
- 8/306 . . . {using hydraulic valves}
- 8/32 . . responsive to a speed condition, e.g. acceleration or deceleration ({using electrical circuitry or regulation means [B60T 8/17](#) } ; [B60T 8/28](#) takes precedence; electric devices on electrically propelled vehicles indicating the wheel slip [B60L 3/10](#); measuring linear or angular speed per se [G01P 3/00](#))
- 8/3205 . . {acceleration ([B60T 8/34](#), [B60T 8/52](#), [B60T 8/54](#), [B60T 8/56](#), [B60T 8/58](#), [B60T 8/72](#), [B60T 8/86](#), [B60T 8/88](#) take precedence)}
- 8/321 . . {deceleration ([B60T 8/34](#), [B60T 8/52](#), [B60T 8/54](#), [B60T 8/56](#), [B60T 8/58](#), [B60T 8/72](#), [B60T 8/86](#), [B60T 8/88](#) take precedence)}
- 8/3215 . . . {Systems characterised by having means acting on components of the drive line, e.g. retarder, clutch or differential gear ([B60T 8/322](#) takes precedence)}
- 8/322 . . . {Systems specially adapted for vehicles driven by more than one axle, e.g. Four Wheel-Drive vehicles}
- 8/3225 . . . {Systems specially adapted for single-track vehicles, e.g. motorcycles ([B60T 8/3235](#) takes precedence)}
- 8/323 . . . {Systems specially adapted for tractor-trailer combinations}
- 8/3235 . . . {Systems specially adapted for rail vehicles}
- 8/324 {Speed measurement by means of centrifugal governors or the like}
- 8/3245 {responsive to the speed difference between wheels and rail, or between two wheels or two axles}
- 8/325 . . . {Systems specially adapted for aircraft}
- 8/3255 . . . {Systems in which the braking action is dependent on brake pedal data}
- 8/326 {Hydraulic systems}
- 8/3265 {with control of the booster ([B60T 8/3275](#) takes precedence)}
- 8/327 {Pneumatic systems}
- 8/3275 {Systems with a braking assistant function, i.e. automatic full braking initiation in dependence of brake pedal velocity}
- 8/328 . . . {Systems sharing components with other fluid systems onboard the vehicle}
- 8/3285 {the other fluid systems being suspension elements}

- 8/329 . . . {Systems characterised by their speed sensor arrangements}
- 8/3295 . . . {Systems in which there is a pulsating signal superposed on the command signal}
- 8/34 . . having a fluid pressure regulator responsive to a speed condition
- 8/341 . . . {Systems characterised by their valves (B60T 8/36, B60T 8/38 take precedence)}
- 8/342 {Pneumatic systems}
- 8/343 . . . {Systems characterised by their lay-out (B60T 8/349 takes precedence)}
- 8/344 {Hydraulic systems}
- 8/345 {having more than one brake circuit per wheel}
- 8/346 {2 Channel systems (B60T 8/345 takes precedence)}
- 8/347 {3 Channel systems (B60T 8/345 takes precedence)}
- 8/348 {4 Channel systems (B60T 8/345 takes precedence)}
- 8/349 . . . {Systems adapted to control a set of axles, e.g. tandem axles}
- 8/36 . . . including a pilot valve responding to an electromagnetic force
- 8/3605 {wherein the pilot valve is mounted in a circuit controlling the working fluid system}
- 8/361 {wherein the pilot valve is mounted in a circuit controlling an auxiliary fluid system}
- 8/3615 {Electromagnetic valves specially adapted for anti-lock brake and traction control systems (electromagnetic valves in general F16K 31/06)}
- 8/362 {in pneumatic systems (B60T 8/3655, B60T 8/3675 and B60T 8/369 take precedence)}
- 8/3625 {having at least one vacuum connection}
- 8/363 {in hydraulic systems (B60T 8/3655, B60T 8/3675 and B60T 8/369 take precedence)}
- 8/3635 {switching between more than two connections, e.g. 3/2-valves (B60T 8/364, B60T 8/3645 and B60T 8/365 take precedence)}
- 8/364 {switching between a number of discrete positions as a function of the applied signal, e.g. 3/3-valves (B60T 8/3645 takes precedence)}
- 8/3645 {having more than one electromagnetic coil inside a common housing}
- 8/365 {combining a plurality of functions in one unit, e.g. pressure relief}
- 8/3655 {Continuously controlled electromagnetic valves}
- 8/366 {Valve details}
- 8/3665 {Sliding valves}
- 8/367 {Seat valves, e.g. poppet valves}
- 8/3675 {integrated in modulator units}
- 8/368 {combined with other mechanical components, e.g. pump units, master cylinders}
- 8/3685 {characterised by the mounting of the modulator unit onto the vehicle}
- 8/369 {Valves using piezoelectric elements (in general F16K 31/004)}
