

[54] **TRACK SYSTEM HAVING NON-LOAD BEARING TRACK SWITCH**

[75] Inventors: **Francis Cyril Perrott**, The Manor House, S. Cerney, Cirencester; **Ian Miller Edington Aitken**, London, England

[73] Assignee: **said Perrott, by said Aitken**

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[51] Int. Cl. **E01b 7/00, E01b 26/00**

[58] Field of Search **104/243, 245, 247, 104/101, 102, 104, 105, 130; 246/415, 417, 418, 427, 377, 379, 385, 386, 387, 388, 391**

[56] **References Cited**

UNITED STATES PATENTS

1,697,922	1/1929	Lancellotte	246/427
568,957	10/1896	Pittman	246/427
514,537	2/1894	Billups	246/427
2,718,194	9/1955	Ruhlmann	104/247
3,098,454	7/1963	Maestrelli	104/130
3,621,790	11/1971	Broome	104/130
3,628,462	12/1971	Holt	104/130

3,593,665	7/1971	Marty	104/130
3,593,668	7/1971	Adams	104/130
736,911	8/1903	Aley	246/385
1,785,895	12/1930	England	246/385

FOREIGN PATENTS OR APPLICATIONS

308,505	3/1929	Great Britain	246/427
643,059	9/1928	France	246/427

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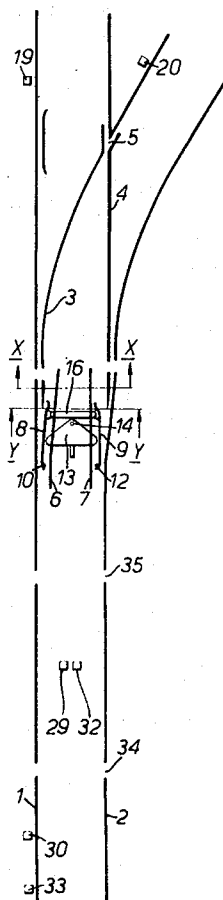
Attorney—Young & Thompson

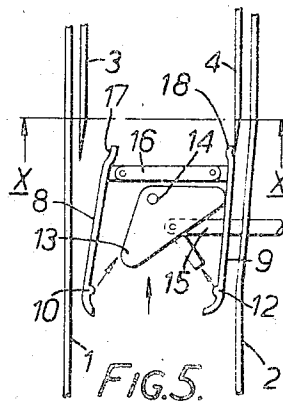
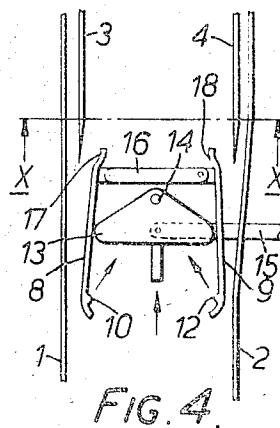
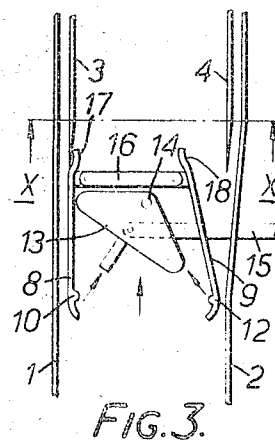
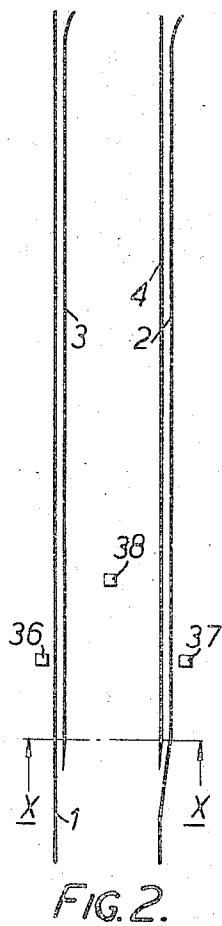
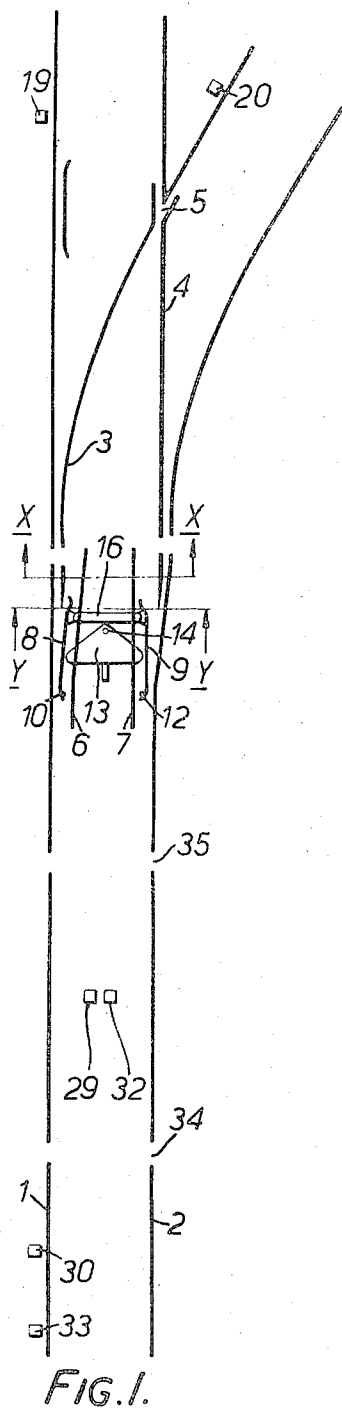
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ABSTRACT

