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(54) **Train traffic control with train simulation for taking track section out of service**

(57) Taking out of service of a railway part by simulating the presence of a train within the security logic to be implemented such that distinction to origin of the simulation data is maintained in the further data processing. The implementation is such that within the logic the distinction between the simulated train and a physical train is maintained. The simulation data is supplied to a proper individual data input of the security logic such that distinction to origin in the at the train traffic control arriving data flow is maintained. The simulation data is separated from the with the track occupation associated, meaning by a physical train generated, data (track occupation data) received by the security logic.

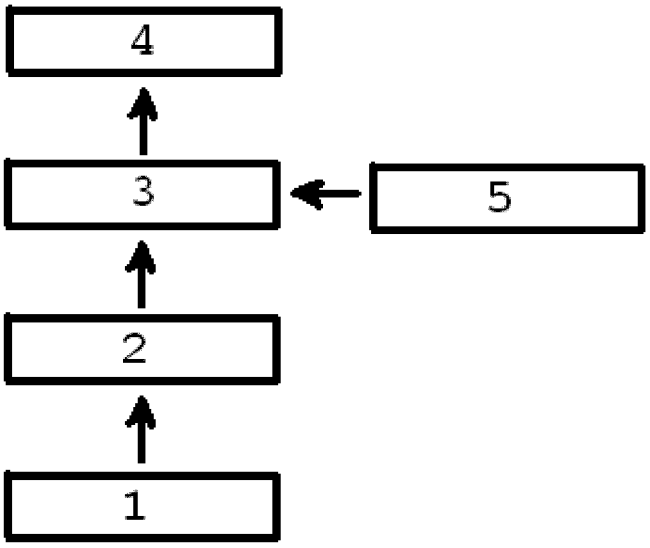

Fig. 2

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Description

[0001] This invention relates to a system to put a halt to traffic for a block or zone or section of a railway track for transport of people or goods with two parallel steel railway tracks onto which a train runs. In other words this invention relates to putting a halt to traffic for a railway part with conservation of differentiation to origin in the data stream arriving at the train traffic control.

[0002] During track repair, or for a different reason, it can be desirable to prohibit train traffic in the relevant block of the track out of service. Combined herewith it could be desirable that the corresponding block of the adjacent track has (speed) limitations for the train traffic.

[0003] As an example presently such protection is realized by intervention if the sign control or to simulate track occupation using a so called short circuit bar (disclosed in e.g. WO97/09193).

[0004] Besides, zone switches are applied, however a plurality of subsequent blocks (at least 5) are simultaneously switched, or particular blocks can not be switched altogether.

[0005] NL1030321 (Locally protecting track out of service) discloses a system to individually protect a block, for which the relay cases are provided with switch means, such that from the relays case the sign of the associated block of the occupied or adjacent track can directly be made red and/or the ATB-code is suppressed/removed. The sign control and the ATB are affected for out of service and/or adjacent track, such that riding on vision in the occupied and/or adjacent track is enforced. For at least the occupied track the roadway setting is made impossible. Thus for the occupied track it is merely possible to ride in the opposite direction to arrive at the work location, e.g. with a maintenance train.

[0006] NL1029220 (Link) relates to mutually connect the two rails of a track in an alternative manner, to simulate the presence of a train for the train traffic control to make further train traffic impossible such that the relative track section is protected from trains and safe maintenance is possible. Electrical contact points are used which at a fixed location and/or permanently are connected to the rails and to which a device can temporarily be connected to provide the desired mutual connection of the rails.

[0007] The object of the invention is versatile and comprises, amongst others, one or more of the following aspects: safe; clear to apply; allows documenting of the manner of use; less people on the track; less mistakes by human action; less safety persons required; train traffic can be halted quickly; quicker solution of malfunctioning; central control of halting train traffic possible; low investment costs.

[0008] According to the invention the simulation of the presence of a train is implemented such that differentiation to origin is maintained in the further data processing, e.g. by offering the simulation data to an own individual data input of the security logic, thus the security logic is extended by an additional data input.

[0009] The invention is based on the recognition that it must be possible for the train traffic control to, from the security logic, differentiate between track occupation by the physical or simulated presence of a train. Presently the security logic monitors the following items: position of the switches; crossing train traffic; track occupation (no differentiation between physical or simulated train presence since for both events the same data input of the security logic is used.

[0010] Compared to the prior art for the first time at a higher level in the data traffic between the track and the train traffic control, to the simulation of the presence of a train directed data (simulation data) is added, such that within the logic the differentiation with a physical train is maintained.

[0011] By way of example the simulation data is provided by a physical switch, however a by virtue of software implemented switch is also feasible (e.g. wherein both the configuration of the track and the security are modeled by way of software, such as with a PLC security).

