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REISSUE PATENT APPLICATION TRANSMITTAL

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Mail Stop Reissue **Commissioner for Patents** **P.O. Box 1450** **Alexandria, VA 22313-1450**	Attorney Docket No.	7552/85663-Reissue-A
	First Named Inventor	Ross PIRTLE
	Original Patent Number	9,403,545
	Original Patent Issue Date (Month/Day/Year)	08/02/2016
	Priority Mail Express® Label No.	

APPLICATION FOR REISSUE OF: (*Check applicable box*) ☑ Utility Patent ☐ Design Patent ☐ Plant Patent

APPLICATION ELEMENTS (37 CFR 1.173)	ACCOMPANYING APPLICATION PARTS
1. ☑ **Fee Transmittal Form** (PTO/SB/56)	11. ☑ **Statement of status and support for all changes to the claims.** See 37 CFR 1.173(c).
2. ☐ **Applicant asserts small entity status.** See 37 CFR 1.27	12. ☐ **Power of Attorney**
3. ☐ **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.	13. ☑ **Information Disclosure Statement (IDS)** PTOSB/08 or PTO-1449 ☑ Copies of citations attached
4. ☑ **Specification and Claims** in double column copy of patent format (*amended, if appropriate*)	14. ☐ **English translation of Reissue Oath/Declaration** (*if applicable*)
5. ☑ **Drawing(s)** (*proposed amendments, if appropriate*)	15. ☐ **Return Receipt Postcard** (MPEP § 503) (Should be specifically itemized)
6. ☑ **Reissue Oath/Declaration or Substitute Statement** (37 CFR 1.175) (PTO/AIA/05, 06, or 07)	16. ☑ **Preliminary Amendment** (37 CFR 1.173; MPEP § 1453)
7. ☑ **Application Data Sheet** NOTE: Benefit claims under 37 CFR 1.78 and foreign priority claims under 37 CFR 1.55 MUST be set forth in an Application Data Sheet (ADS).	17. ☑ **Other:** Abstract
8. ☑ **Original U.S. Patent currently assigned?** ☑ Yes ☐ No (*If Yes, check applicable box(es)*) ☑ Written Consent of all Assignees (PTO/AIA/53) ☑ 37 CFR 3.73(c) Statement (PTO/AIA/96)	
9. ☐ **CD-ROM or CD-R** in duplicate, Computer Program (*Appendix*) or large table ☐ Landscape Table on CD	
10. **Nucleotide and/or Amino Acid Sequence Submission** (*if applicable, items a. – c. are required*) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM (2 copies) or CD-R (2 copies); **or** ii. ☐ Paper c. ☐ Statements verifying identity of above copies	☐ This is a continuation reissue or divisional reissue application (*i.e.*, a second or subsequent reissue application for the same issued patent). (*Check box if applicable.*)

18. CORRESPONDENCE ADDRESS

☑ The address associated with Customer Number: 23432 **OR** ☐ Correspondence address below

Name	COOPER & DUNHAM LLP				
Address	30 Rockefeller Plaza, 20th Floor				
City	New York	State	New York	Zip Code	10112
Country	USA	Telephone	(212) 278-0400		
Email					

Signature		Date	2019 DEC. 10
Name (Print/Type)	Paul Teng	Registration No.	40,837

This collection of information is required by 37 CFR 1.173. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop Reissue, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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REISSUE APPLICATION FEE TRANSMITTAL FORM

Docket Number (Optional): 7552/85663-Reissue-A

Application as Filed – Part 1

	(1) Claims in Patent	(2) Claims Filed in Reissue Application	(3) Number Extra	Micro Entity Rate ($)	Micro Entity Fee ($)	Small Entity Rate ($)	Small Entity Fee ($)	Undiscounted Rate ($)	Undiscounted Fee ($)
Total Claims (37 CFR 1.16(i))	(A) 19	(B) 20	* 0 =	x =		x =		x 100 =	0
Ind. Claims (37 CFR 1.16(h))	(C) 3	(D) 3	** 0 =	x =		x =		x 460 =	0
Application Size Fee (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $400 ($200 for small entity, $100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
		Filing Fee (37 CFR 1.16(e))							300
		Search Fee (37 CFR 1.16(n))							660
		Examination Fee (37 CFR 1.16(r))							2,200
		Total Filing Fee							3,160

Application as Amended – Part 2

	(1) Claims Remaining After Amendment	(2) Highest Number Previously Paid For	(3) Extra Claims Present	Micro Entity Rate ($)	Micro Entity Fee ($)	Small Entity Rate ($)	Small Entity Fee ($)	Undiscounted Rate ($)	Undiscounted Fee ($)
Total Claims (37 CFR 1.16(i))	*** -	****	=	x =		x =		x =	
Ind. Claims (37 CFR 1.16(h))	*** -	*****	=	x =		x =		x =	
Application Size Fee (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $400 ($200 for small entity, $100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
			Total Additional Fee						

* Enter (B) – 20, or enter "0" if (B) is less than 20.
** Enter (D) – minus 3, or enter "0" if (D) is less than 3.
*** After any cancellation of claims.
**** If the "Highest Number of Total Claims Previously Paid For" is less than 20, enter "20" in this space.
***** If the "Highest Number of Independent Claims Previously Paid For" is less than 3, enter "3" in this space.

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☑ The Director is hereby authorized to charge any additional fees under 37 CFR 1.16 or 1.17 which may be required, or credit any overpayment to Deposit Account No. 03-3125.

☐ A check in the amount of $ _____ to cover the filing/additional fee is enclosed.

☑ Payment made via EFS-Web.

☐ Payment by credit card. Form PTO-2038 is attached. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

Signature

2019 DEC. 10
Date

Paul Teng
Typed or Printed Name

40837
Registration Number, if applicable

(212) 278-0400
Telephone Number

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPARATUS AND METHOD FOR RAILWAY TRAFFIC CONTROL", the entire contents of which are incorporated herein by reference.

What is claimed is:

1. A centralized railway control system comprising:

a rail personnel contact database registering, for each railway personnel, an electronic contact address of the railway personnel; and

a railway traffic control apparatus for controlling access to railway tracks, said railway traffic control apparatus comprising a processor, a non-transitory medium storing one or more programs of executable instructions, and a network interface through which the railway traffic control apparatus communicates via a network with a user terminal,

wherein execution of said one or more programs of executable instructions configures the processor to include:

a block placing part to place a block on one or more specified track sections to permit a railway field worker to enter the track sections while blocking railway traffic to said track sections;

a code generation part to generate a removal code, retrieve the electronic contact address of the railway field worker from the rail personnel contact database, and transmit the removal code to the electronic contact address of the railway field worker; and

a block removal part to remove only upon entry of the removal code, the block placed by the block placing part on said one or more track sections.

2. The centralized railway control system of claim **1**, wherein the railway traffic control apparatus further comprises:

a RTC user interface to permit a user to specify said one or more track sections to be blocked, specify an instruction to the centralized railway control system to block the railway traffic to the specified track sections, and specify identifying information of the railway field worker to be performing work in the specified track sections.

3. The centralized railway control system of claim **1**, further comprising:

a railway control database registering block identifying information, including block limits identifying the one or more blocked track sections, along with the removal code for removing the block of the track sections.

4. The centralized railway control system of claim **1**, further comprising:

a railway control database registering (a) identification of the user who specified the instruction to block the track sections and (b) block identifying information, including block limits identifying the one or more blocked track sections, notes specifying reasons for the block, and date and time at which the block was placed.

5. The centralized railway control system of claim **1**, wherein upon placement by the block placing part of the block of railway traffic to said one or more specified track sections, the code generation part transmits the removal code to the electronic contact address of the railway field worker, and the block of railway traffic to said one or more specified track sections remains in place in the centralized railway control system until the entry of the removal code in the centralized railway control system to cause the block removal part to remove the block on said one or more track sections.

6. The centralized railway control system of claim **1**, wherein the railway traffic control apparatus further comprises:

a block removal user interface to permit a user to enter the removal code to cause the block removal part to remove the block on said one or more track sections,

wherein the block of railway traffic to said one or more specified track sections remains in place in the centralized railway control system until the entry of the removal code through the block removal user interface.

7. The centralized railway control system of claim **6**, wherein the block removal user interface further requires, in addition to the entry of the removal code, the user to specify that confirmation that the track sections have been cleared has been obtained from the railway field worker associated with the block, before the block removal user interface permits the removal code to be transmitted to the block removal part, and

the centralized railway control system further comprises a railway control database registering (a) block identifying information identifying the one or more blocked track sections, date and time at which the block was placed and identifying information the railway field worker associated with the block, and (b) block removal information identifying date and time at which the block was removed and identifying the user who entered the removal code and specified that confirmation that the track sections have been cleared was obtained from the railway field worker associated with the block.

8. The centralized railway control system of claim **1**, further comprising:

a voice processing part configured to receive a voice message and extract the removal code from the voice message.

9. The centralized railway control system of claim **1**, wherein the code generation part transmits an electronic message to the electronic contact address of the railway field worker, and the electronic message transmitted to the electronic contact address of the railway field worker includes the removal code and includes an embedded link for activating a return transmission of the removal code to the block removal part of the centralized railway control system.

10. A railway traffic control apparatus for controlling access to railway tracks, said railway traffic control apparatus comprising:

a block placing part to place a block on one or more selected track sections to permit a railway field worker to enter the track sections while blocking railway traffic to said track sections;

a code generation part to generate a removal code, determine an electronic contact address of the railway field worker by accessing a rail personnel contact database registering, for each railway personnel, electronic contact information of the railway personnel, and transmit the removal code to the electronic contact address of the railway field worker; and

a block removal part to remove only upon entry of the removal code, the block placed by the block placing part on said one or more track sections for the railway field worker.

11. The railway traffic control apparatus of claim **10**, further comprising:

a RTC user interface to permit a user to specify said one or more track sections to be blocked, specify an instruction to the centralized railway control system to block the railway traffic to the specified track sections, and specify identifying information of the railway field worker to be performing work in the specified track sections.

12. The railway traffic control apparatus of claim **10**, wherein block identifying information, including block limits identifying the one or more blocked track sections, is regis-

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tered in a railway control database, along with the removal code for removing the block of the track sections.

13. The railway traffic control apparatus of claim **10**, wherein block identifying information, including block limits identifying the one or more blocked track sections, notes specifying reasons for the block, and date and time at which the block was placed, are registered in a railway control database, along with identification of the user who specified the instruction to block the track sections.

14. The railway traffic control apparatus of claim **10**, wherein upon placement by the block placing part of the block of railway traffic to said one or more specified track sections, the code generation code transmits the removal code to the electronic contact address of the railway field worker, and the block of railway traffic to said one or more specified track sections remains in place in the centralized railway control system until the entry of the removal code in the centralized railway control system to cause the block removal part to remove the block on said one or more track sections.

15. The railway traffic control apparatus of claim **10**, further comprising:

a block removal user interface to permit a user to enter the removal code to cause the block removal part to remove the block on said one or more track sections,

wherein the block of railway traffic to said one or more specified track sections remains in place in the centralized railway control system until the entry of the removal code through the block removal user interface.

16. The railway traffic control apparatus of claim **15**, wherein the block removal user interface further requires, in addition to the entry of the removal code, the user to specify that confirmation that the track sections have been cleared has been obtained from the railway field worker associated with the block, before the block removal user interface permits the removal code to be transmitted to the block removal part, and

block identifying information identifying the one or more blocked track sections, date and time at which the block was placed and identifying information the railway field worker associated with the block is registered in a railway control database, along with block removal information identifying date and time at which the block was removed and identifying the user who entered the removal code and specified that confirmation that the track sections have been cleared was obtained from the railway field worker associated with the block.

17. The railway traffic control apparatus of claim **10**, further comprising:

a voice processing part configured to receive a voice message and extract the removal code from the voice message.

18. The railway traffic control apparatus of claim **10**, wherein the code generation part transmits an electronic message to the electronic contact address of the railway field worker, and the electronic message transmitted to the electronic contact address of the railway field worker includes the removal code and includes an embedded link for activating a return transmission of the removal code to the block removal part of the centralized railway control system.

19. A method for a centralized railway control system to control access to railway tracks, the method comprising:

providing a user interface on a user terminal including a block placing part to place a block on one or more specified track sections to permit a railway field worker to enter the track sections while blocking railway traffic to said track sections;

generating a removal code, determining an electronic contact address of the railway field worker by accessing a rail personnel contact database registering, for each railway personnel, electronic contact information of the railway personnel, and transmitting the removal code to the electronic contact address of the railway field worker; and

permitting the block to said one or more track sections to be removed only upon entry of the removal code in the centralized railway control system.

* * * * *

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TOOLS FOR RAILWAY TRAFFIC CONTROL

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Application No. 61/893,547, filed Oct. 21, 2013 and entitled "SYSTEM, APPARATUS AND METHOD FOR RAILWAY TRAFFIC CONTROL".

TECHNICAL FIELD

This disclosure relates to railway traffic control, and more specifically, a system, apparatus, and method for railway traffic control to address concerns for safety of railway workers working on or near railroad tracks.

BACKGROUND

Railway transportation is run under strict operational guidelines or rules, in order to operate safely. Most of these guidelines are standard amongst commercial railway traffic. Examples of transport standards include interlock signals, centralized traffic control (CTC), rule 251, etc.

Interlocking signals govern movement within a sector controlled by an interlock. For example, on a specific track line, a track may be divided into sections of 400 to 2500 m, on each of which trains move at a speed depending on an interlocking signal exhibited by an interlock at an entrance to the section. That is, the interlocking signal displays a color system which instructs the conductor of the train, or the train operating by automated response, how to move through the upcoming section of track. Interlocking systems usually incorporate a 3-color system by which the train, or train conductor, is informed to proceed at regular speed, is informed to proceed at a reduced speed or is prohibited from proceeding through the upcoming section.

While interlocking systems can be operated manually, currently most interlocking systems are controlled electronically. One method of controlling all of the interlocks within a rail system is through a centralized traffic control (CTC), or traffic control system (TCS). A CTC is used for monitoring, tracking and operating trains traversing tracks throughout a network. The CTC is controlled by a single person known as a train dispatcher.

In order for the train dispatcher to make appropriate train control decisions regarding how the train should be operated, various information and data must be obtained and presented. Information regarding track conditions, train traffic, scheduling, etc., are presented on a control console which may include a map of the entire rail system controlled by the CTC. Through the control console, the dispatcher has control of each interlock signal (that is, the dispatcher controls the train traffic and flow of train traffic using the interlocks) and is constantly made aware of the positions of trains in the railway system as such positions are electronically reported by signals present throughout the railway system. In addition, in order to provide for safe traffic control and avoid accidents or collisions, signals are provided throughout the track network, or interlocks.

