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
(power supply lines for electrically-propelled vehicles B60M; vehicle signalling in general B60Q; brakes or auxiliary equipment B61H, B61K; point or crossing construction E01B; insulated rail joints E01B 11/54; optical devices in general G02; controlling in general G05; electric communication technique H04)

WARNING
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  Devices along the route controlled by interaction with the vehicle or vehicle train, [e.g. pedals]
(detonators B61L 5/20; operation of points or signals by passage of the vehicle B61L 11/00, B61L 13/00; central traffic control systems controlled by train B61L 27/04; operation of gates, or gates and signals, by approaching vehicle B61L 29/18)
1/02  . Electric devices associated with track [e.g. rail contacts]
1/025  . . [acted by variation of resistance or by piezoelectricity]
1/04  . mechanically actuated by a part of the vehicle
1/045  . . [acted by fluid-pressure]
1/06  . . actuated by deformation of rail; actuated by vibration in rail
1/08  . . magnetically actuated; electrostatically actuated
1/10  . . actuated by electromagnetic radiation; actuated by particle radiation
1/12  . Electric devices associated with overhead trolley wires
1/14  . Devices for indicating the passing of the end of the vehicle or vehicle train
1/16  . Devices for counting axles; Devices for counting vehicles (counting moving objects in general G06M)
1/161  . [characterised by the counting methods]
1/162  . [characterised by the error correction]
1/163  . [Detection devices]
1/164  . . [Mechanical]
1/165  . . [Electrical]
1/166  . . [Optical]
1/167  . . [Circuit details]
1/168  . . [Specific transmission details]
1/169  . . [Diagnosis]
1/18  . Railway track circuits (automatically-operated track circuits specially adapted for section blocking for controlling traffic B61L 23/00; rail joints E01B 11/00)
1/181  . . [Details]
Local operating mechanisms for points or track-mounted scotch-blocks (track-mounted scotch-blocks per se B61K); Visible or audible signals; Local operating mechanisms for visible or audible signals (B61L 11/00 takes precedence)

5/00

3/065 . . . .[controlling optically]
3/08 . . . controlling electrically
3/10 . . . . using current passing between devices along the route and devices on the vehicle train
3/103 . . . . [Details of current transmitting conductors or contact brushes]
3/106 . . . . [with mechanically controlled electrical switch on the vehicle]
3/12 . . . . using magnetic or electrostatic induction; using radio waves
3/121 . . . . [using magnetic induction]
2003/122 . . . .[French standard for inductive train protection, called “Induktive Zugsicherung” [INDUSH]]
2003/123 . . . . [German standard for inductive train protection, called “Contrôle de vitesse par balises” [KVB]]
3/125 . . . . [using short-range radio transmission (long-range radio transmission B61L 15/0027, B61L 27/0005)]
3/126 . . . . [Constructional details]
3/127 . . . . [for remote control of locomotives (remote control of locomotives within a train consist B61C 17/12)]
3/128 . . . . [for control of tilting trains by external control devices, e.g. by Eurobalise (tilting details B61F 5/22)]
3/14 . . . . to cut-off the power supply to traction motors of electrically-propelled vehicles
3/16 . . . continuous control along the route
3/18 . . . . using electric current passing between devices along the route and devices on the vehicle or vehicle train
3/185 . . . . [using separate conductors]
3/20 . . . . employing different frequencies or coded pulse groups, e.g. using currents carried by traction current (operating and signalling systems using network power supply H02J 13/00)]
3/22 . . . . using magnetic or electrostatic induction; using electromagnetic radiation
3/221 . . . . [using track circuits]
3/222 . . . . [Arrangements on the track only]
2003/223 . . . . [French cab signaling system, called “Transmission Voie-Machine” [TVM]]
3/225 . . . . [using separate conductors along the route]
2003/226 . . . . [German inductive continuous train control, called ‘‘Linienzugbeeinflussung’’ [LZB]]
3/227 . . . . [using electromagnetic radiation]
2003/228 . . . . [Constructional details]
3/24 . . . . employing different frequencies or coded pulse groups [e.g. in combination with track circuits]
3/243 . . . . [using alternating current]
3/246 . . . . [using coded current]