[0012] Typically the simulation data will be separated from the with track occupation associated (by a physical train generated) data (track occupation data) received by the security logic, e.g. provided within the security building of a railway yard. Thus data traffic on separated lines.

[0013] The invention is applicable to e.g. PLC, VPI, EBS or NX security, with or without relays.

[0014] It is now possible to show graphically (e.g. by different colors) the difference between track occupation by a physical train or simulation.

[0015] This invention comprises preferably one or more of the following (known from NL1030321, in that case directed to the relay case, thus at lower level in the data stream) functionalities: the switching means are designed, such that have a master function, meaning that their command always has priority compared to other commands associated with said security logic (with NL1030321: relay case) and the security logic (with NL1030321: relay case) preferably provided with one or more key contacts, such that the setting can be changed by inserting and turning a separate key into the key hole of the contact (in stead of key contacts different (two or multiple position) switches (mechanic or electric/electronic operating) feasible, e.g. through a keyboard operated, or remote controlled, e.g. wire less (radio signals) controlled electronic switches, e.g. a switch can be provided with a modem to receive a command in a wire less manner, e.g. provided from a cellular telephone or PC (GSM, UMTS); all rail sections (with NL1030321: relay case) along a predetermined yard or track part are associated with such switching means, such that at desire one or more successive blocks can be secured individually; the security logic (with NL1030321: relay case) is designed such that if the switching means is operated for the one section (with NL1030321: relay case) to oc-

cupy the associated block, the signal for the block immediately upstream and downstream automatically switches yellow, such that the train operator is timely warned for the obstruction; the switching means is designed to control the adjacent track, in this manner if the track is taken out of service, the setting of the adjacent track is automatically updated; the key contact or equivalent switching means can be accessed externally of the housing of the security logic (NL1030321: relay case).

[0016] The attached drawing shows in Fig. 1 an example of the graphical representation within the present Visio drawings. The fat darkest lines illustrate track sections out of service, thus there is a graphic distinction with a track section where a train is present, illustrated by a fat line of light grey color.

[0017] The invention can be embodied as follows (viz. Fig. 2): The rails 1 (first level) are connected to relays 2 (second level in the train traffic control) within the relay case, such that relay positions correspond to the presence or not of a train within the associated section. The with the relays of this second level associated data are through communication lines brought to the input port of the security logic 3 (third level). The security logic receives through a different port data relating to the simulation 5 of a train in the associated section. The security logic thus knows the difference between the causes physical train and simulation, and can show (or can let show) this distinction in the graphical representation 4 of the track configuration.

[0018] In stead of the higher level of the train traffic control providing the input of simulation data through an individual data input, alternatives are feasible that are functional equivalents, such as with multi channel communication on the same communication connection (such as multiplexing). Thus the core is to provide the data distinguishable to origin at a level such that distinction to one or all levels above it, is maintained.

Claims

1. Taking out of service of a railway part by simulating the presence of a train within the security logic to be implemented such that distinction to origin of the simulation data is maintained in the further data processing.

2. Method according to claim 1, the implementation is such that within the logic the distinction between the simulated train and a physical train is maintained.

3. Method according to claim 1 or 2, the simulation data is supplied to a proper individual data input of the security logic.

4. Method according to claim 1, 2 or 3, such that distinction to origin in the at the train traffic control arriving data flow is maintained.

5. Method according to any of the preceding claims, the simulation data is supplied to the logic by a physical switch or a software switch.

6. Method according to any of the preceding claims, the simulation data is separated from the with the track occupation associated, meaning by a physical train generated, data (track occupation data) received by the security logic.

7. Method according to any of the preceding claims, the security logic monitors the following aspects: the switch positions; crossing train traffic; track occupation with distinction between physical and simulated train presence.

8. System to Carry out the method according to any of the preceding claims, which comprises a logic, such as a computer.

9. System according to claim 8, the rails are connected to relays in the relay case, such that the relay positions correspond to the presence or not of a train in the relevant section; the with these relays associated data is through communication Lines transmitted to the input ports of the security logic; the security logic receives through a different port data relative to the simulation of a train in the relevant section.