The interlocks may be controlled from the CTC in any of various different ways, including, e.g., direct wiring, by pulse codes sent over a wire to distant locations, etc. In addition, interlocks can also be controlled by a native mechanism detecting presence of a train on the track. That is, when a train occupies a certain section of track, the interlock prevents other trains from proceeding onto the same

Further, there are additional safety systems on the train itself, such as automatic train control (ATC). A common feature of many of such automated train control systems is the need for constant or nearly constant communications between onboard train control systems and an offboard hub radio connected to control equipment located along the wayside or in a central office. In some systems, the offboard control equipment generates movement authorities which authorize the train to move in one or more sections of track. In some systems, the offboard equipment informs the onboard train control system of the presence of other trains in the vicinity. In yet other systems, the offboard equipment provides information such as temporary speed restrictions and work zone information to the onboard train control system. Such systems protect against a number of human errors on the part of the train drivers, one of the basics of the system being that the train is provided with a computer which receives traffic information, such as stop signals and speed limits, from a plurality of transmitters along the track. Thus, the computer may bring the train to a standstill regardless of what the train driver does when the train arrives at a stop signal.

Even with all these safety features present in a railway system, railway accidents occur, with many being fatal. For example, one study reported that there were 39 roadway worker accidents that occurred between January 1997 and the end of 2011, in which 41 roadway workers perished while attending to tasks such as inspection, construction, maintenance, or repair of railroad track, bridges, roadway, signal and communication systems, electric traction systems, roadway facilities or roadway maintenance machinery on or near track, operating as flagmen or watchmen/lookouts for other roadway workers, etc.

There remains a need for further safety measures to protect the lives of railway workers.

BRIEF SUMMARY

This disclosure provides tools (in the form of systems, apparatuses, methodologies, etc.) for enhancing railway traffic control, as supplemental measures directed to safety of railway workers.

For example, a centralized railway control system may be adapted (such as via computer hardware, software, or a combination) to include providing on a user terminal a user interface including a block placing part to place a block on one or more specified track sections to permit a railway field worker to enter the track sections while blocking railway traffic to said track sections, generating a removal code and transmitting the removal code to the electronic contact address of the railway field worker, and permitting the block to the track sections to be removed only upon entry of the removal code in the centralized railway control system. Such process may be largely automated via programming such that upon placement, by the block placing part, of the block of railway traffic to the specified track sections, the removal code is automatically transmitted, by a code generation part, to the electronic contact address of the railway field worker, and the block of railway traffic to the specified track sections remains in place in the centralized railway control system until the entry of the removal code in the centralized railway control system to cause a block removal part to remove the block on said one or more track sections.

In another aspect, the adaptation may include a RTC user interface to permit a user (e.g., train dispatcher) to specify a track section(s) to be blocked, specify an instruction to the centralized railway control system to block the railway traffic to the specified track section(s), and specify identifying infor-

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mation of the railway field worker performing (or to be performing) work in the specified track section(s).

In another aspect, the adaptation includes a block removal user interface to permit a user to enter the removal code to cause the block removal part to remove the block on said one or more track sections. Such block removal user interface may be provided in any of various ways. For example, the block removal user interface may be provided within a mobile application or web page through which the railway field worker can enter the removal code manually or orally (i.e. including a voice or speech interface part). As another example, the removal code may be embedded in a link in a message transmitted by email or messaging to the electronic contact address of the railway field worker, and the railway field worker can simply cause the removal code to be entered by activating the link in the message received by the railway field worker. In another example, the block removal user interface may be provided on the same user terminal on which the block placing part is disposed. Further, a voice or speech interface part may be disposed on the system-side to process a voice message (such as received via a telephone call from the railway field worker, extract the removal code from the voice message, and enter the block removal code. In each instance, the block of railway traffic to the specified track sections remains in place in the centralized railway control system until the entry of the removal code through the block removal user interface. Further, entry of the removal code may also require entry of identification of the user entering the removal code, and removal of the block may also require not only the removal code but also confirmation that the user entering the removal code is authorized to remove the block. The block removal user interface may further require, in addition to entry of the removal code, the user to specify that confirmation that the track sections have been cleared has been obtained from the railway field worker associated with the block, before the block removal user interface permits the removal code to be transmitted to the block removal part.

In another aspect, the system may include a railway control database registering block identifying information, including block limits identifying the one or more blocked track sections, along with the removal code for removing the block of the track sections. Further, the railway control database may register additional information, such as identification of the user who specified the instruction to block the track sections, notes specifying reasons for the block, date and time at which the block was placed, etc. The railway control database may further register block removal information identifying date and time at which the block was removed and identifying the user who entered the removal code and who specified that confirmation that the track sections have been cleared was obtained from the railway field worker associated with the block.

BRIEF DESCRIPTION OF THE DRAWINGS

The aforementioned and other aspects, features and advantages can be more readily understood from the following detailed description with reference to the accompanying drawings wherein:

FIG. **1**A shows a block diagram illustrating a railway control system, in accordance with an exemplary embodiment;

FIG. **1**B shows a block diagram illustrating a railway control system, in accordance with another exemplary embodiment;

FIG. **2** shows a block diagram of a railway traffic control apparatus, in accordance with an exemplary embodiment;

FIG. **3**A shows a block diagram of an exemplary configuration of a terminal;

FIG. **3**B shows a block diagram of an exemplary configuration of a computing device;

FIG. **4** shows a schematic diagram illustrating communication flow in the system shown in FIG. **1**A or in the system shown in FIG. **1**B;

FIG. **5** shows an example of a graphical portrayal of a railway network;

FIGS. **6-9** show examples of a user interface display, in accordance with an exemplary embodiment;

FIG. **10** shows an example of a user interface display that may be provided on the field worker side for triggering block removal;

FIG. **11** shows another example of a user interface display;

FIG. **12** shows a flow chart illustrating a block placement method, in accordance with an exemplary embodiment;

FIG. **13** shows a flow chart illustrating a block removal method, in accordance with an exemplary embodiment;

DETAILED DESCRIPTION

This patent specification describes tools (in the form of methods, apparatuses and systems) that controls train traffic within a railway system using, but not limited to, standardized rules or timetables described in the Background section of this specification.

In describing exemplary embodiments illustrated in the drawings, specific terminology is employed for the sake of clarity. However, the subject matter of this patent specification is not intended to be limited to the specific terminology so selected and it is to be understood that each specific element includes all technical equivalents that operate in a similar manner.

The drawings show examples of implementations of the subject matter of this patent disclosure in several computing environments. However, it should be understood that the subject matter of this disclosure can be utilized by any computing device including but not limited to PDAs, cell phones, personal, notebook and workstation computers, kiosks, other information terminals, WIC (or another) pager, etc. In addition, the subject matter of this disclosure might be provided as services in a modular fashion by other devices connected by a communication network.

Referring now to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, there is described tools (systems, apparatuses, methodologies, computer program products, etc.) that can be integrated in a railway traffic control system.

FIG. **1**A shows schematically an exemplary embodiment in which a system **100**A includes a railway traffic control terminal **105**, rail personnel data **104** and a terminal **103**, each connected to the network **102**. FIG. **1**B shows schematically another exemplary embodiment, in which rail personnel contact data **104** is accessed directly by the railway traffic control apparatus **105**. While only one terminal is connected to the network **102** in the example shown in FIG. **1**A as well as in the example shown in FIG. **1**B, it should be appreciated that the network environment can have an arbitrary number of devices (of various types).

The network **102** can be any data network, a local area network, a wide area network or any type of network such as an intranet, an extranet (for example, to provide controlled access to external users, for example through the Internet), a private or public cloud network, the Internet, etc., or a combination thereof. Further, other communications links (such as a virtual private network, a wireless link, etc.) may be used

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as well for the network **102**. In addition, the network **102** preferably uses TCP/IP (Transmission Control Protocol/Internet Protocol), but other protocols such as SNMP (Simple Network Management Protocol) and HTTP (Hypertext Transfer Protocol) can also be used. How devices can connect to and communicate over networks is well-known in the art and is discussed for example, in "How Networks Work", by Frank J. Derfler, Jr. and Les Freed (Que Corporation 2000) and "How Computers Work", by Ron White, (Que Corporation 1999), the entire contents of each of which are incorporated herein by reference.

The rail personnel **104** is a database that can be either connected to or inside the railway traffic control terminal **105**. The rail personnel contact data **104** stores information regarding the maintenance workers used for traveling, inspecting and working on blocked rails. For example, the information stored can include name of the maintenance worker, primary contact, secondary contact, previous assignment, current assignment, etc. as shown via user interface display in FIG. **11**.

FIG. **2** shows a terminal **100**A which is configured (such as via one or more programs of instructions executable by a processor of a computer or another electronic device) with a railway traffic blocking apparatus **101** to include a block placer **101**A, a code generator **101**B, a block remover **101**C and a user interface **101**D. The terminal **100**A can be any electronic device including a processor, storage and display, such as shown by way of examples in FIGS. **3**A and **3**B.

The railway traffic blocking apparatus is programmed to control the traffic of an entire railway network. The block placer **101**A is configured to stop traffic within a certain length of rail line. That is, once a block is placed, no train can traverse the blocked section of rail. For example, in the case of a railway controlled by multiple interlocks, the block placer **101**A causes those interlocks to output a STOP signal, therefore, stopping any train traffic within the rails controlled by that interlock. By doing this, maintenance workers and railway personnel can travel, inspect and work on the rails without the danger of oncoming train traffic. Trains that are scheduled to traverse said blocked tracks either come to a complete stop, electronically or mechanically, before passing the interlock or are rerouted using tracks that are not in a blocked state. However, this disclosure is not limited to a railway traffic control system implementing interlocks. This system can be implemented on any configuration in which there is control of the traffic of a railway system.

The code generator **101**B is configured to produce a removal or release code, such as a cipher which is random, pseudo-random, secret, etc., and stored on the terminal. A new random cipher may be generated for each instance of traffic blocking. This removal or release code is then sent to another terminal belonging to the railway personnel who are scheduled to travel, inspect or work on the specific rails being blocked.

The block remover **101**C is programmed to remove the previous block, or plurality of blocks set by the block placer **101**A. The block remover **101**C is dependent on the code produced by the code generator **101**B. As described in detail below, a block cannot be removed without the input of the removal or release code.

The user interface **101**D is configured preferably for the ease of use for the railway traffic controller. As shown by way of examples in FIGS. **6-9** and **11**, the user interface **101**D displays information and tools needed to enable/disable blocks on rail sections.

The user interface **101**D may be a mobile application, a web page or some other software component, on a terminal device. Such terminal preferably is configured to communicate through a computer or data network to obtain content and data from an external source. However, it should be appreciated that the inventive aspects described herein can be employed even if the mobile device is not configured to connect to a data network, and/or is not connected to a data network.

An example of a configuration of a user terminal (e.g., the terminal **103**) or computer is shown schematically in FIG. **3**A. In the example of FIG. **3**A, terminal device **200** includes a controller (or processor) **202** that communicates with a number of other components, including storage **203**, display **204**, input/output (such as mouse, touchpad, stylus, microphone and/or speaker with voice/speech interface and/or recognition software, etc.) **205** and a network interface **206**, by way of an internal bus **201**.

The storage **203** can provide storage for program and data, and may include a combination of assorted conventional storage devices such as buffers, registers and memories [for example, read-only memory (ROM), programmable ROM (PROM), erasable PROM (EPROM), electrically erasable PROM (EEPROM), static random access memory (SRAM), dynamic random access memory (DRAM), non-volatile random access memory (NOVRAM), etc.].

The network interface **206** provides a connection (for example, by way of an Ethernet connection or other network connection which supports any desired network protocol such as, but not limited to TCP/IP, IPX, IPX/SPX, or NetBEUI) to a network (e.g., network **102**) to enable the terminal device to communicate with another device through the network.

FIG. **3**B shows an exemplary constitution of a computer **300** which can be configured by appropriate programming to operate as the railway traffic control apparatus **105** (FIG. **1**A). The computer **300** shown in FIG. **3**B includes a processor **302**, and various elements connected to the processor **302** by an internal bus **301**, such as a memory **303**, display **304**, keyboard **305** and network interface **306**. The processor **302** processes incoming requests transmitted through the network interface **306**. The network interface **306** enables the railway traffic control terminal to communicate with other network-connected devices such as a terminal (e.g., the terminal **103** of FIG. **1**A or FIG. **1**B) and receive data or service requests.

Each of the terminal **103**, rail personnel database **104** and railway traffic control apparatus **105** can be configured to communicate with each other through the network **102**. The railway traffic control terminal **105** can be configured to request data from the rail personnel contact data **104** through the network **102**, as shown in FIG. **4**. When the railway traffic control apparatus **105** initiates a block on a track section, the railway traffic control apparatus **105** may also designate a worker in associate with the block on the track section. With this information, the railway traffic control apparatus **105** requests the specific personnel data pertaining to the designated worker. The rail personnel contact data retrieves the requested personnel data and sends it to the railway traffic control apparatus **105**. By receiving this data, the railway traffic control apparatus **105** may then generate a release code and save it to an internal storage.

The release code is then sent to the terminal **102**. This terminal **102** is the contact associated with the designated worker, and the electronic address of this terminal is found within the personnel data received from the rail personnel contact data **104**. By this system, only the railway traffic control apparatus **105** and terminal **102** receive the release code generated by the railway traffic control apparatus **105**.

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Additionally, FIG. **4** shows the communication between the terminal **102** and the railway traffic control apparatus **105** in the event that a block on a certain track is to be lifted. In order for a block on a certain track to be lifted, the release code has to be input into the railway traffic control apparatus. The terminal **102** sends the release code to the railway traffic control apparatus **105**. The release code is then input into the block remover **101**C. After which, the block is removed and traffic to that section of rail is then allowed.

FIG. **5** illustrates an example of a railway network **500**. Labeled are interlocks A-F which control sections of railway of the railway network **500**. For example, the rail traffic controller might choose to block the section of rail corresponding to the track between interlock A and interlock B. This way, train traffic between those two interlocks in prohibited. The railway network is present on screen of the railway traffic control terminal **105** at all times for the convenience of the rail traffic controller. By being on screen at all times, the rail traffic controller knows the status of certain sections of rail in real time.

As shown in the example illustrated in FIG. **5**, the railway between interlocks A and B, and interlocks C, D and E is blocked. Train traffic is prohibited between these sections and shown to the railway traffic controller on screen. As further explained below, the railway traffic controller can lift the blocks on these sections of track if the release code is input into the railway traffic control terminal **105**.

FIG. **6** is an exemplary illustration of the user interface of the railway traffic control terminal **105**. The railway traffic controller may place blocks on any section of traffic using this user interface. In this exemplary embodiment, the train traffic controller inputs authority, worker and block limits. This information corresponds to the train traffic controller username, maintenance worker designated to work on the specific blocked track and the sections of track being blocked, respectively. In addition, the railway traffic control terminal **105** then timestamps the order once the block is placed.

Once the block is put into place, the corresponding section on the railway network **500** displays the section of track being blocked. In addition, the railway traffic control terminal **105** generates a release code, stores the release code, and sends the code to the maintenance worker designated for track work, i.e. maintenance worker 12. As shown in FIG. **6**, the railway traffic controller may place blocks on track sections but may not remove the track blocks without the input of the release code in the allotted area labeled release code. FIG. **6** shows that the remove action is dashed out, meaning it cannot be selected (unless a release code is first entered). In the example illustrated in FIG. **6**, it is shown that only one worker, maintenance worker 12 is designated to work on track Section A to Section B. However, as shown in later embodiments, the train traffic controller is not limited to the amount of maintenance workers designated for any track section. In addition, the train traffic controller may apply a block to any number of additional track sections.