5/04 . . . . Fluid-pressure devices for operating points or scotch-blocks
5/045 . . . . [using electrically controlled fluid-pressure operated driving means]
5/06 . . . . Electric devices for operating points or scotch-blocks, e.g. using electromotive driving means
5/062 . . . . [Wiring diagrams]
5/065 . . . . [Construction of driving mechanism]
5/067 . . . . [using electromagnetic driving means]
5/08 . . . . Underground actuating arrangements, e.g. for tramways
5/10 . . . . Locking mechanisms for points; Means for indicating the setting of points
5/102 . . . . [Controlling electrically]
5/105 . . . . [Controlling funiculcularly]
5/107 . . . . [electrical control of points position]
5/12 . . . . Visible signals (signalling means on the vehicle B61L 15/00; signalling means for classification yards, or the like, with multiple indicating means B61L 17/023; signalling means for road crossings B61L 29/24; lighting in general F21; visible signalling arrangements in general G08B 5/00)]
5/125 . . . . [Fixed signals, beacons, or the like]
5/14 . . . . Form signals, e.g. semaphore arms (illumination for points, form signals B61L 9/00)]
5/16 . . . . Local operating mechanisms for form signals
5/161 . . . . [using electromotive driving means]
5/162 . . . . [Wiring diagrams]
5/163 . . . . [Driving mechanisms]
5/165 . . . . [using electromagnetic driving means]
5/166 . . . . [using electrically controlled gravity operated driving means]
5/167 . . . . [using electrically controlled fluid-pressure operated driving means]
5/168 . . . . [using funicular driving means]
5/18 . . . . Light signals; Mechanisms associated therewith, e.g. blenders
5/1809 . . . . [Daylight signals]
5/1818 . . . . [using mobile coloured screen]
5/1827 . . . . [using light sources of different colours and a common optical system]
5/1836 . . . . [using light sources of different colours and separate optical systems]
5/1845 . . . . [Optical systems, lenses]
5/1854 . . . . [Mounting and focussing of the light source in a lamp, fixing means]
5/1863 . . . . [Lamp mountings on a mast]
5/1872 . . . . [Mobile mounting arrangements on a mast; Arrangements for hoisting of the lamp along the mast]
5/1881 . . . . [Wiring diagrams for power supply, control or testing]
5/189 . . . . [using flashing light sources (visible signalling in general using flashing light sources G08B 5/38; thermal switches operating intermittently H01H 61/06, H01H 61/08)]
5/20 . . . . Audible signals, e.g. detonator audible signalling
5/203 . . . . [Detonators; Track mounting means; Composition of the detonative product]
5/206 . . . . [Signalling means for special purposes]
5/22 . . . . Devices for initiating the release of detonators in a certain position of a signal
5/24 . . . . Replacement of detonators
Remote control of local operating means for points, signals, or trackmounted scotch-blocks (B61L 11/00 takes precedence; interlocking arrangements B61L 19/00; transmission per se, see the relevant classes)

using mechanical transmission; e.g. wire, lever
Driving wheels or supports for traction wires
Guiding means or supporting foundations in beton
Coupling for wires or traction bars
Bracing or compensating arrangements
(Leapover)
[Contour] 
[Controlling] 
[Indicating or fixing arrangements in the event of breaking or tension difference of transmission wires for points, signals or similar]
using fluid-pressure transmission
using electrical transmission
[Electromotive driving means]
Wiring diagrams
Construction of driving mechanism
[Electromagnetic driving means]
[Electrically controlled fluid-pressure operated driving means]
[Supply for electric safety arrangements]
[Protection against eddy-currents, short-circuits, or the like, for electric safety arrangements]
Circuitry
Direct line wire control
[Common line wire control using currents of different amplitudes, polarities, frequencies, or the like]
[Common line wire control using synchronous distributors]
[Common line wire control using relay distributors]
[Common line wire control using series of coded pulses]
for light signals, e.g. for supervision, back-signalling
Electric control of the setting of signals
[for form signals]
Illumination specially adapted for points, form signals, or gates (lighting in general F21)
non-electric
[electric

Operation of points from the vehicle or by the passage of the vehicle
using mechanical interaction between vehicle and track
Trailable point locks
with fluid-pressure transmission
using electrical or magnetic interaction between vehicle and track
[ Magnetic control]
[German radio based operations, called "Funkfahrbetrieb" [FFB]]

Operation of signals from the vehicle or by the passage of the vehicle
[ actuated by the passage of the vehicle]
[ optically actuated]
[aacoustically actuated]
using mechanical interaction between vehicle and track
using electrical or magnetic interaction between vehicle and track
[ using isolated rail sections]
[ using separated rail contacts, pedals or similar (B61L 1/02 takes precedence)]
[controlling inductively or magnetically]
Indicators provided on the vehicle or vehicle train for signalling purposes (On-board control or communication systems)
signalling
coded pulses
Distributors
[Common line wire control using synchronous circuits]
[Common line wire control using currents of different amplitudes, polarities, or frequencies]
[Direct line wire control]
![B61L.