- 8/3695 {wherein the pilot valve is mounted separately from its power section (B60T 8/3605, B60T 8/361 and B60T 8/3615 take precedence)}
- 8/38 . . . including valve means of the relay or driver controlled type
- 8/40 . . . comprising an additional fluid circuit including fluid pressurising means for modifying the pressure of the braking fluid, e.g. including wheel driven pumps for detecting a speed condition, or pumps which are controlled by means independent of the braking system
- 8/4004 {Repositioning the piston(s) of the brake control means by means of a fluid pressurising means in order to reduce the brake pressure}
- 8/4009 {the brake control means being the wheel cylinders}
- 8/4013 {Fluid pressurising means for more than one fluid circuit, e.g. separate pump units used for hydraulic booster and anti-lock braking}
- 8/4018 {Pump units characterised by their drive mechanisms (B60T 8/4095 takes precedence)}
- 8/4022 {Pump units driven by an individual electric motor (B60T 8/4027 takes precedence)}
- 8/4027 {Pump units driven by (parts of) the vehicle propulsion unit}
- 8/4031 {Pump units characterised by their construction or mounting (pump units in combination with valve blocks B60T 8/36)}
- 8/4036 {Pump units characterised by their failure-responsive means (B60T 8/88 takes precedence)}
- 8/404 {Control of the pump unit}
- 8/4045 {involving ON/OFF switching}
- 8/405 {involving the start-up phase}
- 8/4054 {involving the delivery pressure control (B60T 8/4072 takes precedence)}
- 8/4059 {involving the rate of delivery}
- 8/4063 {involving the direction of fluid flow}
- 8/4068 {the additional fluid circuit comprising means for attenuating pressure pulsations}
- 8/4072 {Systems in which a driver input signal is used as a control signal for the additional fluid circuit which is normally used for braking}
- 8/4077 {Systems in which the booster is used as an auxiliary pressure source}
- 8/4081 {Systems with stroke simulating devices for driver input (B60T 8/4077 takes precedence)}
- 8/4086 {the stroke simulating device being connected to, or integrated in the driver input device}
- 8/409 {characterised by details of the stroke simulating device}
- 8/4095 {including wheel driven pumps for detecting a speed condition}
- 8/42 . . . having expanding chambers for controlling pressure {, i.e. closed systems}

8/4208	. . . . {Debooster systems}	8/489	. . . . . {using separate traction control modulators}
8/4216	. . . . . {having a mechanically actuated expansion unit (B60T 8/4225 and B60T 8/4266 take precedence)}	8/50	. . . having means for controlling the rate at which pressure is reapplied to {or released from} the brake
8/4225	. . . . . {having a fluid actuated expansion unit}	8/5006	. . . . . {Pressure reapplication by pulsing of valves (B60T 8/5012 , B60T 8/5018 , B60T 8/505 , B60T 8/5056 take precedence)}
8/4233	. . . . . {with brake pressure relief by introducing fluid pressure into the expansion unit (B60T 8/4241 takes precedence)}	8/5012	. . . . . {Pressure reapplication using a plurality of valves in parallel}
8/4241	. . . . . {pneumatically}	8/5018	. . . . . {Pressure reapplication using restrictions (B60T 8/5012 , B60T 8/505 take precedence)}
8/425	. . . . . {using a vacuum}	8/5025	. . . . . {in hydraulic brake systems}
8/4258	. . . . . {with brake pressure relief by creating vacuum inside the expansion unit}	8/5031	. . . . . {open systems}
8/4266	. . . . . {having an electro-mechanically actuated expansion unit, e.g. solenoid, electric motor, piezo stack}	8/5037	. . . . . {closed systems}
8/4275	. . . . . {Pump-back systems}	8/5043	. . . . . {debooster systems}
8/4283	. . . . . {having a pressure sensitive inlet valve}	8/505	. . . . . {Pressure reapplication in a mu-split situation, i.e. a situation with different coefficients of friction on both sides of the vehicle}
8/4291	. . . . . {having means to reduce or eliminate pedal kick-back}	8/5056	. . . . . {Pressure reapplication using memory devices}
8/44	. . . co-operating with a power-assist booster means associated with a master cylinder for controlling the release and reapplication of brake pressure through an interaction with the power assist device {, i.e. open systems}	8/5062	. . . . . {using memory chambers}