The blocks are then tabulated by the railway traffic control apparatus **105** as depicted in FIG. **7**. The table in FIG. **7** lists all the blocks that are in place and in addition lists blocks that were previously set. The information that can be found in this table includes, but is not limited to, the type of work being done on the track sections, when the block was placed, who is designated to work on the sections of track, who placed the block, when was the block removed and who removed the block.

Additional information can be accessed though this table by highlighting a cell of the table and selecting info, as shown in FIG. **7**. For example, by highlighting the cell labeled maintenance worker 12 and selecting info, the train traffic controller may access the bio of the maintenance worker 12, as shown in detail below. The train traffic controller may also highlight a different cell, such as the limits cell label "Sec. A-Sec. B". By selecting this cell and selecting the info command, the past history of maintenance work and operation of the section(s) may be displayed to the train traffic controller.

FIG. **8** shows the user interface of the railway traffic control terminal **105** as the railway traffic controller inputs the release code to remove the block on certain track sections. In the exemplary embodiment of FIG. **8**, the remove option is now able to be selected with the input of the release code provided by the designated worker assigned for track work, maintenance worker 12.

Without the input of the release code, the remove option is not available to be selected. In a different embodiment, the release code may be obtained from the storage of the railway traffic control terminal **105**.

In the case where there are multiple maintenance workers assigned to a certain track section, there may be provided one release code to one, multiple or all of the maintenance workers assigned. That is, The train traffic controller may input that the release code be specified to one maintenance worker, preferably a supervisor or foreman, to multiple maintenance workers or to all of the maintenance workers assigned to work on a given track section. Also, in another embodiment, in a case where there are multiple workers assigned for a certain track section, there may be provided multiple unique release codes which would then all be required to be input into the train traffic control terminal **105** by the train traffic controller in order to be able to remove blocks on certain track sections.

In another embodiment, the train traffic controller may be asked to verify that a railway section is cleared before receiving the option to remove a train block. As shown in FIG. **9**, the user interface displayed by the railway traffic control terminal **105** does not allow a removal of a block until the option corresponding to "Railway Section Cleared" is checked. This option allows for a further protection of the maintenance workers assigned to the block track sections.

FIG. **10** shows an exemplary illustration of a message sent by the railway traffic control terminal **105** to a terminal **103** at a corresponding address of a maintenance worker assigned to work on a blocked track. The message is meant to deliver the release code to the maintenance worker assigned to work on a blocked track. In addition to relaying the code, the message may include, but not limited to, information regarding the section of track that is being blocked, the date and time that the track was blocked, who initiated the track block, and links to quickly respond to the message. By selecting one of the links embedded in the message, the terminal **103** sends the release code to the railway traffic control terminal **105**. The code can be transmitted through, but not limited to, text message, e-mail or voice message. In the present embodiment being illustrated, the terminal **103** is depicted as a mobile phone. The terminal **103** could be any communication device such as, but not limited to, mobile phone or smartphone, tablet, WIC (or another) pager, PDA, etc.

In another embodiment, once the rail traffic controller unblocks a section of track, the railway traffic control terminal **105** may send a message to the worker, or plurality of workers, associated with working on the previously blocked track in order to inform them that the track has been unblocked and is no longer a safe environment to work in.

FIG. **11** depicts an exemplary embodiment of a profile of a maintenance worker. This profile may be accessed directly by highlighting the corresponding maintenance worker cell in the table depicted in FIG. **7** and selecting the info tab. This

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command brings up the profile and the maintenance worker and displays information regarding the worker including, but not limited to, the name, age, primary contact, secondary contact, e-mail, last assignment and current assignment of the maintenance worker. Additionally in this screen, the railway traffic controller may contact the maintenance worker directly using one of the plurality of addresses provided.

Next, the method of placing a block on a track section will be described with reference to FIG. **12**. In S**1201**, the rail traffic controller selects the sections to be blocked using the railway traffic control terminal **105**. Once the block limits are designated and sent, the railway traffic control terminal **105** established office interlocking immediately in S**1202**. That is, the railway traffic control terminal **105** immediately sends a signal to the corresponding interlocks corresponding to the section of track designated to be blocked. Additionally, the railway traffic control terminal **105** generates and saves a random secret code in S**1203**.

After a request to block a certain section of track is sent, the railway traffic control terminal **105** checks if there is one or more of the sections currently has a block placed, as shown in S**1204**. If one or more of the designated sections does not have a block placed, then the railway traffic control terminal **105** opens a user interface for the railway traffic controller to designate a type of block to set and a maintenance worker for the blocked section in S**1206**. If the railway traffic control terminal sees that a block is already in effect (S**1205**), then the railway traffic control terminal **105** allows the railway traffic controller to change the existing block type and maintenance worker using the same interface. The interface is then opened in S**1206**.

The railway traffic controller then inputs the type of block and assigns a worker to work on the blocked section. The railway traffic controller also has the option to block the track for purposes of an emergency and not necessarily for maintenance work in S**1207**. Once the railway traffic controller assigns a block type and/or a corresponding maintenance worker, the railway traffic control terminal **105** checks the status of the selected block in S**1208**. If the current selected section has an existing block, the railway traffic control terminal **105** waits for a response from the interlocks of the corresponding section to send an indication that a new block can be established in S**1209**. Once this indication is received in S**1210**, the railway traffic control terminal **105** enables the place button of the user interface (S**1211**). If the selected section has no previous active block, the railway traffic control terminal **105** immediately enables the place button on the user interface.

Once the place button is selected, the railway traffic control terminal **105** generates a place time and enables safety measures so that the block cannot be removed without the input of the secret code generated (S**1212**). Finally, the railway traffic control terminal **105** sends the secret removal code to the corresponding one or more maintenance workers if the railway traffic controller has selected maintenance workers for the given block.

FIG. **13** describes a method for removing a block placed on a section of track. In S**1301**, the railway traffic controller selects an existing block by using either the network rail map, shown in FIG. **5**, the remove tool, shown in FIGS. **6**, **8** and **9**, or the summary table, shown in FIG. **7**. The remove button is disabled without the input of the secret code from either the maintenance worker or the railway traffic control terminal **105** (S**1302**). In S**1304**, the railway traffic control terminal **105** checks if there is a maintenance worker that is eligible to transmit the random secret code. If there is an eligible maintenance worker available (S**1304**, YES), the maintenance worker transmits the random secret code to the railway traffic control center **105** (S**1305**). If there is no maintenance worker available to transmit the random secret code (S**1304**, NO), the code can be retrieved from the train traffic control terminal **105** by the train traffic controller (S**1306**).

Once the secret code is received, the secret code may be input to the designated field in S**1308**. The railway traffic control terminal **105** checks the secret code with the code saved in its memory in S**1309**. If the code is incorrect, (S**1309**, NO), the railway traffic control terminal **105** will prompt the user to input the code again (S**1308**). If the code is correct (S**1309**, YES), the railway traffic control terminal will prompt the user to enter information into any remaining fields in S**1310**. In S**1311**, the railway traffic control terminal **105** checks that all information input into all fields is correct and that all fields are filled in. After this check is performed by the railway traffic control terminal **105**, the remove button is enabled on the form (S**1312**) and the railway traffic controller may remove the block on the corresponding track section.

The aforementioned specific embodiments are illustrative, and many variations can be introduced on these embodiments without departing from the spirit of the disclosure or from the scope of the appended claims. For example, elements and/or features of different examples and illustrative embodiments may be combined with each other and/or substituted for each other within the scope of this disclosure and appended claims.

The orders in which the steps are performed in the aforementioned methods are not limited to those shown in the examples of FIGS. **12** and **13**, and may be switched as long as similar results are achieved. Also, it should be noted that the methods illustrated in the examples of FIGS. **12** and **13** may be implemented using any of the embodiments shown in FIGS. **1**A-**1**B.

Further, conventional systems can be modified to include the aspects described herein. As an example, a means may be added to a conventional interlock system by which the railway worker has partial control of the interlock system at the times that maintenance work is needed on a certain train block. In such modification, a system, apparatus and/or method may be provided to control the interlocks in a railway system as an interface between the railway workers and the interlock control. Thus, in a case in which maintenance is to be performed on a certain rail block, which is controlled by an interlock, the interlock can be configured to send out a stop signal for all incoming trains, to block train traffic to such portion of the rail system. In addition, once the interlock is placed in a "stop traffic" state, a release code is transmitted to an electronic contact address corresponding to the railway worker.

Once a block has been placed, the interlock remains in a blocked state, until the maintenance worker supplies the release code, which was received at the time the interlock started, and the release code is entered in the interlock control system. So long as the block is in place, the maintenance worker can perform on-track work, without interference of oncoming train traffic. After the maintenance worker finishes the assigned work and is clear of the train tracks, he/she may then supply the interlock control system with the release code, and the interlock control system in turn can release the interlock over the block.

Accordingly, the railway worker has more control over the traffic through the rail block in which the worker is working, and fatal on-track accidents can be reduced.

Additional variations may be apparent to one of ordinary skill in the art from reading U.S. Provisional Application No. 61/893,547, filed Oct. 21, 2013 and entitled "SYSTEM,

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FIGURE 1A

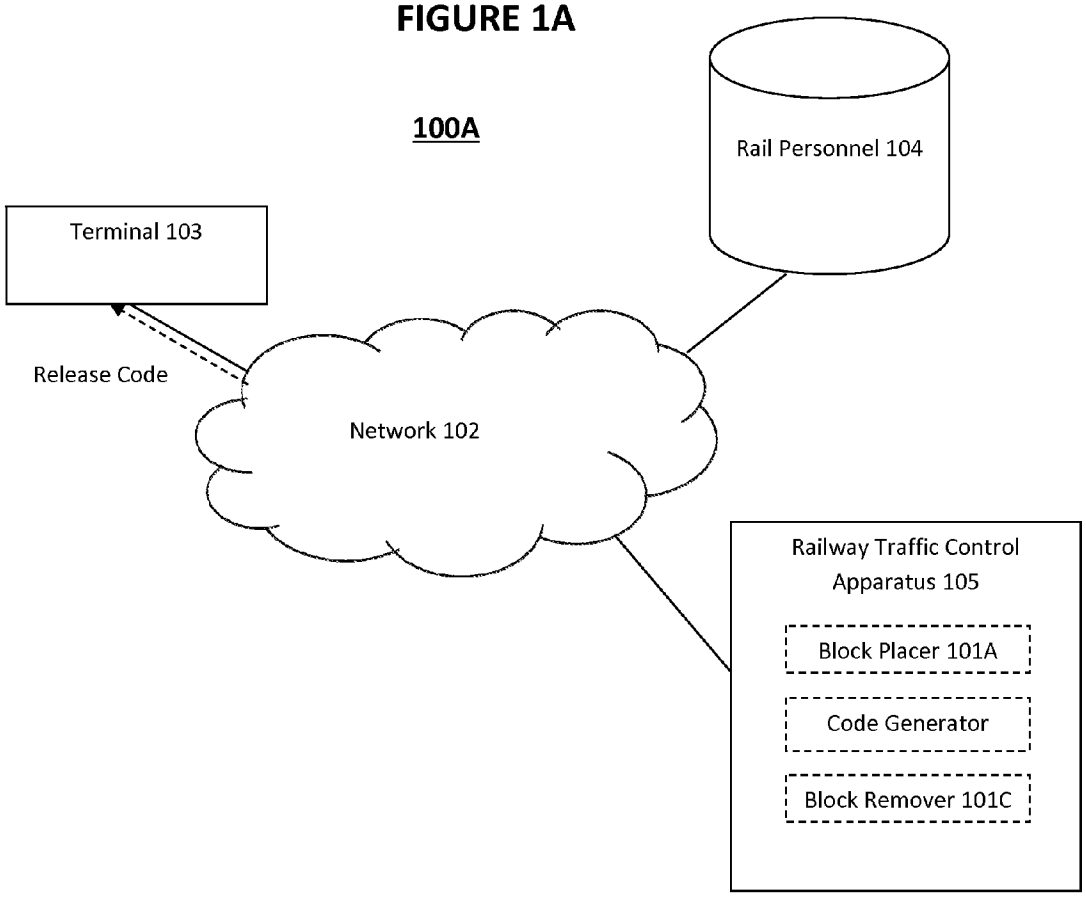

100A
Rail Personnel 104
Terminal 103
Release Code
Network 102
Railway Traffic Control Apparatus 105
Block Placer 101A
Code Generator
Block Remover 101C

FIGURE 1B

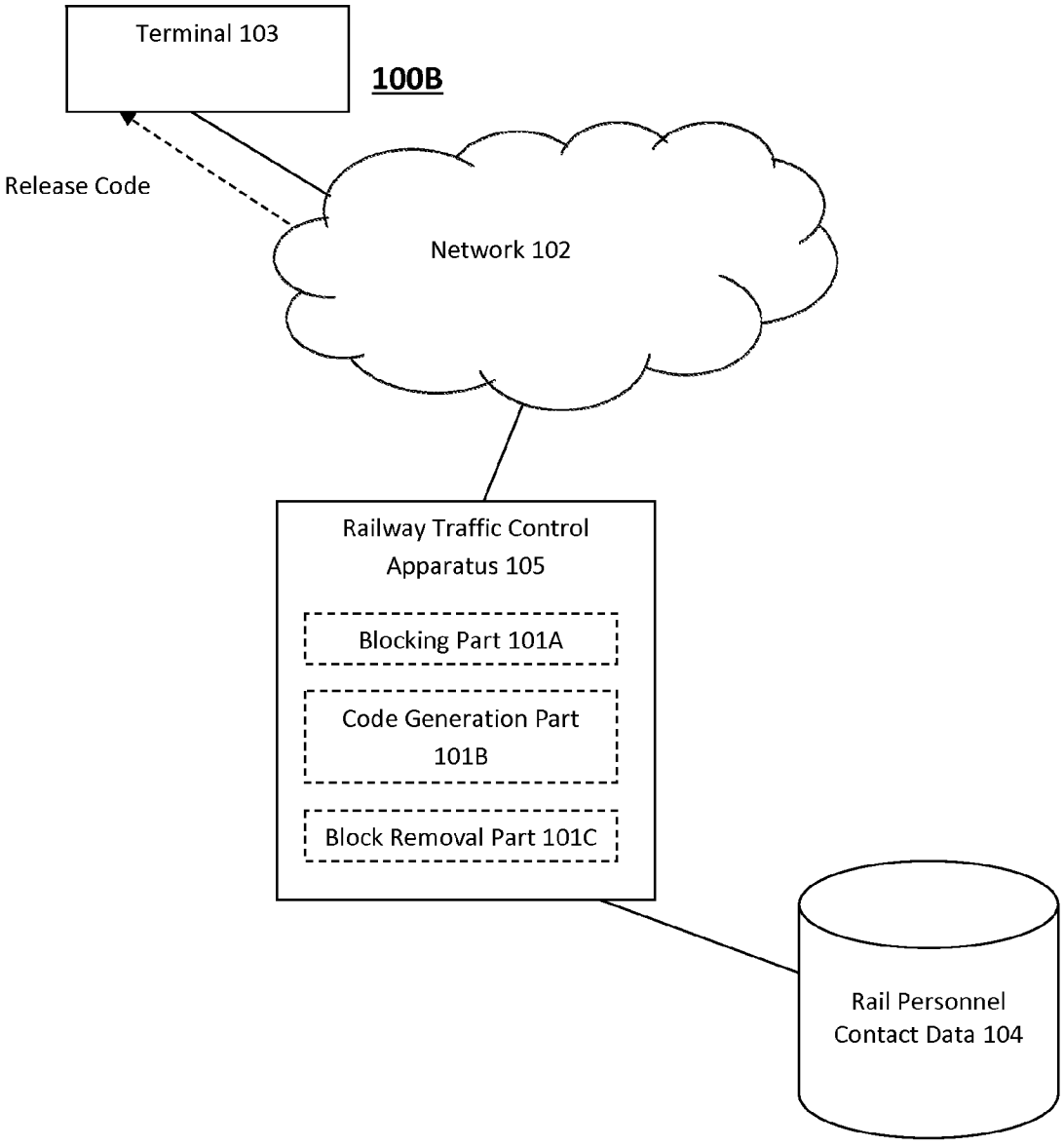

Terminal 103
100B
Release Code
Network 102
Railway Traffic Control Apparatus 105
Blocking Part 101A
Code Generation Part 101B
Block Removal Part 101C
Rail Personnel Contact Data 104