The means of transportation include tracked vehicles, are especially applicable to railways and provide improvements relating particularly to the routing of vehicles at track branches. The means comprise a vehicle and two pairs of support tracks which define alternative routes for the vehicle at a branch, with one track of each pair not meeting the corresponding track of the other pair. The tracks continuously support the vehicle while passing over the branch, and guidance means are operative at and immediately before the branch to align the vehicle with respect to either one of the pairs of tracks whereby to select the corresponding route for the vehicle without relative movement of the support tracks.

3 Claims, 19 Drawing Figures





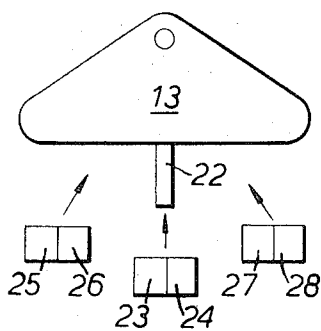


FIG. 6.

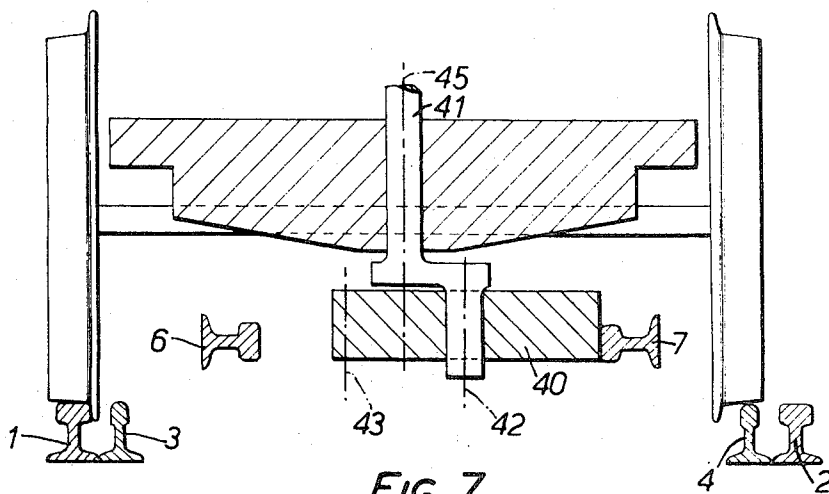


FIG. 7.

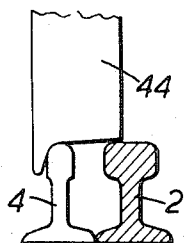


FIG. 8.

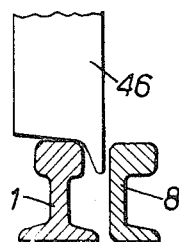


FIG. 9.

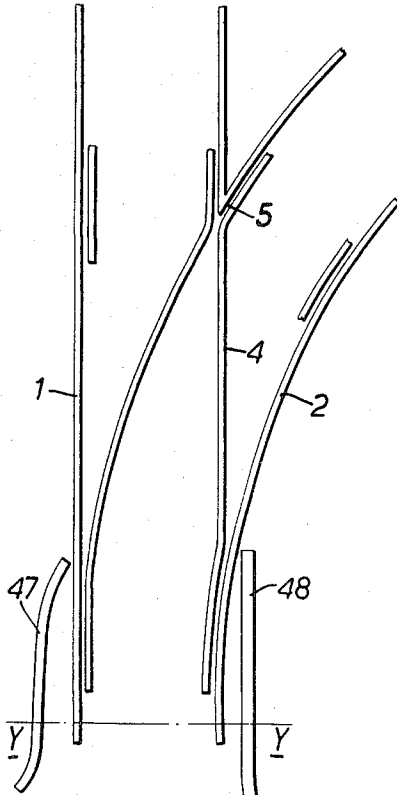


FIG. 10

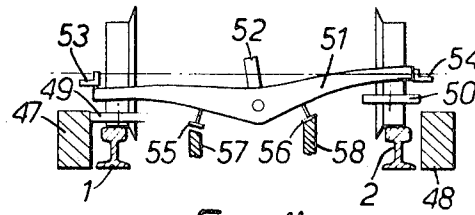


FIG. 11.

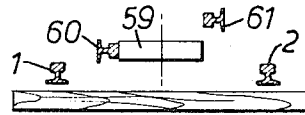


FIG. 12.

