

# CPC COOPERATIVE PATENT CLASSIFICATION

## B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

### TRANSPORTING

#### B61 RAILWAYS

(NOTE omitted)

#### B61L GUIDING RAILWAY TRAFFIC; ENSURING THE SAFETY OF RAILWAY TRAFFIC (brakes or auxiliary equipment [B61H](#), [B61K](#); point or crossing construction [E01B](#))

<b>1/00</b>	<b>Devices along the route controlled by interaction with the vehicle or train</b> (detonators <a href="#">B61L 5/20</a> ; operation of points or signals by passage of the vehicle <a href="#">B61L 11/00</a> , <a href="#">B61L 13/00</a> ; operation of gates, or gates and signals, by approaching vehicle <a href="#">B61L 29/18</a> )	<b>1/20</b>	. Safety arrangements for preventing or indicating malfunction of the device, e.g. by leakage current, by lightning
1/02	. Electric devices associated with track {, e.g. rail contacts}	<b>3/00</b>	<b>Devices along the route for controlling devices on the vehicle or train, e.g. to release brake or to operate a warning signal</b>
1/025	. . {actuated by variation of resistance or by piezoelectricity}	3/02	. at selected places along the route, e.g. intermittent control {simultaneous mechanical and electrical control}
1/04	. . mechanically actuated by a part of the vehicle	3/04	. . controlling mechanically {(arrangements of making elements acting directly on tread <a href="#">B60T 1/04</a> )}
1/045	. . . {actuated by fluid-pressure}	3/06	. . controlling by electromagnetic or particle radiation, e.g. by light beam
1/06	. . actuated by deformation of rail; actuated by vibration in rail	3/065	. . . {controlling optically}
1/08	. . magnetically actuated; electrostatically actuated	3/08	. . controlling electrically
1/10	. . actuated by electromagnetic radiation; actuated by particle radiation	3/10	. . . using current passing between devices along the route and devices on the vehicle or train
1/12	. Electric devices associated with overhead trolley wires	3/103	. . . . {Details of current transmitting conductors or contact brushes}
1/14	. Devices for indicating the passing of the end of the vehicle or train	3/106	. . . . {with mechanically controlled electrical switch on the vehicle}
1/16	. Devices for counting axles; Devices for counting vehicles	3/12	. . . using magnetic or electrostatic induction; using radio waves
1/161	. . {characterised by the counting methods}	3/121	. . . . {using magnetic induction}
1/162	. . {characterised by the error correction}	2003/122	. . . . {German standard for inductive train protection, called "Induktive Zugsicherung"[INDUSI]}
1/163	. . {Detection devices}	2003/123	. . . . {French standard for inductive train protection, called "Contrôle de vitesse par balises" [KVB]}
1/164	. . . {Mechanical}	3/125	. . . . {using short-range radio transmission}
1/165	. . . {Electrical}	3/126	. . . . {Constructional details}
1/166	. . . {Optical}	3/127	. . . . {for remote control of locomotives (remote control of locomotives within a train consist <a href="#">B61C 17/12</a> )}
1/167	. . {Circuit details}	3/128	. . . . {for control of tilting trains by external control devices, e.g. by Eurobalise (tilting details <a href="#">B61F 5/22</a> )}
1/168	. . {Specific transmission details}	3/14	. . to cut-off the power supply to traction motors of electrically-propelled vehicles
1/169	. . {Diagnosis}	3/16	. Continuous control along the route
1/18	. Railway track circuits (rail joints <a href="#">E01B 11/00</a> , e.g. insulated rail joints <a href="#">E01B 11/54</a> )	3/18	. . using electric current passing between devices along the route and devices on the vehicle or train
1/181	. . {Details}	3/185	. . . {using separate conductors}
1/182	. . . {Use of current of indifferent sort or a combination of different current types}		
1/183	. . . . {Use of means on the vehicle for improving short circuit, e.g. in vehicles with rubber bandages}		
1/184	. . . . {Use of additional conductors for examining leakages between rails}		
1/185	. . . {Use of direct current}		
1/186	. . . {Use of rectified alternating current}		
1/187	. . . {Use of alternating current}		
1/188	. . . {Use of coded current}		