FIGURE 2

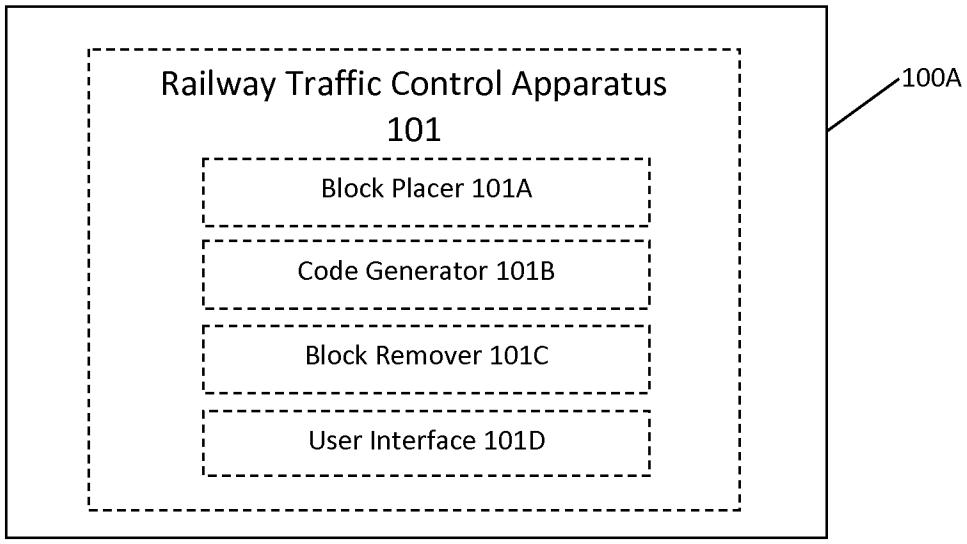


FIGURE 3A

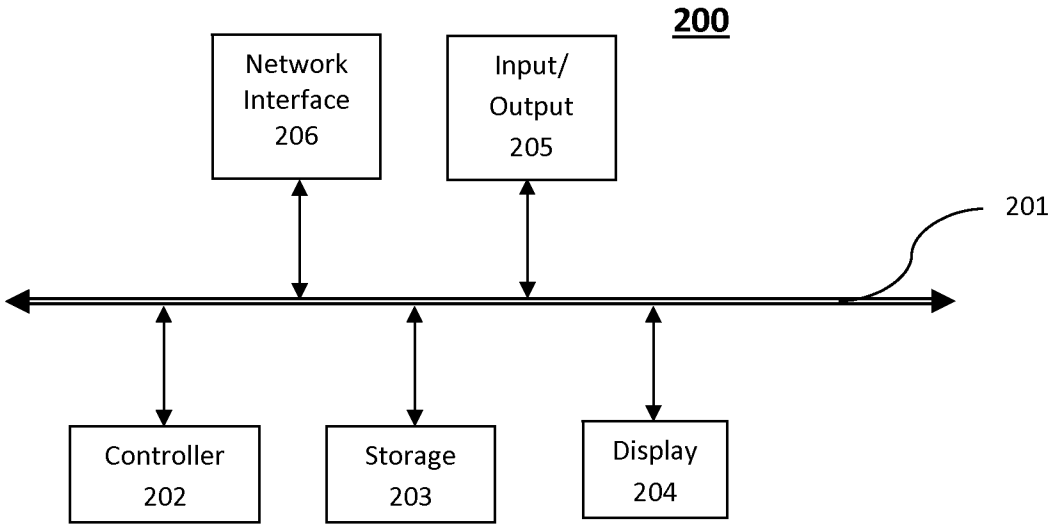


FIGURE 3B

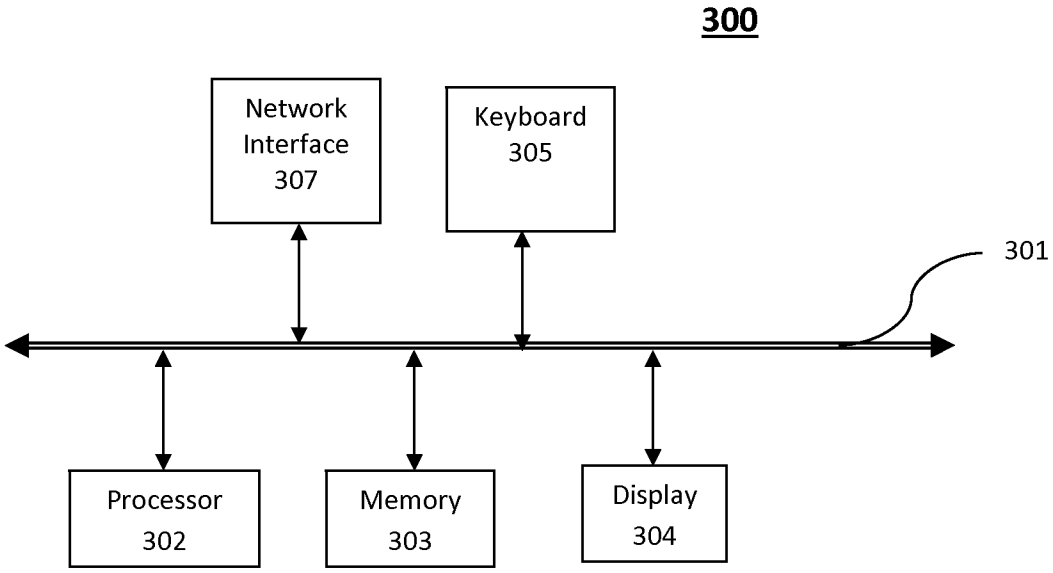

300
Network Interface 307
Keyboard 305
301
Processor 302
Memory 303
Display 304

FIGURE 4

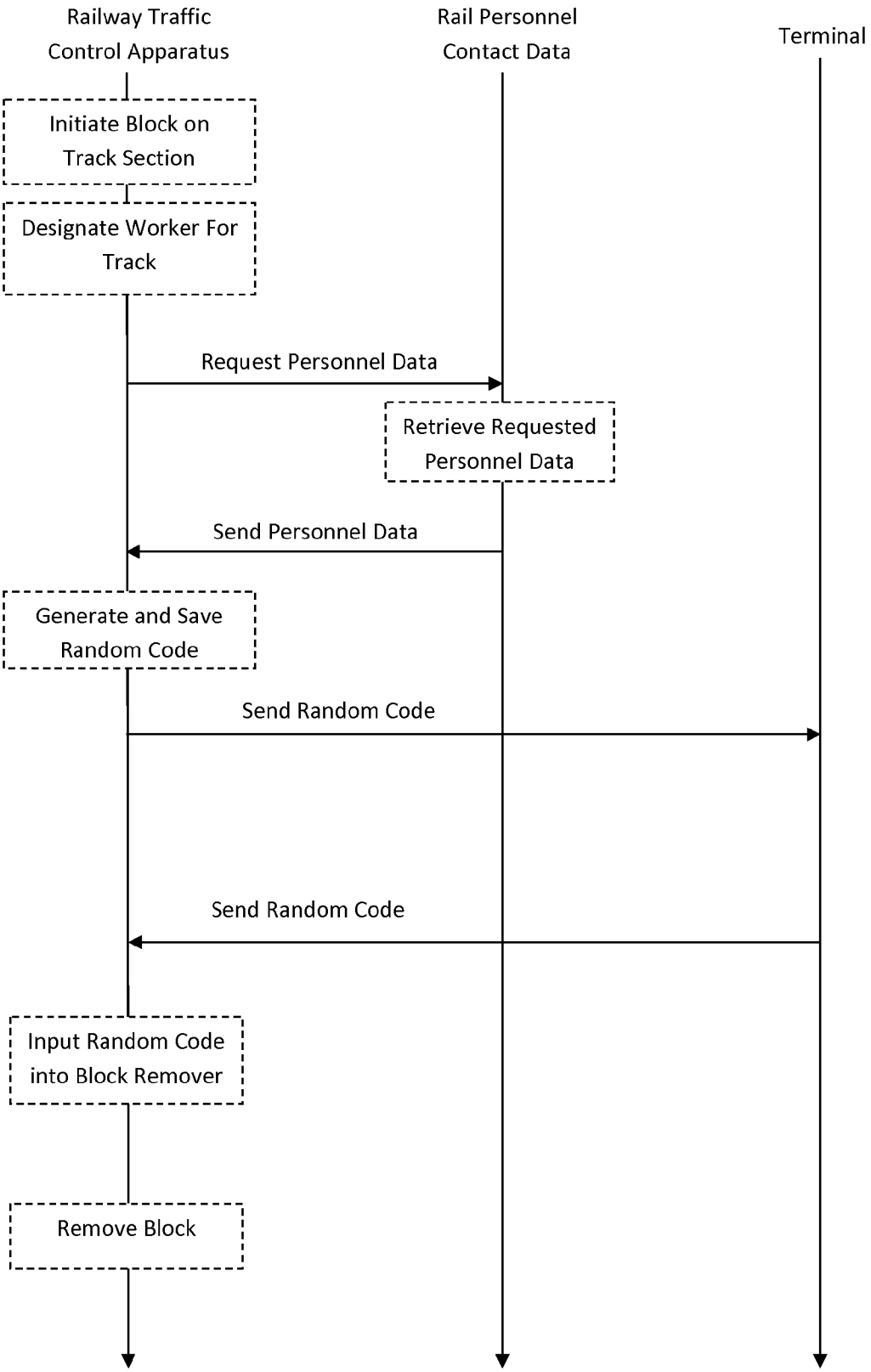

Railway Traffic Control Apparatus
Rail Personnel Contact Data
Terminal
Initiate Block on Track Section
Designate Worker For Track
Request Personnel Data
Retrieve Requested Personnel Data
Send Personnel Data
Generate and Save Random Code
Send Random Code
Send Random Code
Input Random Code into Block Remover
Remove Block