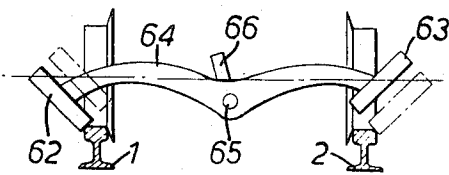


FIG. 13.

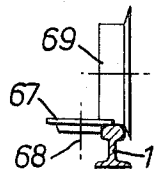


FIG. 15.

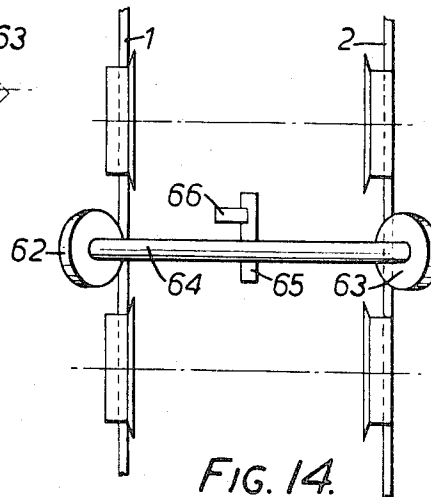
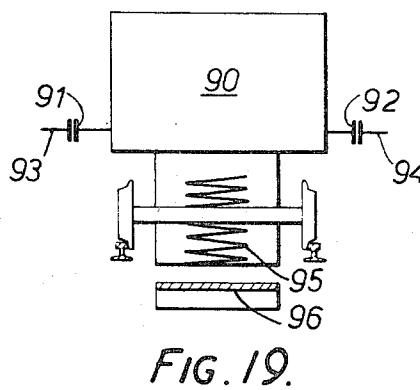
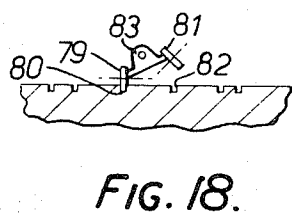
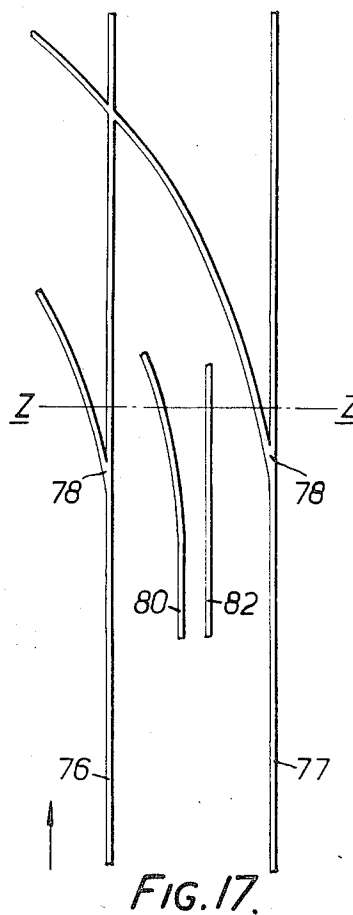
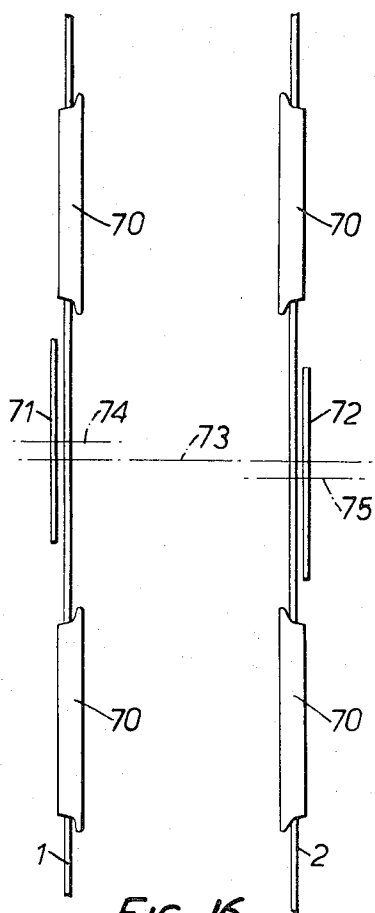


FIG. 14.



TRACK SYSTEM HAVING NON-LOAD BEARING TRACK SWITCH

This invention relates to transportation, and more especially but not exclusively to railways, and has for its object to provide improvements relating particularly to the routing of vehicles at track branches.

Railways are the commonest form of "guided transportation" in which vehicles are guided by stationery guides (in this case the rails). The vehicles are generally routed by "switching," in which vehicles are directed into the required side of each branch in the track, by changes in the track itself and/or said stationery guides, for example a railway switch usually comprising two movable rails.

Switches may involve moving parts in the track itself, their associated auxiliaries and automatic equipment, the control equipment associated with the auxiliaries and the maintenance commitment of the whole. This is a substantial commitment, especially in the case of some mono-rail systems and air slipper vehicles. Buried electrical conductors may be used for guidance and switched by activating alternative guides. However, the control problem still remains. Switching also must be correctly timed to synchronise with the arrival of vehicles at the switch. Safe operation demands margins of safety to allow for stopping vehicles if the switches fail to operate properly and also for any difference between the expected time of arrival of a given vehicle and its real time of arrival at the switch. The result of this is to demand considerable separation distance between differently routed vehicles. This is becoming a major factor relative to the route choice flexibility which guided transportation can provide, to the length of trains which are operationally desirable, and thus to the carrying capacity of railway systems.