3/20	. . . employing different frequencies or coded pulse groups {, e.g. using currents carried by traction current}	5/1836	. . . . {using light sources of different colours and separate optical systems}
3/22	. . using magnetic or electrostatic induction; using electromagnetic radiation	5/1845	. . . . {Optical systems, lenses}
3/221	. . . {using track circuits}	5/1854	. . . . {Mounting and focussing of the light source in a lamp, fixing means}
3/222	. . . . {Arrangements on the track only}	5/1863	. . . . {Lamp mountings on a mast}
2003/223	. . . . {French cab signaling system, called "Transmission Voie-Machine" [TVM]}	5/1872	. . . . {Mobile mounting arrangements on a mast; Arrangements for hoisting of the lamp along the mast}
3/225	. . . {using separate conductors along the route}	5/1881	. . . . {Wiring diagrams for power supply, control or testing}
2003/226	. . . . {German inductive continuous train control, called 'Linienzugbeeinflussung' [LZB]}	5/189	. . . {using flashing light sources}
3/227	. . . {using electromagnetic radiation}	5/20	. Audible signals, e.g. detonator {audible signalling}
2003/228	. . . {Constructional details}	5/203	. . {Detonators; Track mounting means; Composition of the detonative product}
3/24	. . . employing different frequencies or coded pulse groups {, e.g. in combination with track circuits}	5/206	. . {Signalling means for special purposes}
3/243	. . . . {using alternating current}	5/22	. . Devices for initiating the release of detonators in a certain position of a signal
3/246	. . . . {using coded current}	5/24	. . Replacement of detonators
<b>5/00</b>	<b>Local operating mechanisms for points or track-mounted scotch-blocks; Visible or audible signals; Local operating mechanisms for visible or audible signals (B61L 11/00 takes precedence)</b>	<b>7/00</b>	<b>Remote control of local operating means for points, signals, or track-mounted scotch-blocks (B61L 11/00, B61L 13/00 take precedence; interlocking arrangements B61L 19/00)</b>
5/02	. Mechanical devices for operating points or scotch-blocks {, e.g. local manual control}	7/02	. using mechanical transmission, e.g. wire, lever
5/023	. . {using funicular driving means}	7/021	. . {Driving wheels or supports for traction wires}
5/026	. . {fixing switch-rails to the driving means}	7/022	. . {Guiding means or supporting foundations in beton}
5/04	. Fluid-pressure devices for operating points or scotch-blocks	7/024	. . {Coupling for wires or traction bars}
5/045	. . {using electrically controlled fluid-pressure operated driving means}	7/025	. . {Bracing or compensating arrangements}