FIGURE 5

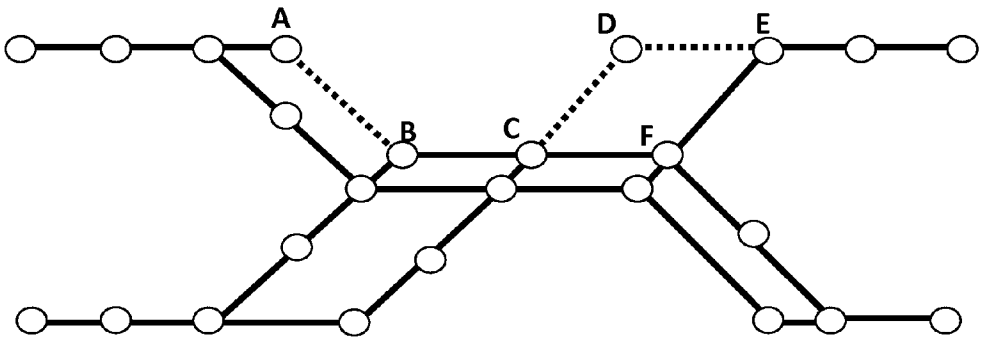


FIGURE 6

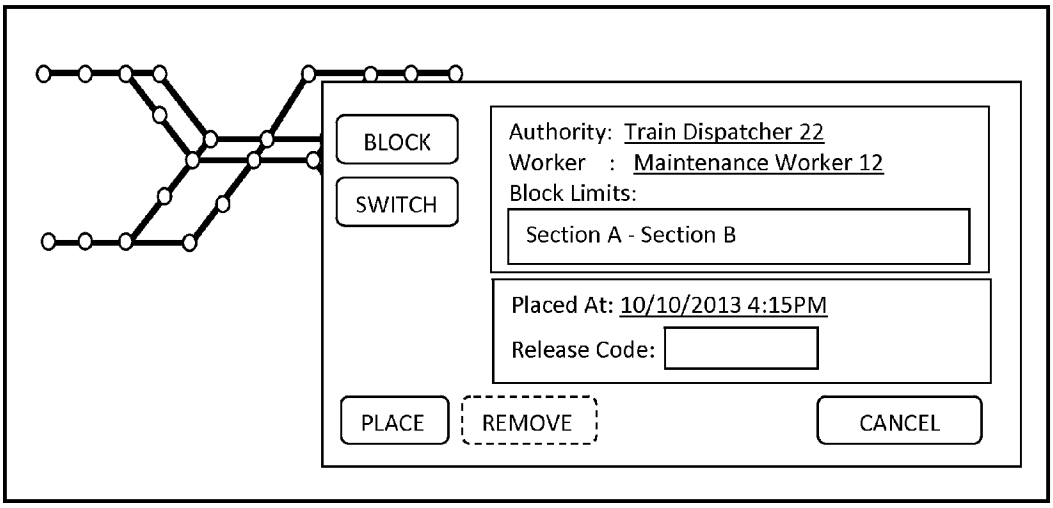


FIGURE 7

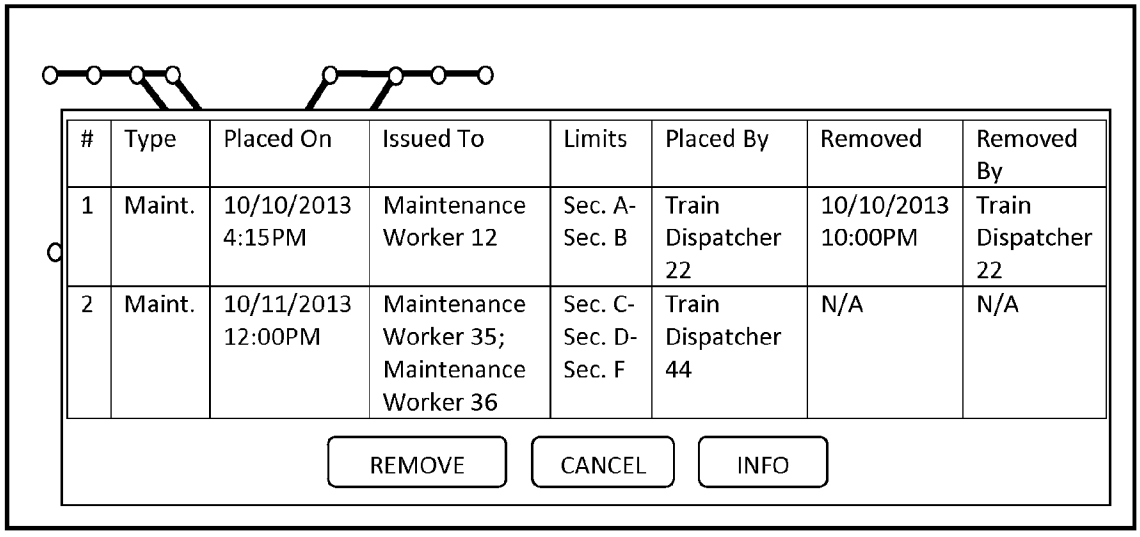


FIGURE 8

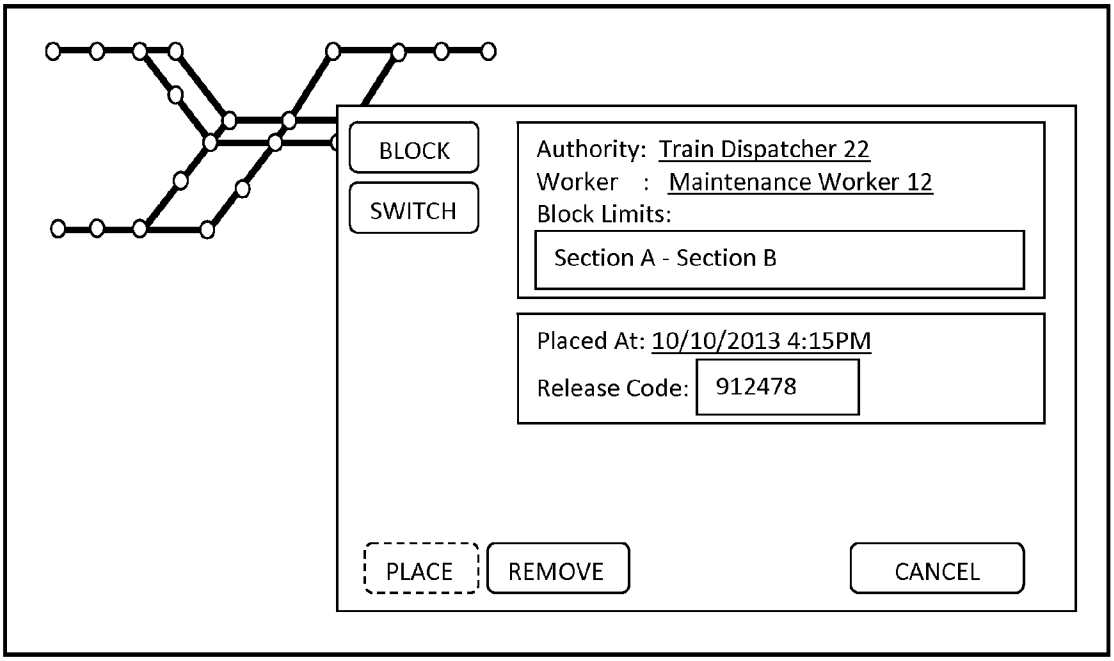


FIGURE 9

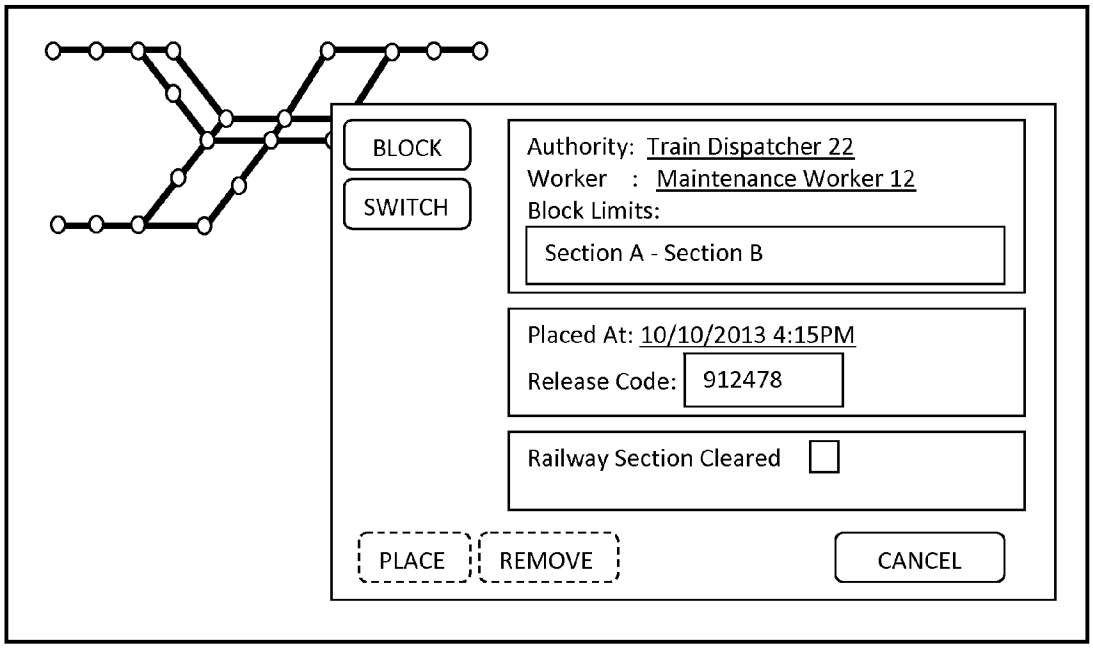


FIGURE 10

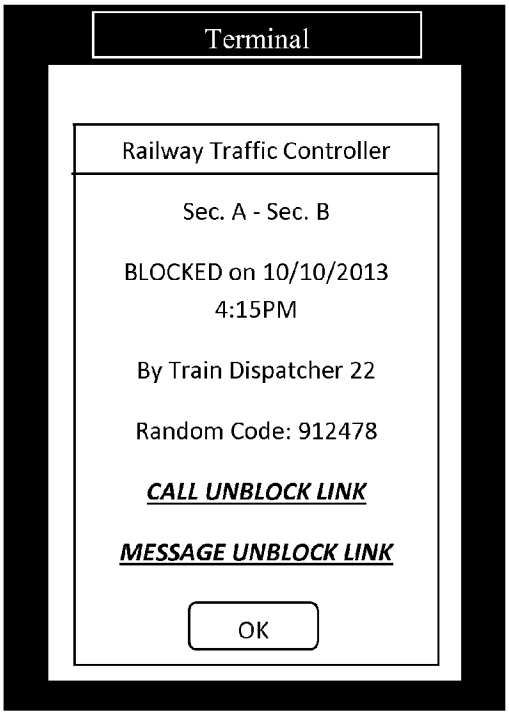
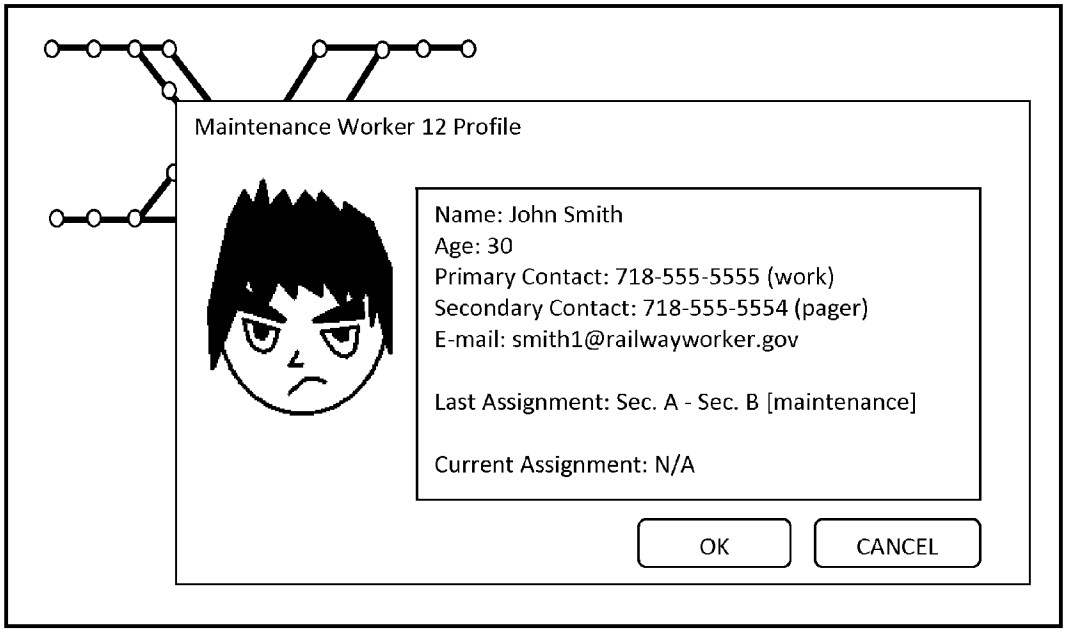


FIGURE 11


Maintenance Worker 12 Profile
Name: John Smith
Age: 30
Primary Contact: 718-555-5555 (work)
Secondary Contact: 718-555-5554 (pager)
E-mail: smith1@railwayworker.gov
Last Assignment: Sec. A - Sec. B [maintenance]
Current Assignment: N/A
OK
CANCEL

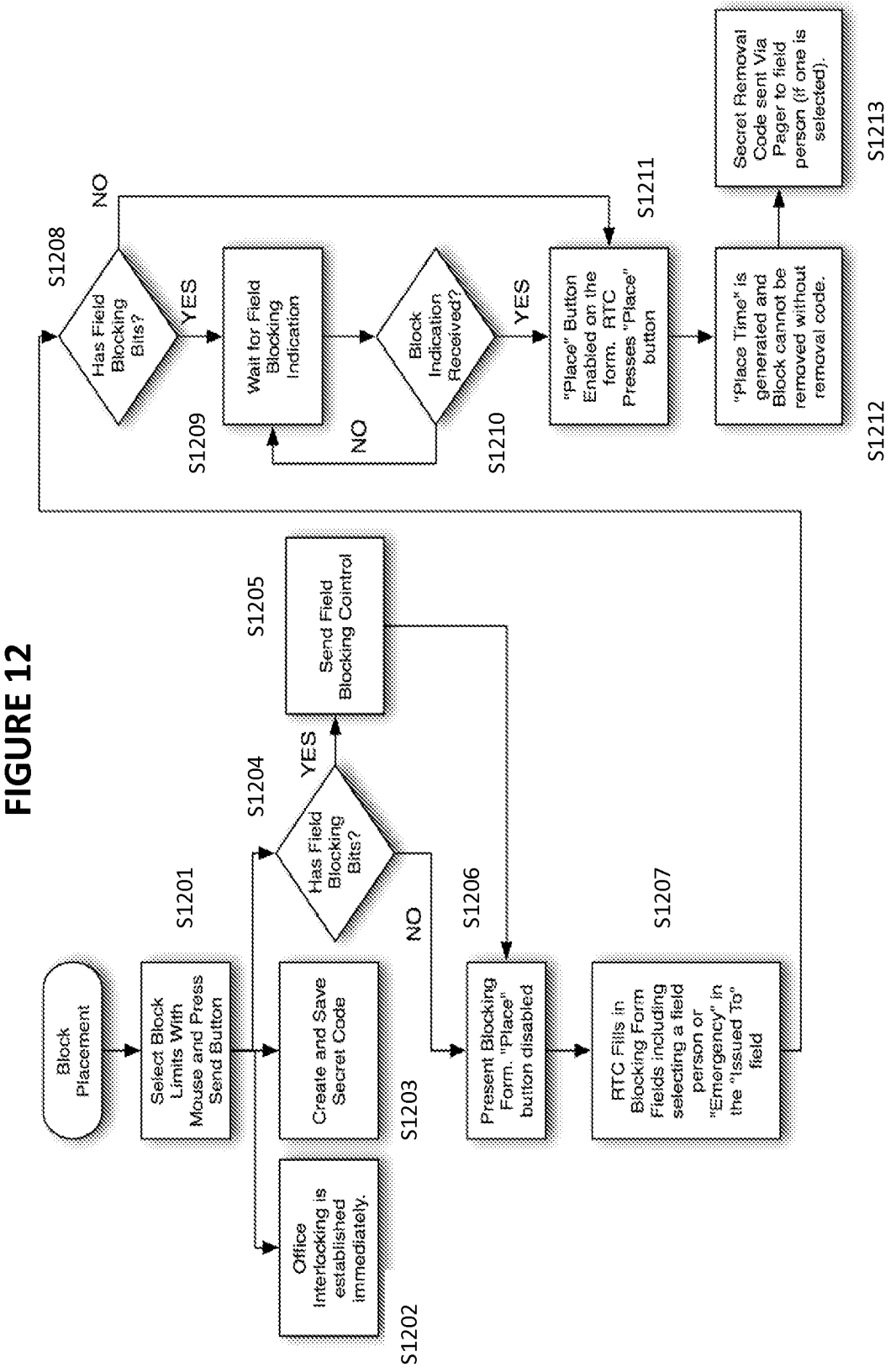
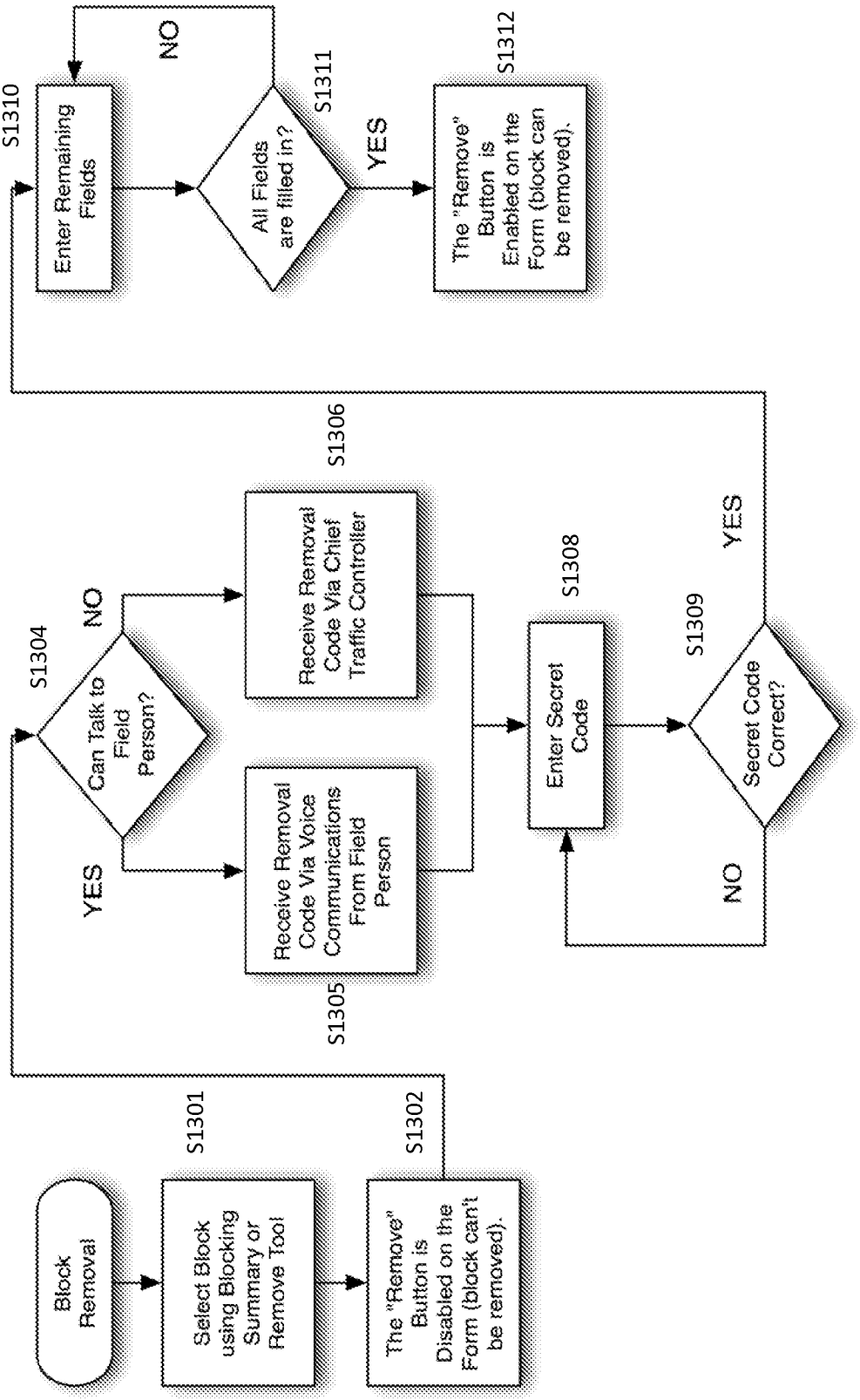