Switching systems for classification yards (rail brakes B61K)
Details, e.g. indicating degree of track filling
Signalling; Signals with multiple indicating means
[Brake devices]

Arrangements for interlocking between points and signals by means of a single interlocking device (e.g. central control (remote control B61L 7/00; station block arrangements B61L 21/00))
Interlocking devices having mechanical or fluid-pressure operation
[ purely mechanical (control levers B61L 7/027)]
[ using fluid-pressure operated points or signals]
Detail- e.g. hand lever, back-signalling device
Interlocking devices having electrical operation
[ with electronic means]
Special arrangements for power supply for interlocking devices
with mechanical locks
Details
with electrical locks
Details
Station blocking between signal boxes in one yard (interlocking between points and signals by means of a single interlocking device B61L 19/00)
23/02: Mechanical locking and release of the route; Repeat locks; Coupling of semaphores
23/04: Electrical locking and release of the route; Electrical repeat locks (central interlocking B61L 19/00)
23/06: Vehicle-on-line indication; Monitoring locking and release of the route
23/08: Order transmission and reception arrangements for giving or withholding permission
23/10: Arrangements for trains which are closely following one another (automatic central traffic control systems B61L 27/04)

23/00 Control, warning, or like safety means along the route or between vehicles or vehicle trains
23/002: (Control or safety means for heart-points and crossings of aerial rails, funicular rack-railway (points or safety systems for model railways A63H; points, crossings or hearts for aerial railway, funicular rack railway E01B 25/12))
23/005: (Automatic control or safety means for points for operator-less railway, e.g. transportation systems)
23/007: (Safety arrangements on railway crossings)
23/02: for indicating along the route the failure of brakes
23/04: for monitoring the mechanical state of the route
23/041: (Obstacle detection)
23/042: (Track changes detection)
23/044: (Broken rails)
23/045: (Rail wear)
23/047: (Track or rail movements)
23/048: (Road bed changes, e.g. road bed erosion)
23/06: for warning men working on the route
23/08: for controlling traffic in one direction only (station blocking between signal boxes in one yard B61L 21/00)
23/10: manually operated, (e.g. block arrangements)
23/12: partly operated by train
23/14: automatically operated
23/16: Track circuits specially adapted for section blocking
23/161: (using current of indifferent sort or a combination of different current types)
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 (station blocking between signal boxes in one yard B61L 21/00)
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
23/28: using non-automatic blocking from a place along the route
23/30: using automatic section blocking
23/32: with provision for the blocking or passing sidings

23/34: Control, warnings or like safety means indicating the distance between vehicles or vehicle trains by the transmission of signals therebetween

25/00 Recording or indicating positions or identities of vehicles or vehicle trains or setting of track apparatus
25/02: Indicating or recording positions or identities of vehicles or vehicle trains
25/021: (Measuring and recording of train speed)
25/023: (Determination of driving direction of vehicle or vehicle train)
25/025: (Absolute localisation, e.g. providing geodetic coordinates)
25/026: (Relative localisation, e.g. using odometer)
25/028: (Determination of vehicle position and orientation within a train consist, e.g. serialisation)
25/04: (Determination of points, e.g. of signals)
25/041: (using reflecting tags)
25/043: (using inductive tags)
25/045: (using reradiating tags)
25/046: (using magnetic tags)
25/048: (using programmable tags)
25/06: Indicating or recording the setting of track apparatus, e.g. of points, of signals
25/065: (for signalling systems on the vehicle using current conduction)
25/08: (Diagrammatic displays)