8/441	. . . . . {using hydraulic boosters (B60T 8/445 , B60T 8/446 , B60T 8/447 take precedence)}	8/5068	. . . . . {having decay means}
8/442	. . . . . {the booster being a fluid return pump, e.g. in combination with a brake pedal force booster}	8/5075	. . . . . {Pressure release by pulsing of valves (B60T 8/5081 , B60T 8/5087 take precedence)}
8/443	. . . . . {using compressed air (B60T 8/445 , B60T 8/446 , B60T 8/448 take precedence)}	8/5081	. . . . . {Pressure release using a plurality of valves in parallel}
8/444	. . . . . {using vacuum (B60T 8/445 , B60T 8/446 , B60T 8/448 take precedence)}	8/5087	. . . . . {Pressure release using restrictions (B60T 8/5081 takes precedence)}
8/445	. . . . . {replenishing the released brake fluid volume into the brake piping}	8/5093	. . . . . {in hydraulic brake systems}
8/446	. . . . . {replenishing the released brake fluid volume via the master cylinder}	8/52	. . Torque sensing, i.e. wherein the braking action is controlled by forces producing or tending to produce a twisting or rotating motion on a braked rotating member
8/447	. . . . . {Reducing the boost of the power-assist booster means to reduce brake pressure}	8/54	. . by mechanical means
8/448	. . . . . {the power-assist booster means being a vacuum or compressed air booster}	8/56	. . having means for changing the coefficient of friction
8/449	. . . . . {of the multiple booster type}	8/58	. . responsive to speed and another condition or to plural speed conditions
8/46	. . . the pressure being reduced by exhausting fluid		NOTE
8/48	. . . connecting the brake actuator to an alternative or additional source of fluid pressure {, e.g. traction control systems}		In this group, a single condition which is itself responsive to, or representative of, another single condition is not regarded as plural conditions
8/4809	. . . . . {Traction control, stability control, using both the wheel brakes and other automatic braking systems}	8/72	. . responsive to a difference between a speed condition, e.g. deceleration, and a fixed reference
8/4818	. . . . . {in pneumatic brake systems}	8/74	. . . sensing a rate of change of velocity
8/4827	. . . . . {in hydraulic brake systems}	8/76	. . . two or more sensing means from different wheels indicative of the same type of speed condition
8/4836	. . . . . {wherein a booster output pressure is used for normal or anti lock braking (B60T 8/4845 , B60T 8/4863 , B60T 8/489 take precedence)}	8/86	. . wherein the brakes are automatically applied in accordance with a speed condition and having means for overriding the automatic braking device when a skid condition occurs
8/4845	. . . . . {using a booster or a master cylinder for traction control}	8/88	. . with failure responsive means, i.e. means for detecting and indicating faulty operation of the speed responsive control means
8/4854	. . . . . {pneumatic boosters}	8/885	. . . {using electrical circuitry}
8/4863	. . . . . {closed systems (B60T 8/4845 , B60T 8/489 take precedence)}	8/90	. . . using a simulated speed signal to test speed responsive control means
8/4872	. . . . . {pump-back systems}		
8/4881	. . . . . {having priming means}		

8/92	. . . automatically taking corrective action	11/236	. . . Piston sealing arrangements
8/94	. . . . on a fluid pressure regulator	11/24	. . Single initiating means operating on more than one circuit, e.g. dual circuits (multiple master cylinder units B60T 11/20)
8/96	. . . . on speed responsive control means		
10/00	Control or regulation for continuous braking making use of fluid or powdered medium, e.g. for use when descending a long slope	11/26	. . Reservoirs (integral with master controls B60T 11/22)
10/02	. with hydrodynamic brake	11/28	. . Valves specially adapted therefor (recuperation valves B60T 11/232)
10/04	. with hydrostatic brake	11/30	. . . Bleed valves for hydraulic brake systems
11/00	Transmitting braking action from initiating means to ultimate brake actuator without power assistance or drive or where such assistance or drive is irrelevant (the power assistance or drive being essential B60T 13/00)	11/32	. . . Automatic cut-off valves for defective pipes
11/04	. transmitting mechanically	11/323	. . . . {in hydraulic systems}
11/043	. . {in case of steerable wheels}	11/326	. . . . {in pneumatic systems}