Block Placement
Select Block Limits With Mouse and Press Send Button
S1201
Has Field Blocking Bits?
S1204
YES
Send Field Blocking Cointrol
S1205
NO
Create and Save Secret Code
S1203
Office Interlocking is established immediately.
S1202
Present Blocking Form. "Place" button disabled
S1206
RTC Fills in Blocking Form Fields including selecting a field person or "Emergency" in the "Issued To" field
S1207
Has Field Blocking Bits?
S1208
NO
YES
Wait for Field Blocking Indication
S1209
Block Indication Received?
NO
S1210
YES
"Place" Button Enabled on the form. RTC Presses "Place" button
S1211
"Place Time" is generated and Block cannot be removed without removal code.
S1212
Secret Removal Code sent Via Pager to field person (if one is selected).
S1213

FIGURE 12

FIGURE 13


Block Removal
S1301
Select Block using Blocking Summary or Remove Tool
S1302
The "Remove" Button is Disabled on the Form (block can't be removed).
S1304
Can Talk to Field Person?
YES
NO
S1305
Receive Removal Code Via Voice Communications From Field Person
S1306
Receive Removal Code Via Chief Traffic Controller
S1308
Enter Secret Code
S1309
Secret Code Correct?
YES
NO
S1310
Enter Remaining Fields
S1311
All Fields are filled in?
NO
YES
S1312
The "Remove" Button is Enabled on the Form (block can be removed).

Doc Code: REIS.DECL
Document Description: Reissue Declaration Filed In Accordance With MPEP 1414

PTO/AIA/05 (06-12)
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REISSUE APPLICATION DECLARATION BY THE INVENTOR	Docket Number (Optional) 7552/85663-Reissue-A

I hereby declare that:
Each inventor's residence and mailing address are stated below next to their name.
I believe I am the original inventor or an original joint inventor of the subject matter which is described and claimed in patent number 9,403,545, granted 08-02-2016 and for which a reissue patent is sought on the invention titled TOOLS FOR RAILWAY TRAFFIC CONTROL,

the specification of which

☑ is attached hereto.

☐ was filed on _____ as reissue application number _____

The above-identified application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

I believe the original patent to be wholly or partly inoperative or invalid, for the reasons described below. (Check all boxes that apply.)

☐ by reason of a defective specification or drawing.

☒ by reason of the patentee claiming more or less than he had the right to claim in the patent.

☐ by reason of other errors.

At least one error upon which reissue is based is described below. If the reissue is a broadening reissue, a claim that the application seeks to broaden must be identified:

The reissue application seeks, by way of added method claim 33, to broaden patent claim 19 which unnecessarily limits the method to include "providing a user interface ..."

This collection of information is required by 37 CFR 1.175. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/05 (06-12)
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(REISSUE APPLICATION DECLARATION BY THE INVENTOR, page 2)

Docket Number (Optional)
7552/85663-Reissue

Note: To appoint a power of attorney, use form PTO/AIA/81.

Correspondence Address: Direct all communications about the application to:

[X] The address associated with Customer Number: 23432

OR

[ ] Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

Legal name of sole or first inventor (*E.g.*, Given Name (first and middle (if any) and Family Name or Surname)
Ross Pirtle

Inventor's Signature		Date (Optional)	
Residence: City Commack	State NY	Country USA	
Mailing Address c/o Railware, Inc., 750 Veterans Memorial Hwy, Suite 200			
City Hauppauge	State NY	Zip 11788	Country USA

[ ] Additional joint inventors are named on the _____ supplemental sheet(s) PTO/AIA/10 attached hereto.

WABTEC EX1002

PTO/AIA/14 (02-18)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Ross		Pirtle	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Commack	NY	US

Mailing Address of Inventor:

Address 1	c/o Railware, Inc.
Address 2	750 Veterans Memorial Hwy, Suite 200

City	State/Province	Postal Code	Country
Hauppauge	NY	11788	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	23432	
Email Address		Add Email Remove Email

Application Information:

Title of the Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL		
Attorney Docket Number	7552/85663-Reissue-A	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	11	**Suggested Figure for Publication (if any)**	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	23432		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	15928955	2018-03-22

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15928955	reissued of	14519727	2014-10-21	9403545	2016-08-02

Prior Application Status	Expired	Remove

Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
14519727	Claims benefit of provisional	61893547	2013-10-21

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Applicant:

Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	RAILWARE, INC.

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	750 Veterans Memorial Hwy, Suite 200		
Address 2			
City	Hauppauge	**State/Province**	NY
Country i	US	Postal Code	11788
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Paul Teng/			Date (YYYY-MM-DD)	2019-12-10
First Name	Paul	Last Name	Teng	Registration Number	40837

Additional Signature may be generated within this form by selecting the Add button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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REISSUE APPLICATION: CONSENT OF ASSIGNEE; STATEMENT OF NON-ASSIGNMENT

Docket Number (Optional)
7552/85663-Reissue-A

This is part of the application for a reissue patent based on the original patent identified below.

Name of Patentee(s)
Ross PIRTLE

Patent Number	Date Patent Issued
9,403,545	08/02/2016

Title of Invention
TOOLS FOR RAILWAY TRAFFIC CONTROL

1. [X] Filed herein is a statement under 37 CFR 3.73(c). (Form PTO/AIA/96)

2. [ ] Ownership of the patent is in the inventor(s), and no assignment of the patent is in effect.

One of boxes 1 or 2 above must be checked. If multiple assignees, complete this form for each assignee. If box 2 is checked, skip the next entry and go directly to "Name of Assignee."

The written consent of all assignees and inventors owning an undivided interest in the original patent is included in this application for reissue.

The assignee(s) owning an undivided interest in said original patent is/are RAILWARE, INC., and the assignee(s) consents to the accompanying application for reissue.

Name of assignee/inventor (if not assigned)
RAILWARE, INC.

Signature	Date
	12/04/2019

Typed or printed name and title of person signing for assignee (if assigned)

Ross Pirtle, President

This collection of information is required by 37 CFR 1.172. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: RAILWARE, INC.

Application No./Patent No.: 9,403,545 Filed/Issue Date: 08/02/2016

Titled: TOOLS FOR RAILWAY TRAFFIC CONTROL

RAILWARE, INC., a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. [✓] The assignee of the entire right, title, and interest.

2. [ ] An assignee of less than the entire right, title, and interest (check applicable box):

   [ ] The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   [ ] There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. [ ] The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. [ ] The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. [✓] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 033995, Frame 0104, or for which a copy thereof is attached.

B. [ ] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

   1. From: _____ To: _____

      The document was recorded in the United States Patent and Trademark Office at

      Reel _____, Frame _____, or for which a copy thereof is attached.

   2. From: _____ To: _____

      The document was recorded in the United States Patent and Trademark Office at

      Reel _____, Frame _____, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The ~~undersigned~~ (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature	2019 DEC. 10 Date
Paul Teng Printed or Typed Name	40837 Title or Registration Number

ABSTRACT

Tools (such as system, apparatus, methodology, etc.) may be provided to control traffic over a railway track section, when a railway worker is working on or near the track section. Move particularly, when traffic over the track section is to be blocked, a release code is generated and sent to an electronic contact address of the railway worker. Traffic through the track section is blocked until the release code is entered in the system.

Dkt. 7552/85663-Reissue-A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Ross PIRTLE

Application No.: not yet known (Continuation of Reissue Application No. 15/928,955)

Filed: herewith

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

This correspondence is being filed electronically with the U.S. Patent and Trademark Office via EFS-Web.

Esther Weiner
Esther Weiner Date

30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

INFORMATION DISCLOSURE STATEMENT

Pursuant to the applicant's duty of disclosure, the information listed in the attached Form PTO-1449 is brought to the attention of the Examiner.

It is respectfully requested that the information cited in annexed Form PTO-1449 be considered by the Examiner in connection with the above-identified patent application, filed concurrently herewith, and that such art be made of record in said application.

The citation of the listed items is not a representation that they constitute a complete or exhaustive listing of the relevant art or that these items are prior art. The items listed are submitted in good faith, but are not intended to substitute for the Examiner's search. It is hoped, however, that in addition to apprising the Examiner of the particular items, they will assist in identifying fields of

search and in making as full and complete a search as possible.

This application is a Continuation of Reissue Application No. 15/928,955 filed March 22, 2018. The Examiner's attention is directed to the file history of prior Reissue Application No. 15/928,955 and that of U.S. Patent No. 9,403,545, including without limitation the submissions and citations of prior art by applicant and prior art of record in said prior application. Further, it should be noted that prior Reissue Application No. 15/928,955 has been allowed.

Pursuant to 37 C.F.R. §1.98, copies are submitted herewith for only references listed on the annexed Form PTO-1449 that are not a U.S. patent or U.S. patent application publication.

Respectfully submitted,



PAUL TENG, Reg. No. 40,837
Attorney for Applicant
COOPER & DUNHAM LLP
30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

Submitted by: Paul Teng, Reg. No. 40,837

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

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Examiner Initials*	Cite No.	Document Number Number-Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Inventor or Applicant
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	B1	WO 2004/026631 A1	05-21-2004	JARVIS FACILITIES LIMITED; FASTLINE LIMITED	
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NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article, title of the item (book, magazine, symposium, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	C1	J.B. CALVERT, "Centralized Traffic Control", May 29, 1999
	C2	FRANK W. BRYAN, "Railroad's traffic control systems", May 1, 2006

EXAMINER	DATE CONSIDERED

*EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609: Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Examiner Initials*	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article, title of the item (book, magazine, symposium, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	C3	KYLE MCINNES, "BlackBerry-Based WIC Pager Pilot Program at Children's Hospital", 2010
	C4	JAI C.S., "Healthcare Communication Interface: WIC Pager, Philips Emergin", October 8, 2010

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Examiner Initials*	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article, title of the item (book, magazine, symposium, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	C5	"Fatal Accidents Involving Roadway Workers-In-Charge and Lone Workers", March 9, 2012, Fatality Analysis of Maintenance-of-way Employees and Signalmen (FAMES) Committee
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	C11	"How Computers Work", by Ron White, (Que Corporation 1999)

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(71) Applicants *(for all designated States except US)*: **JARVIS FACILITIES LIMITED** [GB/GB]; Jarvis House, 4th Floor, Toft Green, York YO1 6JZ (GB). **JARVIS FASTLINE LIMITED** [GB/GB]; Jarvis House, 4th Floor, Toft Green, York YO1 6JZ (GB).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: **WISE, Brian, Peter** [GB/GB]; Jalna, Crabgate Lane, Skellow, Doncaster DN6 8RA (GB).

(74) Agents: **SHERRARD-SMITH, Hugh** et al.; Appleyard Lees, 15 Clare Road, Halifax HX1 2HY (GB).

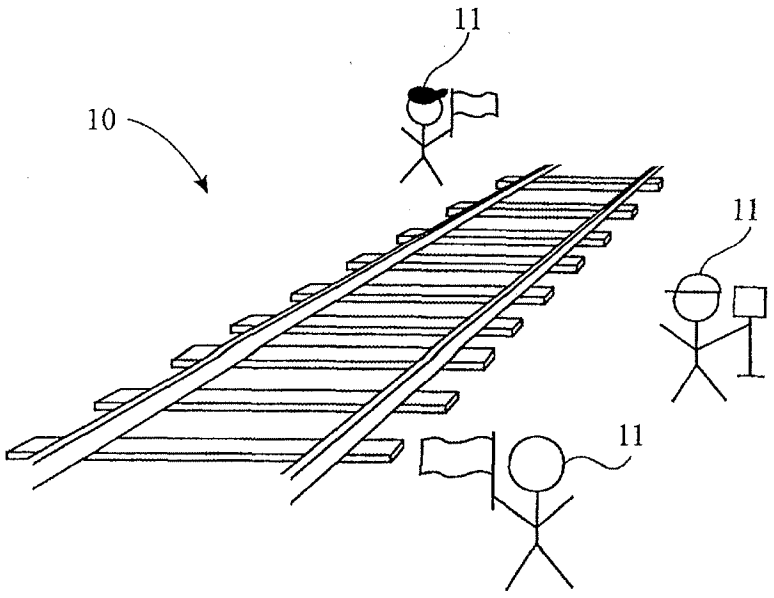
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(54) Title: SAFETY CHECK



(57) Abstract: A method and apparatus are disclosed for protecting users who must access a potentially dangerous location. By having users wishing to access that location first identify themselves and identify that they are trained to enter that location and to thereafter be allocated a access code number safety can be maintained. The invention is particularly advantageous when workers must access a work site to carry out work under a safe system of work.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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SAFETY CHECK

The present invention relates to a method and apparatus for improving the safety of workers. In particular, but not exclusively, the invention relates to a method for improving safety of personnel working at a work site which may be part of a rail network.