5/06	. Electric devices for operating points or scotch-blocks {, e.g. using electromotive driving means}	7/027	. . {Control levers}
5/062	. . {Wiring diagrams}	7/028	. . {Indicating or fixing arrangements in the event of breaking or tension difference of transmission wires for points, signals or similar}
5/065	. . {Construction of driving mechanism}	7/04	. using fluid-pressure transmission
5/067	. . {using electromagnetic driving means}	7/06	. using electrical transmission
5/08	. Underground actuating arrangements, e.g. for tramways	7/061	. . {using electromotive driving means}
5/10	. Locking mechanisms for points; Means for indicating the setting of points	7/062	. . . {Wiring diagrams}
5/102	. . {Controlling electrically}	7/063	. . . {Construction of driving mechanism}
5/105	. . {Controlling funicularly}	7/065	. . {using electromagnetic driving means}
5/107	. . {electrical control of points position}	7/066	. . {using electrically controlled fluid-pressure operated driving means}
5/12	. Visible signals	7/067	. . {Supply for electric safety arrangements}
5/125	. . {Fixed signals, beacons, or the like}	7/068	. . {Protection against eddy-currents, short-circuits, or the like, for electric safety arrangements}
5/14	. . Form signals, e.g. semaphore arms	7/08	. . Circuitry
5/16	. . . Local operating mechanisms for form signals	7/081	. . . {Direct line wire control}
5/161	. . . . {using electromotive driving means}	7/083	. . . {Common line wire control using currents of different amplitudes, polarities, frequencies, or the like}
5/162	. . . . . {Wiring diagrams}	7/085	. . . {Common line wire control using synchronous distributors}
5/163	. . . . . {Driving mechanisms}	7/086	. . . {Common line wire control using relay distributors}
5/165	. . . . {using electromagnetic driving means}	7/088	. . . {Common line wire control using series of coded pulses}
5/166	. . . . {using electrically controlled gravity operated driving means}	7/10	. . . for light signals, e.g. for supervision, back-signalling
5/167	. . . . {using electrically controlled fluid-pressure operated driving means}	7/103	. . . . {Electric control of the setting of signals}
5/168	. . . . {using funicular driving means}	7/106	. . . . . {for form signals}
5/18	. . Light signals; Mechanisms associated therewith, e.g. blinders	<b>9/00</b>	<b>Illumination specially adapted for points, form signals, or gates</b>
5/1809	. . . {Daylight signals}	9/02	. non-electric
5/1818	. . . . {using mobile coloured screen}		
5/1827	. . . . {using light sources of different colours and a common optical system}		