11/046	. . {Using cables (B60T 11/043 takes precedence)}	11/34	. . . Pressure reducing or limiting valves {(for arrangements for adjusting wheel-braking force responsive to vehicle weight or load B60T 8/1831)}
11/06	. . Equalising arrangements	13/00	Transmitting braking action from initiating means to ultimate brake actuator with power assistance or drive; Brake systems incorporating such transmitting means, e.g. air-pressure brake systems (arrangements for adjusting wheel-braking force to meet varying vehicular or ground-surface conditions B60T 8/00; valves incorporated in such systems B60T 15/00)
11/08	. . providing variable leverage	13/02	. with mechanical assistance or drive {(combined with fluid pressure B60T 13/588)}
11/10	. transmitting by fluid means, e.g. hydraulic	13/04	. . by spring or weight (fluid released B60T 13/10)
11/101	. . {equalising arrangements}	13/06	. . by inertia, e.g. flywheel
11/102	. . {in combination with mechanical elements}	13/065	. . . {of the propulsion system}
11/103	. . {in combination with other control devices (conjoint control of brake system and at least another sub-unit B60W 10/188)}	13/08	. . . Overrun brakes
11/105	. . . {with brake locking after actuation, release of the brake by a different control device, e.g. gear lever}	13/10	. with fluid assistance, drive, or release
11/106	. . . . {locking and release of the brake by the clutch}	13/12	. . the fluid being liquid
11/107	. . {overrun brakes with fluid means}	13/14	. . . using accumulators or reservoirs {fed by pumps}
11/108	. . {to a trailer fluid system}	13/141	. . . . {Systems with distributor valve (B60T 13/147 takes precedence)}
11/12	. . the transmitted force being varied therein (B60T 11/16 - B60T 11/26 take precedence)	13/142	. . . . {Systems with master cylinder}
11/14	. . the transmitted force being substantially unchanged	13/143	. . . . . {Master cylinder mechanically coupled with booster}
11/16	. . Master control, e.g. master cylinders (master cylinders associated with vacuum boosters B60T 13/565)	13/144	. . . . . {Pilot valve provided inside booster piston}
11/165	. . . {Single master cylinders for pressurised systems}	13/145	. . . . . {Master cylinder integrated or hydraulically coupled with booster}
11/18	. . . Connection thereof to initiating means	13/146	. . . . . {Part of the system directly actuated by booster pressure}
11/20	. . . Tandem, side-by-side, or other multiple master cylinder units	13/147	. . . . . {In combination with distributor valve}
11/203	. . . . {Side-by-side configuration}	13/148	. . . . . {Arrangements for pressure supply}
11/206	. . . . . {with control by a force distributing lever}	13/16	. . . using pumps directly, i.e. without interposition of accumulators or reservoirs
11/21	. . . . with two pedals operating on respective circuits, pressures therein being equalised when both pedals are operated together, e.g. for steering (steering non-deflectable wheels or endless tracks by differentially driving ground-engaging elements on opposite vehicle sides using brakes as main steering effecting means B62D 11/08)	13/161	. . . . . {Systems with master cylinder}
11/22	. . . characterised by being integral with reservoir	13/162	. . . . . {Master cylinder mechanically coupled with booster}
11/224	. . . with pressure-varying means, e.g. with two stage operation provided by use of different piston diameters including continuous variation from one diameter to another	13/163	. . . . . {Pilot valve provided inside booster piston}
11/228	. . . Pressure-maintaining arrangements, e.g. for replenishing the master cylinder chamber with fluid from a reservoir (B60T 11/232 takes precedence)	13/165	. . . . . {Master cylinder integrated or hydraulically coupled with booster}
11/232	. . . Recuperation valves	13/166	. . . . . {Part of the system directly actuated by booster pressure}
		13/167	. . . . . {In combination with distributor valve}
		13/168	. . . . . {Arrangements for pressure supply}
		13/18	. . . . with control of pump output delivery {, e.g. by distributor valves (B60T 13/167 takes precedence)}

13/20	. . . . with control of pump driving means	13/565	. . . . . characterised by being associated with master cylinders, e.g. integrally formed
13/22	. . . Brakes applied by springs or weights and released hydraulically	13/567	. . . . . characterised by constructional features of the casing or by its strengthening or mounting arrangements