It is well known that workmen or other safety personnel often need to access a work site to carry out some service. This service might be the repair of equipment or replacement of equipment or other such activity. In order to carry out this service the personnel need to access the area where work is to be carried out. It is also known that many work environments can provide situations which are safety critical. That is to say when the service is carried out the personnel or users carrying out that service may be under threat. This may come from many different sources.

One particular area in which personnel often need to carry out services under safety critical conditions is in the transport industry for example in the rail industry where rail lines, points and other equipment necessary for the correct functioning of a rail network need to be maintained, checked or replaced. The presence of potentially fast moving vehicles close to the work sites offers potentially lethal circumstances under which users need to carry out services. It will be understood that other areas of potential danger include motorway repair and/or repair close to airports.

One method for reducing risk in such a dangerous environment is to provide a physical barrier such as wall

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or fence surrounding the dangerous locations and providing personnel with access points, such as doors, which they may open only once correctly authorised. However in situations where it is impractical to provide a physical barrier to dangerous locations other forms of checks to ensure the safety of employees/personnel have been suggested.

One of these is to restrict access to a work site for personnel unless those personnel have assessed potential risks and taken steps to reduce as much as possible those risks. This may for example include the introduction of look outs to observe potential risks as they occur and the provision of safe locations to which personnel can locate themselves when conditions become dangerous. Unfortunately a problem with such circumstances is that they are prone to user error so that look outs and safe locations may be incorrectly or inadequately provided. Also human nature tends to underestimate danger or potential risks may simply be ignored.

It is an aim of embodiments of the present invention to at least partly mitigate the above-referenced problems.

According to a first aspect of the present invention there is provide a method for increasing safety at a work site which a user is required to access to carry out a service, comprising the steps of:

said user determining at least one parameter associated with said work site;

said user calling a remote station and providing user data to an operator at said remote station;

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responsive to said user information, verifying that said user has correctly determined each said at least one parameter; and

subsequently providing said user with an access code for permitting said user to carry out said service.

According to a second aspect of the present invention there is provided a call center for processing calls from users requesting a permit to carry out a service at a work site, comprising:

an operator terminal, located remote from said work site, arranged to receive a call from a user and for relaying said call to an operator;

a database for holding records associated with a plurality of users;

processing means for processing user data provided by said user to said operator and input by said operator; wherein

a unique access code is provided to said user if user data provided said user satisfies at least one predetermined condition.

According to a third aspect of the present invention there is provided a method for improving safety at a work site comprising the steps of:

identifying a service to be carried out at a work site;

prior to said service being carried out, assessing at least one parameter associated with the service;

providing data associated with said assessment to a review officer;

if said assessment satisfies at least one predetermined condition issuing a unique identifier associated with said service; and

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notifying a controller of said forthcoming service prior to said service being carried out whereby said controller can vary at least one condition associated with said work site to reduce the risk of injury at said work site when said service is carried out.

Embodiments of the present invention provide the advantage that key safety personnel must correctly assess potential dangers prior to obtaining authorisation to access a work site. If potential dangers are not correctly identified no authorisation will be given so that personnel will not be permitted to access a location in which safety critical conditions occur.

Embodiments of the present invention provide the advantage that personnel who are responsible for assessing dangers on site have the emphasis placed upon them to do their job correctly and assess potential problems. Users quickly realise that if they are not able to assess problems correctly they will not be able to do their job this acts as a good learning incentive.

Embodiments of the present invention provide a highly efficient system whereby the nature of the system is such that both users at a work site and operators at remote stations can do their allocated tasks with a minimum amount of interaction from the other party.

Embodiments of the present invention provide the advantage that the possibility of a user being in a dangerous location without correctly obtaining authorisation is obviated. This is because users are prevented from accessing potentially dangerous site without first obtaining a valid permit.

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Embodiments of the present invention provide a method and apparatus for validating a safe system of work. During a planning stage prior to work being carried out at a target work site a duly authorised user, being a user being trained to make such decisions, is asked to indicate a level of working at the work site which satisfies the highest possible safe system of work available at that site. The user is provided with a hierarchical list beginning with the highest level of safety and if that level of safety is not possible reasons must be selected from an exhaustive list of acceptable reasons. In this way a safe system of work carried out at the target work site is validated and a fully auditable trail of work carried out is recorded.

Embodiments of the present invention provide the advantage that a great deal of planning which occurs prior to and at the time that work is carried out at a work site is automated. This helps prevent errors made by human users, helps speed up the planning and operating process, provides a fully recorded trail to enable users subsequent to work being carried out to identify potential problems and/or prevents vast quantities of paper being required to be stored.

Embodiments of the present invention will now be described hereinafter by way of example only with reference to the accompanying drawings in which:

Figure 1 illustrates a work site;

Figure 2 illustrates how a call may be made and how a job may be planned;

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Figure 3 illustrates an overall system for achieving a safe system of work;

Figures 4A to 4E illustrates an automated planning stage;

Figure 5A to 5H illustrates a call logging process for issuing a safety check number;

Figure 6 illustrates a call logging screen;

Figures 7A and 7B illustrate a card validating sequence;

Figures 8A and 8B illustrate a web page showing a portion of an electronic sectional appendix; and

Figure 9 illustrates the steps taken by a user accessing a target location; and

Figure 10 illustrates a remote call centre.

In the drawings like reference numerals refer to like parts.

Various acronyms are referred to hereinbelow. A brief description of some of these is given at this point to aid the reader in their understanding of the present invention.

ATWS refers to an automatic track warning system which is mobile equipment fitted on a railway network and which provides an audible warning to users when a train approaches.

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TOWS is a train operated warning system which is permanent equipment fitted at a specific location on the railway network and which provides an audible warning when a train approaches.

COSS refers to a controller of site safety. When a group consisting of more than one person accesses a portion of a railway network at least one of those people in the group must be qualified to provide a system of safe working. Such a person is referred to as being COSS qualified as will be understood by those skilled in the art. Typically a COSS qualified user will be the person responsible for assessing potential dangers and parameters such as line speeds distances and proximity to other dangers of a work site wherever it is located.

SMTH refers to a signal maintenance testing handbook. A user qualified as a signal maintenance tester (SMT) will refer to a testing handbook when carrying out a check of equipment. A check list in the handbook will be used. Such a person will be referred to as SMTH qualified.

IWA refers to an individual walking alone.

SO19 (also referred to as SL19 or Rimini) is an improved standard for use on rail networks which places the emphasis on contractors to pre-plan work which is to be carried out on a rail network. Such work is typically referred to as red zone work or green zone work. Red zone work is work which is considered to be dangerous such as work operating between moving trains. In red zone areas the risk of injury is greater than in green zones. A green zone refers to a location where there is a blockage such a traffic lights preventing potentially

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dangerous vehicles, such as trains, from entering that zone. The object of the SO19 standard is for contractors to plan to increase the percentage of green zone work in comparison to red zone work.

ATWS is an automatic train warning system which may be arranged at a part of a rail track where work is to be carried out to give an audible and/or visible warning which a train approaches. TOWS is a train operated warning system which likewise provides a warning to work men at a work site when a train approaches. LOWS is a lookout operated warning system which utilises lookouts to give a signal when a train approaches. A PEE WEE is another type of warning system which can be operated at a work site to give a warning when a particular danger is imminent.

Figure 1 illustrates a work site 10 where personnel 11 may be located to carry out some service such as the renewal, mending or replacement of broken equipment. In the example shown the personnel 11 are located near a portion of a rail network which comprises rails and sleepers as will be known by those skilled in the art. It will be understood that embodiments of the present invention may be utilised in any environment where personnel must access a site to carry out a service and that site may provide a potentially dangerous environment or where access is otherwise to be restricted. In the particular example described hereinbelow workmen at the work site may be allocated specific jobs. For example the workmen may be allocated the task of acting as lookouts in particular directions to try to spot fast moving vehicles whilst further workmen may be allocated

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the task of carrying out the actual service such as repairing a rail or sleeper.

There have been various standards which have been developed to which key personnel must adhere when carrying out operations in dangerous circumstances. Prior to allowing personnel onto the work site a member of the team which will be deployed to carry out the service undertakes to carry out an assessment of the work site and the inherent dangers. In order to do this the assessment personnel will be sent on various courses to teach them what the potential dangers are and how to assess parameters about a work site. In order to help the assessor assess the parameters of a work site a paper form may be provided which will help focus that persons mind as to each and every parameter which needs to be assessed. Once this form (referred to as a COSS 3181 form) has been filled in the assessor telephones a remote station to obtain a permit which will enable that assessor and any other members of his team to access the work site.

Figure 2 illustrates the remote access system. The assessor user uses a mobile terminal 20 to call a remote station 21. The remote station and mobile terminal are connected via a wireless communication link 22 base transceiver station 23 and a router illustrated as the internet 24. Likewise a planner intending to plan work ahead of it being carried out may do so using a user terminal 25. It will be understood that embodiments of the present invention are not restricted to use of such a system for connecting the remote station with a user. For example the caller may call the remote station directly via a fixed land line.

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Figure 3 illustrates an overview of how work (or some other service) may be carried out at a work site (or other target location). It will be understood that such work may be maintenance or fault repair work on a railway line but is not limited to such use. Rather the method and apparatus are applicable to any environment where pre-planned work or work immediately due because of a newly noticed fault must be carried out under a safe system of work. Other possible uses are therefore use on an underground rail network or on a road or motorway network or any other application where human users must access a potentially dangerous environment (such as soldiers accessing a firing range) amongst other things.

Figure 3 illustrates the system employed for providing a safe system of work when work to be carried out may be predicted greater than twenty four hours prior to the work being carried out. This may often be the case for cyclic renewal or cyclic maintenance types of work. When work must be carried out under a safe system of work with less than twenty four hours notice a slightly different procedure will be operated without a preplanning stage as will be described hereinbelow.

Figure 3 illustrates how work is planned and carried out at a rail network work site. As noted above embodiments of the present invention are not limited to such use. At step S301 a supervisor or other manager determines that work must be carried out at a target location. This will require access to rail track. Details of the work to be carried out are passed to a user notionally called a "planner" who, at step S302, works through the details of work and for each incidence of work which must be carried

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out the planner seeks to obtain authorisation for carrying out that work. This is achieved by the planner submitting a request together with details of the work to be carried out to a net based planning node 303. This planning process is described more fully with respect to figure 4. If the safe system of work planned by the planner requires an alteration or prevention of trains running on a portion of track the request must be submitted to a body authorised to carry out such alteration or prevention. This is illustrated as step S304. The authorised body which in the area of rail networks may be Network Rail in the UK will either approve or decline a request. This is illustrated as step S305 and this is notified to a post planning portion of the planning node 303. This process is carried out automatically with various users being able to observe the development of the planning process by virtue of a "bulletin board" which is a computer generated display visible to various authorised users either in a planning room 306 or via web pages 307 and 308. The planner, after submitting the request for work to be carried out, will be notified by a web based page bulletin board 307 whether his request has been accepted. If so a unique identifier number, which may be identified as a Rimini number associated with that job is allocated to the particular work job planned by the planner. The planner then moves on to plan for a further job. If the request is denied as notified to the planner via bulletin board 307 the planner must re-plan changing a parameter of the job such as day or time and resubmit a request. Jobs which are accepted are displayed on a further web based bulletin board 308 which is accessible to users who are to carry out the actual work. As a day approaches when a particular job is to be carried out a duly authorised

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person such as a COSS or IWA downloads details of the work to be carried out at step S309.

The controller of site safety will then proceed to the work site where further details of a safe system of work to be provided at that work site will be assessed. At step S310 details of the system of work assessed by the qualified user at the work site are verified and if those details satisfy predetermined conditions a unique check number, which may be referred to as a safety check number (SCN), are allocated to the qualified person. This authorises/permits the user and any workmen associated with that user to proceed to carry out work and access a work site. Alternatively the user themselves may not enter the work site.

Figure 4 illustrates in more detail how a planner at step S302 must assess various parameters associated with a job which is to be carried out at a target location. At step S401 the nature of the work itself is identified. This may be part of a cyclic maintenance programme or maybe some other work which has been identified. At step S402 basic planning considerations are accounted for such as resources required i.e. manpower and equipment and a type of protection required. The type of protection may be governed by a rule book associated with the particular industry in which the planning is taking place. For example section T of the rule book setting out how work can be carried out on the rail network in the UK allocates a T_i or Tii type of work which is work which requires the passage of trains on a particular line to be stopped.

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In this sense a "job" is defined as work which can be carried out under a single safe system of work (SSoW) which can be verified and for which a safety check number can be issued. These jobs are to be input as described below into a planning system which is designed to prevent inputters selecting a lower method of protection without justifying their decision. If required fields are not completed in the submission the system refuses to submit the request. At step S403 further parameters associated with the job to be carried out are input by the planner into a web based form accessed by the planner. The filling in of these details is carried out by the planner typing in appropriate information into a box identified on a web page or web pages.

Various protection methods are then listed in a specific order. This order starts which the highest protection method which is termed as "safe guarded" and ends which the lowest level of safety possible which is termed red zone with unassisted independent working alone. This process of working must be completed for all jobs and records of the process retained. No hard copies of the process are required but may of course be kept. At step S404 the planner is presented with the safest possible system for working which is a green zone type of working. The green zone working indicates that human workers are separated from trains. If this option of working is selected at step S405 then the remainder of the planning may be completed and a request for a Rimini number may be submitted to the planning node 303. If this option is not selected at S404 then a drop down menu on the web page accessed by the planner presents a pre-selected list of possible reasons why the option is not necessary or possible. The planner must select one option from this

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exhaustive list of acceptable reasons. The reasons for not selecting the most safe system of work are therefore logged and recorded. The selection of a reason for not using the safe guarded system of work is illustrated as step S406.

If a valid reason is selected the next most safe system of work is offered to the planner at step S407. If this option is selected at step S408 then the remainder of the work may be planned and a request submitted for a Rimini number. If the option for the next most safe system of work is not selected a reason must be selected from a displayed list of acceptable reasons. This is shown as step S409.

Option three illustrated in figure 4C is the least safe green zone option possible. If this option is selected at step S410 then the remainder of the job may be planned and a submission made for a planning number (Rimini number) if the option is not selected then again a valid reason must be selected from an exhaustive list of acceptable reasons. The list of acceptable reasons may change for each option but for each option there is a respective list of acceptable reasons. If this option is not selected then the remaining options for a system of work are all termed "red zone" working. Red zone working requires further questions to be asked and answered. These questions are displayed on the net based web page accessed by the planner when filling out a request. The planner must thus enter further details into pre-displayed boxes. At step S412 an assessment is made as to whether all of these further questions have been answered. If not the request for a Rimini number is aborted. If the planner is successfully able to input

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the further required parameters the next most safe system of work is offered. This is the most safe red zone system of working. If this option is selected at step S413 then a submission can be made for a Rimini number.