9/04	. electric	19/02	. Interlocking devices having mechanical or fluid-pressure operation
<b>11/00</b>	<b>Operation of points from the vehicle or by the passage of the vehicle</b>	19/023	. . {purely mechanical (control levers <a href="#">B61L 7/027</a> )}
11/02	. using mechanical interaction between vehicle and track	19/026	. . {using fluid-pressure operated points or signals}
11/04	. . Trailable point locks	19/04	. . Details, e.g. hand lever, back-signalling device
11/06	. . with fluid-pressure transmission	19/06	. Interlocking devices having electrical operation
11/08	. using electrical or magnetic interaction between vehicle and track	2019/065	. . {with electronic means}
11/083	. . {Magnetic control}	19/08	. . Special arrangements for power supply for interlocking devices
2011/086	. . {German radio based operations, called "Funkfahrbetrieb" [FFB]}	19/10	. . with mechanical locks
<b>13/00</b>	<b>Operation of signals from the vehicle or by the passage of the vehicle</b>	19/12	. . . Details
13/002	. {actuated by the passage of the vehicle}	19/14	. . with electrical locks
13/005	. {optically actuated}	19/16	. . . Details
13/007	. {acoustically actuated}	<b>21/00</b>	<b>Station blocking between signal boxes in one yard</b>
13/02	. using mechanical interaction between vehicle and track	21/02	. Mechanical locking and release of the route; Repeat locks; Coupling of semaphores
13/04	. using electrical or magnetic interaction between vehicle and track {, e.g. by conductor circuits using special means or special conductors}	21/04	. Electrical locking and release of the route; Electrical repeat locks
13/042	. . {using isolated rail sections}	21/06	. Vehicle-on-line indication; Monitoring locking and release of the route
13/045	. . {using separated rail contacts, pedals or similar ( <a href="#">B61L 1/02</a> takes precedence)}	21/065	. . {for signals, including signals actuated by the vehicle}
13/047	. . {controlling inductively or magnetically}	21/08	. Order transmission and reception arrangements for giving or withholding permission
<b>15/00</b>	<b>Indicators provided on the vehicle or train for signalling purposes</b>	21/10	. Arrangements for trains which are closely following one another
15/0009	. {wiring diagrams for start- or stop-signals on vehicles having one or more carriages and having electrical communication lines between the carriages}	<b>23/00</b>	<b>Control, warning or like safety means along the route or between vehicles or trains</b>
15/0018	. {Communication with or on the vehicle or train}	23/002	. {Control or safety means for heart-points and crossings of aerial railways, funicular rack-railway}
15/0027	. . {Radio-based, e.g. using GSM-R}	23/005	. . {Automatic control or safety means for points for operator-less railway, e.g. transportation systems}
15/0036	. . {Conductor-based, e.g. using CAN-Bus, train-line or optical fibres}	23/007	. {Safety arrangements on railway crossings}
15/0045	. {Destination indicators, identification panels or distinguishing signs on the vehicles}	23/02	. for indicating along the route the failure of brakes
15/0054	. {Train integrity supervision, e.g. end-of-train [EOT] devices}	23/04	. for monitoring the mechanical state of the route
15/0058	. {On-board optimisation of vehicle or vehicle train operation}	23/041	. . {Obstacle detection}
15/0062	. {On-board target speed calculation or supervision}	23/042	. . {Track changes detection}
15/0063	. {Multiple on-board control systems, e.g. "2 out of 3"-systems}	23/044	. . . {Broken rails}
15/0072	. {On-board train data handling}	23/045	. . . {Rail wear}
15/0081	. {On-board diagnosis or maintenance}	23/047	. . . {Track or rail movements}
15/009	. {On-board display devices}	23/048	. . . {Road bed changes, e.g. road bed erosion}
15/0092	. {Memory means reproducing during the running of the vehicle or vehicle train, e.g. smart cards}	23/06	. for warning men working on the route
15/0094	. {Recorders on the vehicle}	23/08	. for controlling traffic in one direction only
15/02	. Head or tail indicators, e.g. light	23/10	. . manually operated {, e.g. block arrangements}
<b>17/00</b>	<b>Switching systems for classification yards</b>	23/12	. . partly operated by train
17/02	. Details, e.g. indicating degree of track filling	23/14	. . automatically operated
17/023	. . {Signalling; Signals with multiple indicating means}	23/16	. . . Track circuits specially adapted for section blocking
17/026	. . {Brake devices}	23/161	. . . . {using current of indifferent sorte or a combination of different current types}
<b>19/00</b>	<b>Arrangements for interlocking between points and signals by means of a single interlocking device {, e.g. central control}</b>	23/163	. . . . {using direct current}
		23/165	. . . . {using rectified alternating current}
		23/166	. . . . {using alternating current}
		23/168	. . . . {using coded current}
		23/18	. . . specially adapted for changing lengths of track sections in dependence upon speed and traffic density
		23/20	. . . with transmission of instructions to stations along the route
		23/22	. for controlling traffic in two directions over the same pair of rails
		23/24	. . using token systems, e.g. train staffs, tablets