A more modern concept is known, in which switching is controlled from the vehicles themselves. This offers advantages in the synchronisation of switch operation with real vehicle arrival times, but margins of safety are still required in case the switches should fail to operate correctly and the other disadvantages of switching remain. A principle object of the invention according to some embodiments thereof is to provide improved forms of track selection whereby switching may be eliminated. According to track selection, two alternative guides are provided at each branch in the track, one leading to the right and the other to the left, and each vehicle is provided with means whereby to select which guide it follows. The term "passive switching" is sometimes used for this concept but is felt to introduce an element of confusion since the object of track selection is to eliminate switches as that term is normally defined.

According to one aspect of the invention means of transportation comprise a vehicle, two pairs of support tracks which define alternative routes for the vehicle at a branch, with one track of each pair not meeting the corresponding track of the other pair, and which continuously support the vehicle while passing over the branch, and guidance means operative at and immediately before the branch to align the vehicle with respect to either one of the pairs of tracks whereby to select the corresponding route for the vehicle without relative movement of the support tracks.

According to another aspect of the invention means of transportation comprise a vehicle, a track for the ve-

hicle including a branch, normal vehicle guidance means operative throughout the track to guide the vehicle and which has lateral "slack" in the vicinity of the branch, and additional guidance means in the vicinity of the branch operative to locate the vehicle at one or other lateral limit of the normal guidance means whereby to align the vehicle to follow the corresponding route at the branch and thereafter to be guided by the normal guidance means.

References in this specification to "alignment" of the vehicle at a branch are used in the sense of positioning the vehicle at the branch so that further forward movement of the vehicle takes it on to the appropriate track branch in engagement with the guidance means operative along the subsequent track. In preferred embodiments of the invention such guidance means are the vehicle support tracks, normally pairs of rails, tramlines or the like.

Several embodiments of the invention as applied to double-track railways are illustrated in the accompanying drawings and will now be described with reference thereto and by way of example. In the drawings:

FIG. 1 is a plan view of a track branch showing an immediately preceding section of track,

FIG. 2 is a view of illustrating a "fail-safe" length of track which may be inserted at the branch of FIG. 1,

FIGS. 3 to 5 illustrate alternative positions of guidance means of FIG. 1,

FIG. 6 is a detail view of a member shown in FIGS. 2 to 5 illustrating the operation of safety interlock switches,

FIG. 7 is a transverse sectional view showing a vehicle bogie located on the track at the section X — X in FIG. 1,

FIG. 8 illustrates track engagement of a righthand wheel when branching left,

FIG. 9 is a corresponding view of a lefthand wheel,

FIG. 10 illustrates an alternative form of track branch with a different arrangement of vehicle guidance means,

FIG. 11 is a view corresponding to that of FIG. 7 but illustrating a bogie passing over the branch at the track section Y — Y in FIG. 10,

FIG. 12 is a corresponding view illustrating an alternative bogie follower arrangement,

FIG. 13 is a similar view showing a further follower arrangement,

FIG. 14 is a plan view of the follower arrangement of FIG. 13,

FIG. 15 illustrates a further follower arrangement,

FIG. 16 is a diagrammatic plan view of a bogie according to another embodiment,

FIG. 17 is a plan view of an alternative track branch employing tramlines,

FIG. 18 is a detail view of a vehicle-mounted track-selection mechanism engaging a portion of the track of FIG. 17, and

FIG. 19 is a diagrammatic end elevation of an electrically propelled vehicle.

The track branch of FIG. 1 includes arrangements for both track selection and for switching but without any relative movement of the support rails as with conventional points. Such switching enables the track to be used by conventional railway vehicles not provided with the track selection facility although all the advantages of the latter are obtained with the appropriate vehicles.

The two approach rails 1 and 2 are gauged at the branch, i.e., in the vicinity of the section X — X, to allow two more rails 3 and 4 to be fitted. Thus alternative route pairs of rails are provided: rails 1 and 4 leading straight ahead and rails 2 and 3 branching off to the right. Rails 3 and 4 cross in the usual manner at a "frog" 5.

Track selection is achieved by selectively aligning a vehicle in the lateral sense, i.e., transversely of the approach rails 1 and 2, so that its wheels follow the selected rail pair 1,4 or 2,3. To this end guidance means operative at and immediately before the branch comprise fixed supplementary guide rails 6 and 7 located within the track. One or other of these supplementary guide rails is engageable by a vehicle-mounted follower member, thereby to align the vehicle laterally, in a manner to be described.