13/24	. . the fluid being gaseous	13/5675	. . . . . {Supportstruts}
13/241	. . . {Differential pressure systems}	13/569	. . . . . characterised by piston details, e.g. construction, mounting of diaphragm
13/242	. . . . {The control valve is provided as one unit with the servomotor cylinder}	13/57	. . . . . characterised by constructional features of control valves
13/243	. . . . . {Mechanical command of the control valve, mechanical transmission to the brakes}	13/573	. . . . . characterised by reaction devices
13/244	. . . . . {Mechanical command of the control valve, hydraulic transmission to the brakes}	13/575	. . . . . using resilient discs or pads
13/245	. . . . . {Hydraulic command of the control valve, hydraulic transmission to the brake}	13/577	. . . . . using levers
13/246	. . . . {The control valve is provided apart from the servomotor cylinder}	13/58	. . Combined or convertible systems
13/247	. . . . . {Mechanical command of the control valve, mechanical transmission to the brakes}	13/581	. . . {both hydraulic and pneumatic}
13/248	. . . . . {Mechanical command of the control valve, hydraulic transmission to the brakes}	13/583	. . . . {using converters}
13/249	. . . . . {Hydraulic command of the control valve, hydraulic transmission to the brakes}	13/585	. . . {comprising friction brakes and retarders}
13/26	. . . Compressed-air systems	13/586	. . . . {the retarders being of the electric type}
13/261	. . . . {systems with both indirect application and application by springs or weights and released by compressed air}	13/588	. . . {both fluid and mechanical assistance or drive}
13/263	. . . . . {specially adapted for coupling with dependent systems, e.g. tractor-trailer systems}	13/62	. . . both straight and automatic
13/265	. . . . . {dependent systems, e.g. trailer systems}	13/64	. . . both single and multiple, e.g. single and tandem
13/266	. . . . {Systems with both direct and indirect application, e.g. in railway vehicles}	13/66	. . Electrical control in fluid-pressure brake systems
13/268	. . . . {using accumulators or reservoirs}	13/662	. . . {characterised by specified functions of the control system components}
13/36	. . . . direct, i.e. brakes applied directly by compressed air	13/665	. . . {the systems being specially adapted for transferring two or more command signals, e.g. railway systems (B60T 13/662 takes precedence)}
13/365	. . . . . {for railway vehicles}	13/667	. . . . {and combined with electro-magnetic brakes}
13/38	. . . . Brakes applied by springs or weights and released by compressed air (B60T 13/261 takes precedence)}	13/68	. . . by electrically-controlled valves {(B60T 13/662 and B60T 13/665 take precedence)}
13/385	. . . . . {Control arrangements therefor}	13/683	. . . . {in pneumatic systems or parts thereof (in vacuum systems B60T 13/72)}
13/40	. . . . indirect, i.e. compressed air booster units {indirect systems}	13/686	. . . . {in hydraulic systems or parts thereof}
13/403	. . . . . {specially adapted for coupling with dependent systems, e.g. tractor-trailer systems}	13/70	. . . by fluid-controlled switches
13/406	. . . . . {specially adapted for transfer of two or more command signals, e.g. railway systems (with electrical control B60T 13/665)}	13/72	. . . in vacuum systems {or vacuum booster units}
13/44	. . . . . with two-chamber booster units	13/74	. with electrical assistance or drive
13/45	. . . . . with multiple booster units, e.g. tandem booster units	13/741	. . {acting on an ultimate actuator}
13/46	. . . Vacuum systems	13/743	. . . {with a spring accumulator}
13/465	. . . . {for railway vehicles}	13/745	. . {acting on a hydraulic system, e.g. a master cylinder}
13/48	. . . . direct, i.e. brakes applied directly by vacuum	13/746	. . {and mechanical transmission of the braking action}
13/50	. . . . Brakes applied by springs or weights and released by vacuum	13/748	. . {acting on electro-magnetic brakes (combined with fluid-pressure brake systems B60T 13/667)}
13/52	. . . . indirect, i.e. vacuum booster units	15/00	Construction arrangement, or operation of valves incorporated in power brake systems and not covered by groups B60T 11/00 or B60T 13/00 (valve structures responsive to a speed condition B60T 8/34; valves in general F16K)