23/26	. . with means for actuating signals from the vehicle or by passage of the vehicle	27/57	. . for vehicles or trains, e.g. trackside supervision of train conditions
23/28	. . using non-automatic blocking from a place along the route	27/60	. Testing or simulation
23/30	. . using automatic section blocking	27/70	. Details of trackside communication
23/32	. . . with provision for the blocking of passing sidings	<b>29/00</b>	<b>Safety means for rail/road crossing traffic</b>
23/34	. for indicating the distance between vehicles or trains by the transmission of signals therebetween	29/02	. Guards or obstacles for preventing access to the route ( <a href="#">cattle guards connected to the permanent way E01B 17/00</a> )
<b>25/00</b>	<b>Recording or indicating positions or identities of vehicles or trains or setting of track apparatus</b>	29/023	. . {Special gates}
25/02	. Indicating or recording positions or identities of vehicles or trains	29/026	. . . {Preventing access by means of obstacles raising across the route}
25/021	. . {Measuring and recording of train speed}	29/04	. Gates for level crossings
25/023	. . {Determination of driving direction of vehicle or train}	29/06	. . yielding to vehicles in one direction but operated in a different direction
25/025	. . {Absolute localisation, e.g. providing geodetic coordinates}	29/08	. Operation of gates; Combined operation of gates and signals
25/026	. . {Relative localisation, e.g. using odometer}	29/10	. . Means for securing gates in their desired position
25/028	. . {Determination of vehicle position and orientation within a train consist, e.g. serialisation}	29/12	. . Manual operation
25/04	. . Indicating or recording train identities	29/14	. . . mechanically
25/041	. . . {using reflecting tags}	29/16	. . . electrically
25/043	. . . {using inductive tags}	29/18	. . Operation by approaching rail vehicle or train
25/045	. . . {using reradiating tags}	29/20	. . . mechanically
25/046	. . . {using magnetic tags}	29/22	. . . electrically
25/048	. . . {using programmable tags}	29/222	. . . . {using conductor circuits with separate contacts or conductors}
25/06	. Indicating or recording the setting of track apparatus, e.g. of points, of signals	29/224	. . . . . {using rail contacts}
25/065	. . {for signalling systems on the vehicle using current conduction}	29/226	. . . . {using track-circuits, closed or short-circuited by train or using isolated rail-sections}
25/08	. . Diagrammatic displays	29/228	. . . . . {using optical means}
<b>27/00</b>	<b>Central railway traffic control systems; Trackside control; Communication systems specially adapted therefor</b>	29/24	. Means for warning road traffic that a gate is closed or closing, or that rail traffic is approaching, e.g. for visible or audible warning
27/02	. Manual systems	29/243	. . {Transmission mechanism or acoustical signals for gates}
27/04	. Automatic systems, e.g. controlled by train; Change-over to manual control	29/246	. . {Signals or brake- or lighting devices mounted on the road vehicle and controlled from the vehicle or train}
27/10	. Operations, e.g. scheduling or time tables	29/26	. . mechanically operated
27/12	. . Preparing schedules	29/28	. . electrically operated
27/14	. . Following schedules	29/282	. . . {magnetic or inductive control by the vehicle}
27/16	. . Trackside optimisation of vehicle or train operation	29/284	. . . {using rail-contacts, rail microphones, or the like, controlled by the vehicle}
27/18	. . Crew rosters; Itineraries	29/286	. . . {using conductor circuits controlled by the vehicle}
27/20	. Trackside control of safe travel of vehicle or train, e.g. braking curve calculation	29/288	. . . {Wiring diagram of the signal control circuits}
2027/202	. . {using European Train Control System [ETCS]}	29/30	. . . Supervision, e.g. monitoring arrangements
2027/204	. . {using Communication-based Train Control [CBTC]}	29/32	. . . Timing, e.g. advance warning of approaching train
27/30	. Trackside multiple control systems, e.g. switch-over between different systems	<b>99/00</b>	<b>Subject matter not provided for in other groups of this subclass</b>
27/33	. . Backup systems, e.g. switching when failures occur	99/002	. {Autonomous vehicles, i.e. under distributed traffic control}
27/37	. . Migration, e.g. parallel installations running simultaneously		
27/40	. Handling position reports or trackside vehicle data		
27/50	. Trackside diagnosis or maintenance, e.g. software upgrades		
27/53	. . for trackside elements or systems, e.g. trackside supervision of trackside control system conditions		
		<b>Indexing scheme associated with groups B61L 1/00 – B61L 99/00 relating to control methods, communication or navigation systems for railway traffic, features of light signals or vehicle systems.</b>	
		<b>2201/00</b>	<b>Control methods</b>
		2201/02	. Fuzzy control

**2205/00**      **Communication or navigation systems for railway traffic**

- 2205/02      . Global system for mobile communication - railways [GSM-R]
- 2205/04      . Satellite based navigation systems, e.g. global positioning system [GPS]

**2207/00**      **Features of light signals**

- 2207/02      . using light-emitting diodes [LEDs]

**2210/00**      **Vehicle systems**

- 2210/02      . Single autonomous vehicles
- 2210/04      . Magnetic elevation vehicles [maglev]