Additional guidance means, for switching vehicles not equipped with track selection, comprise two pivoted guides 8 and 9. These guides are mounted adjacent the guide rails 6 and 7 and respectively pivot about axes 10 and 12. In a central neutral position, in which they are inoperative in the guidance sense, the guides 8 and 9 are positioned as shown in FIG. 4 so as not to interfere with track selection of either route at the branch. The fail-safe length of track illustrated in FIG. 2 is an optional addition to the track branch of FIG. 1. Its position, if fitted, is identifiable by the section line X — X which appears in both these figures.

Referring now particularly to FIGS. 3 to 5, a triangular member 13 is pivotable about a shaft 14, being actuated by a link 15. A central neutral position of the member 13 provides the track selection condition of FIG. 4 already described. FIG. 3 illustrates the lefthand switching condition, in which the guide 8 engages the inner side of vehicle wheels to align and guide the vehicles on to the lefthand pair of tracks 1 and 4. It is to be noted that the point of contact between the triangular member 13 and the guide 8 is not before the corresponding dead-point, i.e., the member 13 passes over-centre to the lefthand operative switching position, so that the switching system is self-locking and loads on the guide 8 are not transmitted to the actuating link 15.

The pivoted guides 8 and 9 are interconnected by a link 16, and it is also to be noted that they have end extensions 17 and 18. In the switching condition of FIG. 3 the extension 17 is loaded against the inner surface of the branch rail 3, thereby reinforcing the end of the latter against transverse loads from left to right, such as might result from gusts of wind acting on vehicles in that direction.

FIG. 5 illustrates the alternative righthand switching condition, and as described for FIG. 3 the member 13 again locks the operative guide 9 in the required switching position. In this case it is the corresponding extension 18 which acts to reinforce the end of the rail 4, as a precaution against heavy transverse loads from right to left. Alignment and guidance of vehicles on the righthand branch route is achieved by engagement of the guide 9 with the inner sides of the righthand vehicle wheels.

The importance of reinforcing the rails 3 and 4, by means of the extensions 17 and 18, lies in the fact that switching is performed by guiding both the treads and flanges, and the inner surfaces, of the wheels on one side only. The wheels are normally coned and flanged in accordance with usual railroad practice. If, for exam-

ple, a vehicle is being switched to follow the lefthand branch route, i.e., straight ahead in FIG. 1, the switching conditions are as shown in FIG. 3 and the lefthand wheels are located between the rail 1 and the guide 8. As the rail 2 inclines to the right the righthand wheels continue to be supported thereby, but not guided. Thus, loads from the left which would normally be carried by the cones and flanges of the righthand wheels are supported by the inner surfaces of the lefthand wheels, acting first upon the guide 8 and subsequently the rail 3. It is necessarily some distance beyond the guides 8 and 9 that the gauging can be readjusted to transfer this load to the righthand wheels, and the leading end of the rail 3, as with the rail 4, is necessarily thin where it engages the guide 8. This is because it has to permit free passage of the wheels either to its left or to its right, such passage being directed by the transverse location of the wheels which location is restricted by the relatively small movements permitted by the width of the wheel treads.

Thus, as the end of the rail 3 is necessarily thin it will tend to deflect and/or to be overstressed by heavy transverse loads from left to right. Such deflection, of either rail 3 or 4, would cause a shock in a vehicle as its wheels passed from the corresponding guide 8 or 9 on to the deflected rail. This, and any oversteering of the rails 3 and 4, is prevented by loading the guide extensions 17 and 18 against the inner surfaces of the rails 3 and 4 according to whether the condition of FIG. 3 or the condition of FIG. 5 obtains. As the guides 8 and 9 are used for guidance on one side only there is no practical limit to their thickness and consequently to their stiffness and strength. The link 16 by which they are joined only has to withstand the load required to draw the inoperative guide 8 or 9 clear of the path of the wheels of passing vehicles.

It will be appreciated that in accordance with one of the aspects of the invention the gauging of the rails at the branch provides lateral slack in the vicinity of the branch so far as the normal guidance provided by the rails along the track is concerned. The described switching mechanism provides additional guidance means in the vicinity of the branch operative to locate a passing vehicle at one or other lateral limit of the normal guidance means at the branch, whereby to align the vehicle to follow the corresponding route of the branch and thereafter to be guided by the normal guidance means, i.e., the support rails 1 and 4 or 2 and 3.

Following the branch, and preferably immediately following it, there are track-to-vehicle signal units 19 and 20. This causes programming units of passing vehicles equipped for track selection to be advanced. This initiates the operation of the track selection mechanism of such a vehicle so that it reaches the condition appropriate to routing at the next branch. Checks follow to ensure that all bogies of each vehicle or coupled unit have reached consistent track selection conditions in good time, and failure for this to be confirmed leads to automatic stopping of the vehicle or coupled unit concerned.

There is a remote possibility of track selection being in conflict with switching, and an ultimate fail-safe provision may be incorporated to ensure that whichever form of routing is to have priority should have greater strength. For example, the axles of horizontal follower wheels used for track selection, as described hereinafter, may be weaker than the pivot mounting of the

switching member 13, or vice versa. However, interlocks are preferably provided to preclude this happening and one such system of electrical interlocks will now be described with particular reference to FIG. 6.