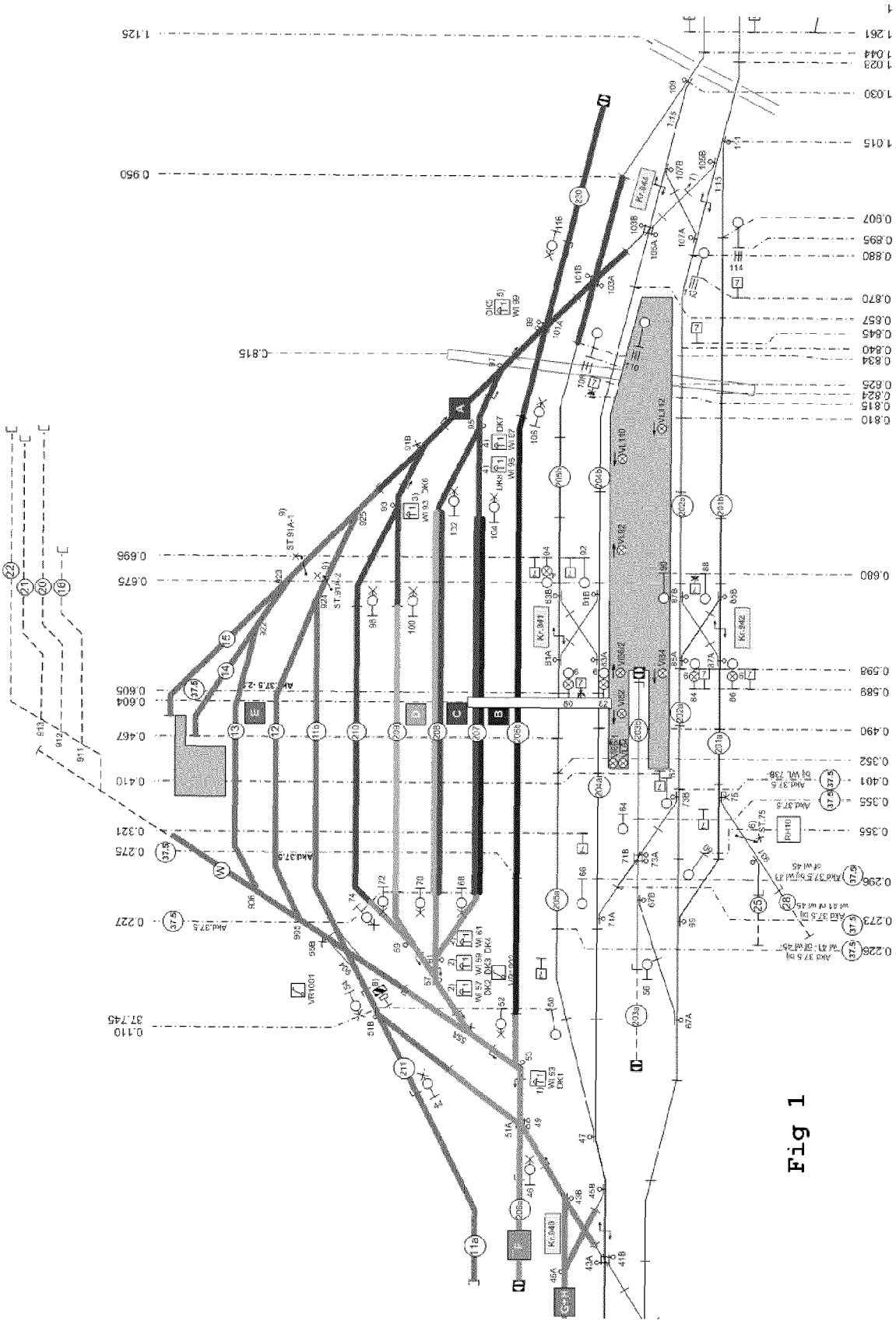

Fig 1

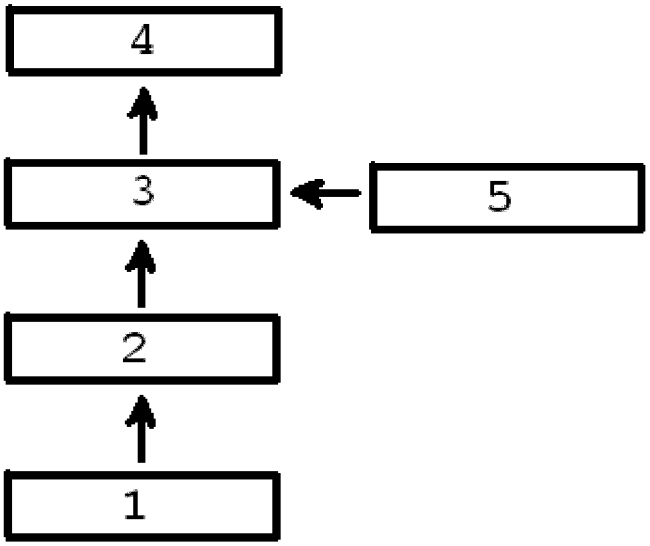

Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 9709193 A **[0003]**
- NL 1030321 **[0005] [0015]**
- NL 1029220 **[0006]**