

# 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](#))

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|-------------|---|-------------|--|
| <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}  |             |  |

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| 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}   |             |   |

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| 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   |

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| 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]