The member 13 has a central switch-operating projection 22 which controls six electrical interlock switches 23, 24, 25, 26, 27 and 28. In the central neutral position of the member 13 the switch 23 is open and this results in a signal unit 29 becoming operative so that all traffic not equipped for track selection is stopped. Simultaneously, by reason of the central position of the switch-operating projection 22, the switch 24 is closed and this renders operative a signal unit 30. This signal unit is of special type and receives a signal from the leading bogie of each vehicle or train, which signal sets the unit 30 in a condition such that every subsequent bogie of the same vehicle or coupled unit has to provide an affirmative signal indicating that its track selection equipment is in the same selection condition, i.e., right or left, as the leading bogie. The signal from each passing bogie indicates its condition, and the reception of incompatible signals by the unit 30 causes trains or vehicles to be stopped by an associated track-to-vehicle signal unit 32.

When the switching member 13 is pivoted from the neutral position shown in FIG. 6 the initial movement renders operative the signal unit 32, thereby stopping all traffic until the switching movement is completed. Completion of movement into the condition of FIG. 3, i.e., switching to the left, closes interlock switches 25 and 26. The switch 25 activates a signal unit 33, which then acts directly upon the track selection control mechanism of any passing vehicle which is so equipped, causing it to select the lefthand route at the junction, i.e., the route compatible with the condition of the switching mechanism. Closing of the switch 26 re-activates the signal unit 30, so that it functions as a safeguard in the same way as described in connection with the neutral position of the switching member 13.

Alternatively, completion of movement of the member 13 to the righthand switching position illustrated in FIG. 5 completes electrical circuits through the interlock switches 27 and 28. The switch 27 activates the signal unit 33, which then acts directly upon the track selection control unit of any passing vehicle, which is so equipped, causing the vehicle to select the righthand route at the junction. Closing of the switch 28 re-activates the signal unit 30, so that it functions as a safeguard as before. The two breaks shown in the tracks 1 and 2 in FIG. 1 and indicated by the reference numerals 34 and 35 represent substantial distances. The break 34 provides an adequate distance for the track selection mechanisms of vehicles so equipped to operate, and the later break 35 provides an adequate distance to allow trains to be safely brought to rest if this is necessary.

The fail-safe length of track is associated with further signal means. After the pairs of rails have commenced in parallel, i.e., shortly before the section X — X, the vehicles pass signal units 36 and 37. Each of these units is set by the leading bogie of each train or coupled unit, and each subsequent bogie thereof has to provide positive confirmation that it is running upon the same pair of rails. Failure to provide such affirmation results in the automatic operation of an emergency stop signal 38, thereby stopping the train before the position is reached where the pairs of tracks actually branch

apart. The length of the parallel section of rails is such as to provide an adequate stopping distance.

Referring now to the track selection mechanism of FIG. 7, one or other of the supplementary guide rails 6 and 7 is engageable by a follower wheel 40 which is mounted on the bogie bolster by a vertical crankshaft 41. Alternative route selection positions for the axis of rotation of this wheel are shown at 42 and 43, and it has a cylindrical periphery so that it is free to slide up and down over the engaged guide rails 6 or 7. It is high enough to clear the support rails 1, 2, 3 and 4 when the actual branch is reached, and it will be noted that while the bogie is passing the section of track Y — Y in FIG. 1 one or other of the support wheels has to bridge a gap between rails which do not quite meet. This is illustrated in FIG. 8 for a righthand wheel 44 of a bogie branching left. Track selection is achieved by turning the crankshaft 41 about its vertical axis 45 so that the wheel 40 engages either the guide rail 6, to align the vehicle to take the righthand route at the branch, or the guide rail 7 as shown in FIG. 7 to take the lefthand route. FIG. 9 is a view comparable to that of FIG. 8 but showing the guidance operative on a lefthand bogie wheel 9 when switching to the left utilising the guidance means described with particular reference to FIGS. 3 to 5.

In general the arrangement shown in FIG. 7 is the most convenient one, but in special cases it may be more convenient to situate the follower and supplementary guide rails just outside the support rails 1 and 2. Such an arrangement is represented in FIGS. 10 and 11, the guide rails being identified by the numerals 47 and 48. Alternative vehicle-mounted follower wheels 49 and 50 are mounted at the extremity of a transverse rocker 51 which is operable by a crank 52 lockable in position by means of alternative detents 53 and 54. Cam followers 55 and 56 are fitted to the rocker 51 and may if desired be used to initiate track selection by means of track mounted cams 57 and 58. Such track mounted cams may present surfaces inclined to engage the cam followers by reason of the motion of the vehicle. These followers and cams are a feature that may be used for any embodiment employing track selection and should preferably be actuated considerably before the branch concerned.

FIG. 12 is a transverse section, similar to that of FIG. 11, of another embodiment in which a follower wheel 59 may be raised or lowered to engage either of the supplementary guide rails 60 and 61.