13/56	. . . . . with two-chamber booster units	15/02	. Application and release valves
13/563	. . . . . with multiple booster units, e.g. tandem booster units	15/021	. . {Railway control or brake valves}
		15/022	. . . {with one slide valve, e.g. an emergency slide valve}
		15/024	. . . . {with quick braking action and evacuation of air to a reservoir, to the atmosphere or to the brake cylinder}
		15/025	. . {Electrically controlled valves}
		15/027	. . . {in pneumatic systems}
		15/028	. . . {in hydraulic systems}
		15/04	. . Driver's valves

15/041	. . . {controlling auxiliary pressure brakes, e.g. parking or emergency brakes (B60T 15/048 takes precedence)}	15/38	. . . for quick take-up and heavy braking, e.g. with auxiliary reservoir for taking-up slack
15/043	. . . {controlling service pressure brakes (B60T 15/048 takes precedence)}	15/40	. . . . with separate take-up and applying cylinders
15/045	. . . . {in multiple circuit systems, e.g. dual circuit systems}	15/42	. . . with a quick braking action, i.e. with accelerating valves actuated by brake-pipe pressure variation
15/046	. . . . . {with valves mounted in tandem}	15/44	. . . . and operating independently of the main control device
15/048	. . . {Controlling pressure brakes of railway vehicles}	15/46	. . . for retarding braking action to prevent rear vehicles of a vehicle train overtaking the forward ones
15/10	. . . for vacuum brakes	15/48	. . . for filling reservoirs
15/12	. . . combined with relay valves or the like	15/50	. . . . with means for limiting or relieving pressure in reservoirs
15/14	. . . influencing electric control means	15/52	. . . for quick release of brakes, e.g. for influencing counter- pressure in triple valve or recirculating air from reservoir or brake cylinder to brake pipe
15/16	. . . Arrangements enabling systems to be controlled from two or more positions	15/54	. . . for controlling exhaust from triple valve or from brake cylinder
15/18	. . Triple or other relay valves which allow step-wise application or release and which are actuated by brake-pipe pressure variation to connect brake cylinders or equivalent to compressed air or vacuum source or atmosphere	15/56	. . . for filling reservoirs by means of a secondary supply pipe
15/181	. . . {Trailer control valves (B60T 15/20 and B60T 15/243 take precedence)}	15/58	. . . for supplying control impulses through a secondary air pipe
15/182	. . . {Trailer brake valves (B60T 15/20 and B60T 15/246 take precedence)}	15/60	. . . for releasing or applying brakes when vehicles of a vehicle train are uncoupled
15/184	. . . {Railway control or brake valves}	17/00	Component parts, details, or accessories of power brake systems not covered by groups B60T 8/00, B60T 13/00 or B60T 15/00, or presenting other characteristic features (air compressors per se F04)
15/185	. . . . {with one slide valve}	17/002	. {Air treatment devices}
15/187	. . . . . {with a slide valve for initiation and a second slide valve for control of the braking}	17/004	. . {Draining and drying devices}
15/188	. . . . . {with a slide valve for initiation and annular valves for control of the braking}	17/006	. . {Anti-frost devices}
15/20	. . . controlled by two fluid pressures	17/008	. . {Silencer devices}
15/203	. . . . {Trailer control valves (B60T 15/223 takes precedence)}	17/02	. Arrangements of pumps or compressors, or control devices therefor
15/206	. . . . {Trailer brake valves (B60T 15/226 takes precedence)}	17/04	. Arrangements of piping, valves in the piping, e.g. cut-off valves, couplings or air hoses (traction couplings involving joints for supply lines, electric circuits, or the like B60D 1/62 ; couplings peculiar to railway vehicles for, or combined with, couplings or connectors for fluid conduits or electric cables B61G 5/06 ; pipes, cut-off valves, couplings, air hoses per se F16C, F16K, F16L)
15/22	. . . . with one or more auxiliary valves, for braking, releasing, filling reservoirs	17/043	. . {Brake line couplings, air hoses and stopcocks}
15/223	. . . . . {Trailer control valves}	17/046	. . {Devices for pipe guiding and fixing}
15/226	. . . . . {Trailer brake valves}	17/06	. Applications or arrangements of reservoirs