27/00 Central traffic control systems {Track-side control or specific communication systems}
27/0005: (Details of track-side communication)
27/0011: (Regulation, e.g. scheduling, time tables)
27/0016: (Preparing schedules)
27/0022: (Following schedules)
27/0027: (Track-side optimisation of vehicle or vehicle train operation (on-board optimisation B61L 3/006))
27/0033: (Crew rosters and itineraries)
27/0038: (Track-side control of safe travel of vehicle or vehicle train, e.g. braking curve calculation (on-board target speed calculation and supervision B61L 3/008))
2027/0044: (using European Train Control System [ETCS])
27/0005: (Using Communication-based Train Control [CBTC])
27/0055: (Testing or simulation)
27/0061: (Track-side multiple control systems, e.g. switch-over between different systems, "2 out of 3"-systems (on-board multiple control systems B61L 15/0063))
27/0066: (Backup systems, e.g. switching when failures occur)
27/0072: (Migration, e.g. parallel installations running simultaneously)
27/0077: (Track-side train data handling, e.g. vehicle or vehicle train data, position reports (on-board train data handling B61L 15/0072))
27/0083: (Track-side diagnosis or maintenance, e.g. software upgrades (on-board diagnosis or maintenance B61L 15/0081))
27/0088: (For track-side elements or systems, e.g. trackside supervision of trackside control system conditions)
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<td>27/004</td>
<td>(for vehicles or vehicle trains, e.g. trackside supervision of train conditions)</td>
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<tr>
<td>27/02</td>
<td>Manual systems</td>
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<tr>
<td>27/04</td>
<td>Automatic systems, e.g. controlled by train; Change-over to manual control</td>
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<td>29/00</td>
<td>Safety means for rail/road crossing traffic</td>
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<td>29/02</td>
<td>Guards or obstacles for preventing access to the route (cattle guards connected to the permanent way E01B 17/00)</td>
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<tr>
<td>29/023</td>
<td>[Special gates]</td>
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<td>29/026</td>
<td>[Preventing access by means of obstacles raising across the route]</td>
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<td>29/04</td>
<td>Gates for level crossings</td>
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<td>yielding to vehicles in one direction but operated in a different direction</td>
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<td>Operation of gates; Combined operation of gates and signals</td>
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<td>29/10</td>
<td>Means for securing gates in their desired position</td>
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<tr>
<td>29/12</td>
<td>Manual operation</td>
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<tr>
<td>29/14</td>
<td>mechanically</td>
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<td>29/16</td>
<td>electrically</td>
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<td>29/18</td>
<td>Operation by approaching rail vehicle or rail vehicle train</td>
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<tr>
<td>29/20</td>
<td>mechanically</td>
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<td>29/22</td>
<td>electrically</td>
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<tr>
<td>29/222</td>
<td>[using conductor circuits with separate contacts or conductors]</td>
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<tr>
<td>29/224</td>
<td>[using rail contacts]</td>
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<tr>
<td>29/226</td>
<td>[using track-circuits, closed or short-circuited by train or using isolated rail-sections]</td>
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<td>29/228</td>
<td>[using optical means]</td>
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<td>Means for warning road traffic that a gate is closed or opening, or that rail traffic is approaching, e.g. for visible or audible warning</td>
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<td>[Transmission mechanism or acoustical signals for gates]</td>
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<td>[Signals or brake- or lighting devices mounted on the road vehicle and controlled from the vehicle train]</td>
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<td>29/26</td>
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<td>29/28</td>
<td>electrically operated</td>
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<td>29/282</td>
<td>[magnetic or inductive control by the vehicle]</td>
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<td>29/284</td>
<td>[using rail-contacts, rail microphones, or the like, controlled by the vehicle]</td>
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<td>29/286</td>
<td>[using conductor circuits controlled by the vehicle]</td>
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<tr>
<td>29/288</td>
<td>[Wiring diagram of the signal control circuits]</td>
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<td>29/30</td>
<td>Supervision, e.g. monitoring arrangements</td>
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<td>29/32</td>
<td>Timing, e.g. advance warning of approaching train</td>
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<th>Class</th>
<th>Description</th>
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<tbody>
<tr>
<td>99/00</td>
<td>Subject matter not provided for in other groups of this subclass</td>
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<td>Control methods</td>
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<td>2201/02</td>
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<td>2205/00</td>
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<td>2205/02</td>
<td>Global system for mobile communication - railways (GSM-R)</td>
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<td>2205/04</td>
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