In the embodiment of FIG. 13 either of two follower wheels 62 or 63 is engageable with the outer surface of the corresponding support rail 1 or 2. In this particular case they are mounted on the extremities of a rocker arm 64 which is pivotable about journal bearings 65 and operable by a crank 66. In this case it is not necessary to provide the supplementary guide rails. FIG. 14 shows the rocker arrangement which is common to several embodiments, although the actual follower wheels shown are those of the FIG. 13 construction.

FIG. 15 is a transverse section showing a follower wheel 67 which is flanged and rotates about a vertical axis so that it rests upon the support rail 1 between the two corresponding side wheels such as 69 of the bogie.

The diagrammatic plan view of FIG. 16 shows a bogie according to yet another embodiment of track selection. Support wheels 70 ride the rails 1 and 2 and track selection is by means of alternatively engageable

wheels 71 and 72. Means are provided to lower one or other of the wheels 71 and 72 each of which comprises a flange which is thus engageable with the outer surface of the corresponding support rails 1 or 2 between the two adjacent support wheels 70, so causing the bogie to follow that particular rail. The means shown comprise eccentrics or cranks, and for the intermediate position shown the axis of the crankshaft is 73, the axis of rotation of the wheel 71 is 74 and that of the wheel 72 is 75.

FIGS. 17 and 18 relate to another embodiment of track selection, FIG. 18 showing in section a portion of the vehicle-mounted track selection mechanism and the guides and rails beneath a vehicle at the branch shown in FIG. 17. The vehicle rides tramlines 76 and 77 which branch at the positions 78, and the vehicle may be guided left by engaging a follower wheel 79 with a groove 80. Alternatively it may be guided right by engaging a follower wheel 81 with a groove 82. The followers 79 and 81 are mounted at the ends of a rocker 83 shown in FIG. 18 which shows the section of track at Z — Z in FIG. 17.

It is preferable that systems of track selection should be compatible with switching systems so that they can both use existing railroad tracks, and this compatibility requires switching as an alternative to track selection at the same branches of the track. Said switching may be provided by conventional switching of the points, i.e., movement of the lower extremities of the rails 3 and 4 in FIG. 1 to bear respectively against the rail 1 or the rail 2 as the case may be. However, for satisfactory switching in this manner the points must be rather more slender than is desirable for track selection operation, since for track selection the unsupported point has to carry the weight of the vehicle. Thus switching is preferably achieved as described with particular reference to FIGS. 3 to 5.

Any of the embodiments which have been described may be propelled by linear induction in any of the various ways which have been suggested or by other means in accordance with the state of the art, and various forms of speed control may be employed. Rotary motors or engines of any type may also be used. High density traffic is being considered and thus electric traction is felt to be the natural choice. In general all vehicles are self-propelled and may either carry batteries, or be supplied with power from an external source through distribution rails or overhead wires, or the two systems may be combined for different parts of the same journey. For miniature vehicles, low level distribution rails may be used, mainly for aesthetic reasons. For economy and reliability, three-phase squirrel cage induction motors are often to be preferred.

In normal conditions, all vehicles should have the same nominal speed when they are on the same section of track. This is fundamentally safe, and provides the best starting point for any system of automatic control. However, for various practical reasons, four special exceptions are made as will be hereinafter described. The nominal speeds themselves may vary between different sections of the track. This variation can be introduced by varying the frequency and voltage of the power supply to different sections of the track.

This retains the advantages of speed variations to suit the track, but eliminates variable speed drive from vehicles themselves, except for the speed trim which will be hereinafter mentioned and consequently reduces

both cost and maintenance requirements for the vehicle. It is not necessary for motors to develop full power at low speeds because for track selection the number of intermediate stops is reduced and consequently acceleration is relatively unimportant.

Power collectors may be duplicated on the vehicles, to provide continuity of supply at branches and junctions in the track. In the construction of FIG. 19 the vehicle 90 is fitted with two power collectors 91 and 92. By reason of the separation of the routes, at branches in the track, these collectors engage power distribution rails 93 and 94 without the necessity of means for articulation of the collectors relatively to the vehicle.

Also shown in FIG. 19 are the optional features of a vehicle-mounted linear induction motor 95 which operates upon a flat track-mounted conductor strip 96. If desired the conductor strip 96, or conductor member corresponding thereto, may be vehicle-mounted instead of the motor and the motor itself be track-mounted.

In general, communication between vehicle and track can be by cams or electromagnetic inductive devices embodied in signal units, for example the signal units described with reference to FIGS. 1 and 2. Such signal units may act from track to vehicle or vice versa as required, and at least four types of signal unit may be used:

Type A: The unit provides a uniform track-to-vehicle signal, causing the route programming units of passing vehicles to advance one step or stage. For example the signal units 19 and 20 described in conjunction with FIG. 1.

Type B: An externally controlled track-to-vehicle signal unit able to convey two alternative types of signal which are detected and distinguished by vehicle-mounted means. This causes the track selection control mechanism to operate, selecting the required lefthand or righthand route without action from the vehicle programming unit. For example the signal unit 33 described in conjunction with FIG. 1.

Type C: A special vehicle-to-track signal unit, used to check which pair of rails at a branch a passing bogie is following. For example the signal unit 30 described in conjunction with FIG. 1.