15/24	. . . controlled by three fluid pressures	17/08	. Brake cylinders other than ultimate actuators (with built-in wear-compensating mechanisms, ultimate actuators F16D)
15/243	. . . . {Trailer control valves}	17/081	. . {Single service brake actuators}
15/246	. . . . {Trailer brake valves}	17/083	. . {Combination of service brake actuators with spring loaded brake actuators}
15/26	. . . . without a quick braking action	17/085	. . {Spring loaded brake actuators}
15/28	. . . . . and having auxiliary valves	17/086	. . . {Spring loaded brake actuators with emergency release device}
15/30	. . . . with a quick braking action	17/088	. . {Mounting arrangements}
15/302	. . . . . {Railway control or brake valves with evacuation of air to a reservoir, to the atmosphere or to the brake cylinder}	17/10	. . Two or more cylinders acting on the same brake with means for rendering them effective selectively or successively, the number of effective cylinders being variable
15/304	. . . . . . {with one slide valve}	17/12	. . . according to vehicle weight
15/306	. . . . . . {with a slide valve for initiation and a second slide valve for control of the braking}	17/14	. . . according to vehicle speed
15/308	. . . . . . {with a slide valve for initiation and annular valves for control of the braking}		
15/32	. . . . . and having auxiliary valves		
15/34	. . . controlled alternatively by two or three fluid pressures		
15/36	. . Other control devices or valves characterised by definite functions {(electrically controlled valves in fluid-pressure brake systems B60T 15/027 , B60T 15/028)}		

17/16	. . Locking of brake cylinders	2210/14	. . Rough roads, bad roads, gravel roads
17/18	. Safety devices; Monitoring	2210/16	. . Off-road driving conditions
17/20	. . Safety devices operable by passengers other than the driver {, e.g. for railway vehicles}	2210/20	. Road shapes
17/22	. . Devices for monitoring or checking brake systems; Signal devices	2210/22	. . Banked curves
17/221	. . . {Procedure or apparatus for checking or keeping in a correct functioning condition of brake systems (hydraulic pressure systems in general F15B 19/00, F15B 21/04; testing structures or apparatus G01M)}	2210/24	. . Curve radius
17/222	. . . . {by filling or bleeding of hydraulic systems}	2210/30	. Environment conditions or position therewithin
17/223	. . . . {Devices for pressurising brake systems acting on pedal}	2210/32	. . Vehicle surroundings
17/225	. . . {brake fluid level indicators (level indication in general G01F; H01H)}	2210/34	. . Blind spots
17/226	. . . {using devices being responsive to the difference between the fluid pressures in conduits of multiple braking systems}	2210/36	. . Global Positioning System [GPS]
17/227	. . . . {With additional functions, e.g. by-pass}	2220/00	Monitoring, detecting driver behaviour; Signalling thereof; Counteracting thereof
17/228	. . . {for railway vehicles}	2220/02	. Driver type; Driving style; Driver adaptive features
		2220/03	. Driver counter-steering; Avoidance of conflicts with ESP control
		2220/04	. Pedal travel sensor, stroke sensor; Sensing brake request
		2220/06	. Adjustment of accelerator pedal reaction forces
		2230/00	Monitoring, detecting special vehicle behaviour; Counteracting thereof
		2230/02	. Side slip angle, attitude angle, floating angle, drift angle
		2230/03	. Overturn, rollover
		2230/04	. Jerk, soft-stop; Anti-jerk, reduction of pitch or nose-dive when braking
		2230/06	. Tractor-trailer swaying
		2230/08	. Driving in reverse
2201/00	Particular use of vehicle brake systems; Special systems using also the brakes; Special software modules within the brake system controller	2240/00	Monitoring, detecting wheel/tire behaviour; counteracting thereof
2201/02	. Active or adaptive cruise control system; Distance control	2240/02	. Longitudinal grip
2201/022	. . Collision avoidance systems	2240/03	. Tire sensors
2201/024	. . Collision mitigation systems	2240/04	. Tire deformation
2201/03	. Brake assistants	2240/06	. Wheel load; Wheel lift
2201/04	. Hill descent control	2240/07	. Tire tolerance compensation
2201/06	. Hill holder; Start aid systems on inclined road	2240/08	. Spare wheel detection; Adjusting brake control in case of spare wheel use
2201/08	. Lane monitoring; Lane Keeping Systems	2250/00	Monitoring, detecting, estimating vehicle conditions