Type D: A special track-to-vehicle signal unit, which is again externally controlled and capable of conveying a signal causing a passing vehicle to be stopped. For example the signal unit 32 described in conjunction with FIG. 1.

Every vehicle may carry a track selection control mechanism by means of which it selects or makes operative the guide which it is to follow at branches and junctions. Where appropriate, this also operates retractable power collectors. The track selection control is most commonly operated by the vehicle-mounted programming unit. However, it may also be directly controllable by certain signal units, such as units of Type B as defined above.

In cases where wheels or other followers are articulated for purposes of track selection, then the track selection control mechanism may cause this to be done through electric, hydraulic, compressed air, or vacuum circuits, and said circuits may be common to several track selection assemblies within one vehicle or coupled unit, in order to assure similar operation. Operation will normally take place immediately the preceding branch has been passed and signal units such as 19

and 20 may cause this to be done by moving on the vehicle-mounted programming unit one stage as vehicles pass them. The detents 53 and 54 which are shown in FIG. 11 may only be withdrawn or operated by the first activation of the track selection control operating circuit or its final activation after the completion of the track selection operations. For example, the detent 53 restrains the lefthand arm of the rocker 51 so that the wheel 49 cannot accidentally be disengaged from the guide rail 47. When, for example, it is desired to engage the guide rail 48, then the crank 52 may be moved to the right by a system which first withdraws the detent 53 and subsequently advances the detent 54 to lock the rocker 51 in the new position. In addition, FIG. 11 is used to illustrate an arrangement of interlocks, by which the stationery track-mounted cams 57 and 58 may be engaged by the motion of the vehicles. The cam followers 55 and 56 are provided with means to override other means of control, causing the rocker 51 to be unlocked and impelled either to an intermediate position, with both followers 49 and 50 disengaged, or to the appropriate track selection control position. In the case of branches equipped for both track selection and switching, then the switching should be inoperative for track selection vehicles and interlocks may be provided so that track selection vehicles approaching such branches cause the switching arrangement automatically to be put into the neutral or track selection position. Alternatively, if it is desired to maintain overall control in the hands of the signalman then special track-to-vehicle signal units of Type B may be positioned sufficiently before a track branch. Such a unit acts directly upon the vehicle track selection control mechanism in order to make it comply with the approaching switch. As an additional check, as already also described, interlocks may be provided to stop any vehicle which approaches with track selection control settings contrary to the positive switching arrangements utilising signal units Type D.

There is a pre-recorded set of lefthand and righthand branches to route a vehicle from one point to any other point on the system. The function of the programming units carried by the vehicles is to cause every vehicle to select the correct sequence of such righthand and lefthand branches in order to reach its individual selected destination. A signal unit advances it by at least one step for every branch. In the case of a simple system, it may well utilise a punched card or ticket which is pre-programmed to kist the correct routing from a given starting point to the required destination. The ticket is automatically scanned by a card reading device in the vehicle as the various routing actions are completed.

The mechanism may be basically electromagnetic in

its simplest form, or alternatively embody character or code recognition devices with electrical sensors. Where multi-passenger vehicles are involved, passengers may select their destinations within the vehicle, and this requires a vehicle-borne destination memory and routing faculties. This is analagous to the system presently used for passenger lifts. For the more complex branching track layout, vehicle destination indicators would be used and the routing programmed for all vehicles as advised by a traffic control unit. In all cases feedback is supplied by the routing changes effected in transit, and for more complex system an electronic memory becomes necessary.

It will be appreciated that the described track and guidance arrangements accommodate vehicles travelling in the opposite direction, i.e., with the described branches acting as junctions. A vehicle approaching along either track pair 1,4 or 2,3 passes safely on to the pair 1,2.

I claim:

1. Means of transportation comprising a wheeled vehicle, two pairs of permanently stationary support tracks which define alternative routes for the vehicle at a track branch and which provide continuous support for all wheels of the vehicle while traversing the branch in any direction, the wheel-supporting surface of one track of each pair being spaced from the wheel-supporting surface of the corresponding track of the other pair, and guidance means in advance of the track branch with respect to the direction of travel of the vehicle and being operative to divert a vehicle along either pair of support tracks at said branch, said guidance means serving solely to divert the vehicles laterally at the branch and being substantially free of the vertical load of the vehicle wheels in operation and comprising a guide which engages only the inner side of a vehicle support wheel.

2. Means of transportation according to claim 1, wherein said guide is one of two such guides alternatively operable to switch vehicles to either side of said branch, and means rendering both of said guides inoperable simultaneously thereby to permit vehicles to pass through from either side of the branch when travelling in the trailing direction.

3. Means of transportation according to claim 1, wherein said guide is one of two such guides alternatively operable to switch vehicles to either side of said branch, said two guides having oppositely outwardly directed surfaces thereon that alternatively engage the inner sides of a pair of said vehicle support wheels, said oppositely directed surfaces having portions laterally spaced apart from each other a distance less than the distance between said inner sides of said pair of wheels.

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