2201/081	. . using distance control	2250/02	. Vehicle mass
2201/082	. . using alarm actuation	2250/03	. Vehicle yaw rate
2201/083	. . using active brake actuation	2250/04	. Vehicle reference speed; Vehicle body speed
2201/084	. . using suspension control	2250/042	. . Reference speed calculation in ASR or under wheel spinning condition
2201/085	. . using several actuators; Coordination of the lane keeping system with other control systems	2250/06	. Sensor zero-point adjustment; Offset compensation
2201/086	. . using driver related features	2250/062	. . loosing zero-point calibration of yaw rate sensors when travelling on banked roads or in case of temperature variations
2201/087	. . using active steering actuation	2260/00	Interaction of vehicle brake system with other systems
2201/088	. . using transmission control	2260/02	. Active Steering, Steer-by-Wire
2201/089	. . using optical detection	2260/022	. . Rear-wheel steering; Four-wheel steering
2201/09	. Engine drag compensation	2260/024	. . Yawing moment compensation during mu-split braking
2201/10	. Automatic or semi-automatic parking aid systems	2260/04	. Automatic transmission
2201/12	. Pre-actuation of braking systems without significant braking effect; Optimizing brake performance by reduction of play between brake pads and brake disc	2260/06	. Active Suspension System
2201/122	. . Pre-actuation in case of ESP control	2260/08	. Coordination of integrated systems
2201/124	. . Rain brake support [RBS]; Cleaning or drying brake discs, e.g. removing water or dirt	2260/09	. Complex systems; Conjoint control of two or more vehicle active control systems
2201/14	. Electronic locking-differential	2270/00	Further aspects of brake control systems not otherwise provided for
2201/16	. Curve braking control, e.g. turn control within ABS control algorithm	2270/10	. ABS control systems
2210/00	Detection or estimation of road or environment conditions; Detection or estimation of road shapes		
2210/10	. Detection or estimation of road conditions		
2210/12	. . Friction		
2210/122	. . . using fuzzy logic, neural computing		
2210/124	. . . Roads with different friction levels		
2210/13	. . Aquaplaning, hydroplaning		

B60T

- 2270/12 . . for all-wheel drive vehicles
- 2270/14 . . hydraulic model
- 2270/20 . ASR control systems
- 2270/202 . . for all-wheel drive vehicles
- 2270/203 . . hydraulic system components
- 2270/204 . . hydraulic model
- 2270/206 . . Monitoring, e.g. parameter monitoring,
plausibility check
- 2270/208 . . adapted to friction condition
- 2270/211 . . Setting or adjusting start-control threshold
- 2270/213 . . Driving off under Mu-split conditions
- 2270/30 . ESP control system
- 2270/302 . . for all-wheel drive vehicles
- 2270/303 . . Stability control with active acceleration
- 2270/304 . . during driver brake actuation
- 2270/306 . . hydraulic system components
- 2270/308 . . hydraulic model
- 2270/311 . . Predefined control maps, lookup tables
- 2270/313 . . with less than three sensors (yaw rate, steering
angle, lateral acceleration)
- 2270/40 . Failsafe aspects of brake control systems
- 2270/402 . . Back-up
- 2270/403 . . Brake circuit failure
- 2270/404 . . Brake-by-wire or X-by-wire failsafe
- 2270/406 . . Test-mode; Self-diagnosis
- 2270/408 . . Hierarchical failure detection
- 2270/411 . . Offset failure
- 2270/413 . . Plausibility monitoring, cross check, redundancy
- 2270/414 . . Power supply failure
- 2270/415 . . Short-circuit, open circuit failure
- 2270/416 . . Wheel speed sensor failure
- 2270/60 . Regenerative braking
- 2270/602 . . ABS features related thereto
- 2270/603 . . ASR features related thereto
- 2270/604 . . Merging friction therewith; Adjusting their
repartition
- 2270/606 . . Axle differential or center differential features
related thereto
- 2270/608 . . Electronic brake distribution (EBV/EBD) features
related thereto
- 2270/611 . . Engine braking features related thereto
- 2270/613 . . ESP features related thereto
- 2270/82 . Brake-by-Wire, EHB
- 2270/83 . Control features of electronic wedge brake [EWB]
- 2270/84 . Driver circuits for actuating motor, valve and the
like
- 2270/86 . Optimizing braking by using ESP vehicle or tire
model
- 2270/88 . Pressure measurement in brake systems
- 2270/89 . Criteria for brake release