In this way options for a safe system of work are provided to a planner in a reducing order of safety. If a planner does not wish a more safe system of work to be selected a reason selected from a possible list of options must be chosen and recorded. Occasionally, as indicated by step S414 further questions must be demanded of the planner. These are asked by virtue of the planner having to fill in answers to predetermined questions displayed on a web page. The lowest possible safety for a system of work under which a job can be carried out is indicated by option eight at step S415. This option is selected when no more safe options are possible and then the request for the system of work is submitted.

By virtue of a net based planning system which automatically provides a planner with a pre-selected number of questions and options and which allows the planner to automatically submit the request for a planning number a very efficient system is provided. By defaulting to the most safe system of work and by demanding a planner provide a valid reason for not selecting that system a clear audit trail is provided.

Once a job has been planned the job is stored in a database and displayed on a bulletin board indicating all forthcoming jobs. As a time approaches for the job (an item of work or a service to be carried out) is to be carried out a suitable qualified user who is able to attend the work site will be supplied with the job and

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will then visit the work site either alone or with a group of people having the skills to carry out the particular work. As indicated at step S309 of figure 3 the qualified user is provided with details of the job submitted by a planner and visits the work site. As an alternative if work is to be carried out at a work site without preplanning, such as when a fault is apparent on a line or when work has to be carried out with less than twenty four hours notice before the work is identified, this is possible.

Figure 5 illustrates the steps taken immediately prior to carrying out the actual work at a target location and indicates the steps in a call made by an authorised at the work site to an operator at a remote location. General principles of this system are that all staff working on or about a rail line (a target location) require a safety check number which permits them to access a target location to carry out such work. A safety check number can only be obtained either once a preplanning number, allocated according to the method indicated above, or a fault number are obtained. A fault number is generated when a fault at a target location is reported and a unique identifier, a fault number, identifying that particular fault and other parameters associated with the fault are allocated. It will be understood that embodiments of the present invention are not restricted to use of both the safety check number and planning number. Rather embodiments of the present invention can be used merely to allocate preplanning numbers according to the method described above which may be then used for other purposes. Alternatively the allocation of a safety check number according to the

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method described below may also be applied without first obtaining a Rimini number.

At step S501 the duly authorised user who is a member of staff qualified to set up a safe system of work calls a remote location from the work site. An operator answers at step S502 with a request for the caller to confirm that they are located in a safe location. If not they are asked to move to such a location. At step S503 the operator requests whether a Rimini number or fault number are being used to obtain a safety check number. If neither a fault number nor Rimini number are available the call is terminated. An exception to this is when no fault number or Rimini number are available but work must be carried out due to adverse weather conditions. Other exceptional circumstances may be proposed. Under such a circumstance the fault number process S504 is followed. If a Rimini number is available indicating that the job is one carried out according to a pre-planned schedule that Rimini number which uniquely identifies a particular job and its associated characteristics is requested at step S505. Upon entering the Rimini number various parameters associated with the job indexed by the Rimini number will be entered into a net based screen illustrated by figure 6. These details are auto-populated from the information input by the planner during the preplanning stage. This is illustrated by step S506. When the caller is calling with a fault number rather than a Rimini number a new record is opened which displays the web based page illustrated in figure 6A. This web based page has no auto-populated information but rather all fields will be blank.

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At step S507 the operator asks for a Sentinel card number. The Sentinel card is a generally acknowledged identity card which has associated with it a number of parameters for each respective user. It will be understood that for uses other than at a rail track side other types of authorisations may be accepted or the steps associated with the Sentinel card omitted. Each user has a unique Sentinel card number which identifies characteristics such as name and contact details and qualifications for the user. A number of digits from the Sentinel card are entered by the operator at the remote location at step S508 which are input into box 60 in figure 6A. The digits or whole number of the Sentinel card index the various characteristics logged against this card and these are automatically displayed by auto-populating in an upper portion of the work screen 61 viewed by the operator at a location (such as a call centre) remote from the work site.

An assessment of whether the user associated with the Sentinel card number which is provided has valid skills is made at step S509 and if not a Sentinel card validity process is carried out at step S510. These steps are shown in more detail in figure 7. As shown in figure 7 if the Sentinel card number, identified by inputting all digits of the Sentinel card, provided by the caller is not located in a database to which the operator has access the caller is advised that the card is not valid and that the person in question can therefore not carry out the setting up of a safe system of work until the card has been checked. The caller is asked if a further person with the skills which are required is available at the work site. If the answer is affirmative that other person is identified and the system returns to step S509

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if another person is not available then an enquiry form is completed and passed to a further authorised user who can access an automated helpline for obtaining and checking validity of cards. If at this stage the Sentinel card can be validated the caller is informed of this fact and the procedure returns to step S509. If not the caller is informed that the card is not valid and that a safety check number can not be allocated. A call is bombed (or terminated) at this point. This informs the caller that they have made an invalid request which means they must reassess the requirements for the site or obtain a further user who is qualified to carry out the system of work required for the site. By terminating the call the emphasis is placed upon the people wishing to carry out work to satisfy requirements. At step S510 indicated in figure 5b emergency contact details for the caller are identified which are filled in at box 62 of figure 6a.

The operator then asks the caller for details of the nature of work at step S510 and these are input in box 63 of the call log screen 64. At step S512 the caller is requested for the location of the work site. The location of the work site is input at box 65 which is provided with a pull down menu. In this way a correct detail location of the work site may be identified. Each specific location indicated in the pull down box is associated with one page from a electronic version of a sectional index setting out details of every possible work site where work or a service may be carried out. The operator who views the web page illustrated in figure 6 is also provided with a separate user display which forms part of their user interface. The second user display is used to display an image of a section of a

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rail network where the work is to be carried out as identified at this stage.

Figure 8 illustrates a page displayed on the further display in front of the operator. As will be appreciated by those skilled in the art the display of the work site and details associated therewith is a highly convenient way for the operator to check whether details provided by the caller are correct and accurate. This acts as double check to assess accuracy and thus aids in improving safety. In this way figure 8 illustrates an image which may be displayed on a terminal in front of an operator subsequent to the input of location information from said user identifying the location of the work site where access is requested. The system for issuing safety check numbers is provided with a database containing details of a large number of locations where work may be carried out. By entering in details of the location and images presented setting out details of lines, speed restrictions, distances between various features and many other different characteristics of the location. The user calling the operator will not have access to this information but the operator will be able to look at the image and ask for details from the user based on the displayed information. Responsive to data supplied by the user the operator establishes whether an accurate assessment of dangers has been made and whether a secure system of work has been put in place. At step S513 the operator assesses whether the work content location and mileage supplied by the caller are correct. If some of the details are not correct a caller may ask a manager for advice at step S514. An assessment is then made whether to continue with the call at step S515 and the

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call is terminated at step S516 or returns to the call at step S517.

The next question asked of the caller is whether red or green zone working is to be set up. This is illustrated as step S518. Here if the caller is calling with a Rimini number the system of work is already pre-indicated. However the caller at any time may select a more safe system of work than that used during the planning procedure. However if the caller wishes to go down the planning hierarchy to a lower level of protection then authority must be provided from the callers supervisor or immediate superior. The name and contact details of the person giving permission must be recorded. This provides a clearly recorded record or how work is to carried out at a work site. If red zone working is indicated then the operator will have displayed whether red zone working is permitted at that moment in time or at the time when work is to be carried out at that location. If red zone work is prohibited an assessment of this fact is made at step S519. If red zone working is prohibited the call is terminated as the system is not able to issue a safety check number. If green zone working is selected or red zone working is selected which is not prohibited further details are input at step S520. If the caller cannot answer any of the questions asked at this point satisfactorily the call is terminated. This means that the caller must reassess safety procedures and details associated with the job and call again to be granted a safety check number.

Once the predetermined questions are input at step S510 the system proceeds depending on whether red or green zone working was selected. Figure 5D illustrates the

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process when red zone working is to be carried out and indicates how a user is asked for the time needed at a work site at step S522. If this time matches the time indicated by the caller, an assessment indicated by step S523, then line speed is requested from the caller at step S524. If the time calculated at step S522 does not match then a check is made with the caller at steps S525 and 526. If these do not tally then the call is terminated ensuring that details of the call up to that point are recorded. If the line speed is assessed at step S527 to match details illustrated in the sectional appendix displayed as shown in figure 8 the system displays a warning distance required at step S528. If the line speed indicated on the display does not match that given by the caller this fact is checked at steps S529 and 530. If a discrepancy cannot be resolved the call is terminated at step S531. Again details of the call up to that point may be recorded. At step S532 the operator requests that the caller indicates their assessment of the parameter calculated. This parameter may be a warning distance which is required. An assessment is then made whether the two pieces of information match. If not the call is terminated at step S534. If details do match then further questions are asked at steps S535 and S536. These questions require the input of parameters which if not correctly assessed may result in further questions being requested such as those illustrated at step S537. Such a question may result in an alteration to a pre-given parameter such as an additional amount of time being added to a pre-calculated time as illustrated in step S538. An assessment must then be made at step S539 whether the new amended parameter satisfies details given by the caller. If not then no SCN is provided and the call is

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terminated. Details of which are recorded. If the newly calculated parameter matches that given by the caller at step S539 or whether the original parameters match as indicated by step S541 then further questions are asked of the caller at steps S542 and S543 after which the procedure proceeds to the assignment of an SCN as indicated in figure 5H.

Figure 5G illustrates the process when green zone working is selected in figure 5C. The green zone working selection causes a user screen as illustrated in figure 6C to be displayed to the operator at the remote location. The type of protection being set up by the caller is requested by the operator at step S544 and this is selected from the drop down screen 66 according to the type of protection required. Further questions indicated by steps S545 to S547 are requested and these are input into appropriate boxes of the green zone working screen.

When details for red zone or green zone working jobs have been correctly input a further screen is displayed to the operator as illustrated in figure 6D. This is termed the assignment screen. When the assignment screen 67 is displayed at step S548 the operator will request further information from the caller such as whether any further work men, who may be lookouts, hand signal men, site wardens or other skilled workers who are required to carry out parts of a service at a work site, are on site. Details of these are provided by the caller and entered into appropriate user data input boxes 68 and 69 in step S549. For each named person entered in box 69 and other boxes a Sentinel card ID number associated with that particular user is also entered. These details are entered in box 68. At step S550 an assessment is made by

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the operator whether the person associated with the Sentinel card number given by a caller is qualified to carry out the role which the caller indicates that person will be carrying out. If the person is not so qualified the Sentinel card validity process described with respect to figure 7 is carried out at step S551. If the person is qualified to carry out the particular job then the operator requests the next person who is on site and enters their details and checks their skills. This proceeds until all persons due to work at a work site have been duly identified and their qualified skills checked to make sure they are qualified to carry out a particular task which has been allocated to them. Details of these users are recorded at steps S551 and 552. The caller provides an operator with a time when work is due to commence at a work site and provides an estimate of when the work group will withdraw from the work site. These are entered in appropriate boxes on the displayed screen 67. It is at this point, when the caller has provided accurate information which has been checked by an operator and duly recorded, that an SCN is automatically generated and displayed on the screen to an operator. This number may then be verbally given to the caller at step S553 which then acts to authorise the user and/or the group of people identified by the caller to proceed to access the work site and begin work.

After the safety check number is provided to the COSS caller. The call between the caller and operator is terminated. The job is automatically displayed on a bulletin board in a remote location where authorised personnel may observe the development of that job and other jobs logged by other callers which may be taking place at many different work sites. Since the caller has

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provided an estimated withdrawal time of himself and/or his group of workers as time progresses an assessment can be made whether the group is working effectively or whether time will run out. As soon as a job is completed and workers are removed from a target location a qualified caller again calls the operator (step S554) and informs them that the team has withdrawn providing the operator with the SCN number which has previously been allocated to the job. This is illustrated as step S555. At this stage the bulletin board is updated to indicate that that job has successfully been carried out. However if the estimated time for withdrawal is exceeded (shown as step S556) before a caller calls to indicate that the job has been finished then this fact will be displayed on the bulletin board. The use of colours on the bulletin bard to indicate jobs within time, jobs slightly running late and jobs running well over schedule may be used. At this stage the previous COSS caller is contacted (at step S557) using the emergency contact details received during the prior telephone conversation and is asked if there is any reason why the job is overrunning. The COSS may request a an extension of time. This further call is terminated after a job is finished or an extension of time requested.

Figure 9 illustrates the steps taken when carrying out a service at a work site. Initially the user who is a person in charge of safety and who is COSS qualified completes a form assessing certain parameters at the work site. These parameters might be the location, date of any pre-site visit, where the red zone working is prohibited, whether the job will entail red or green zone working. The COSS qualified user must accurately and correctly assess all information prior to calling the

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remote station where a permit to work will be provided. This is illustrated as step S901 from near to the work site the COSS user uses mobile equipment 20 to call the remote station 21. This is illustrated as step S902. At this stage an operator at the remote station 21 acting as safety verification staff checks information supplied by the COSS user. Details of the conversation and information provided between the COSS user and operator are described above. The call between the COSS user and operator entails the COSS user providing the operator with predetermined information when prompted by the operator. This is illustrated as step S903. Only if the COSS user provides correct information will the operator provide a safety check number. This is step S904. The safety check number acts as a permit authorising the COSS user and his work group to enter onto the work site and carry out the service they need to do under the safety provisions that the COSS qualified user has indicated during the dialogue with the operator. A safety check number is not issued when incorrect data is supplied, in which case the call between the user and operator is terminated immediately, or because such work is not possible. When the COSS user calls the operator they do so in the full knowledge that no assistance will be given regarding possible answers. The COSS user must have calculated and/or established answers to all predicted questions. If a call is terminated that caller, the COSS user, knows that they must reassess the data and call again in order to obtain permission to carry out the work. In this way emphasis is placed on the COSS user to know all the details of the safety provisions and does not rely in any way upon skills and/or knowledge of the operator.

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Once a safety check number has been issued, that safety check number (SCN) may be filled in on the paper form pre-filled in by the COSS user. This is illustrated as step S905. The COSS user may then take his work group onto the work site and set up the safe system for work. Throughout the work an assessment is made by the COSS user to determine if conditions have changed. This is illustrated by step S906. If conditions do change a determination is made at step S907 to see if a new safe system of work can be put in place. If it can the COSS user completes another form and attempts to obtain a further safety check number following the pre-described steps. If no new safe system of work can be put in place or work conditions do not change and the work is completed, work is terminated and the COSS user calls the remote station 21, at step S908 verifying that that particular job has been finished. At the end of a predetermined period such as every day or every week the completed forms are handed in to a supervisor as shown by step S909.

Figure 10 illustrates a remote location such as a call centre 21 in more detail. The call centre includes a processor unit 1000 which may include one or more servers 1001 and associated databases which act as a data store. A bulletin board 1003 may be linked to the processor 1000 and may display a list of all jobs currently taking place. As noted above these jobs may be highlighted in background colours to indicate when jobs are within a prescheduled time or when they are running late. An operator terminal 1004 includes a user interface including first and second user displays 1005 and 1006 and a keyboard 1007. The multiple screens enable an operator to be provided with a view of a work site and a

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web based call logging screen simultaneously. The operator may input data using keyboard 1007 and may be provided with a headset to enable them to talk with a caller whilst typing.

A user will also be requested to provide an estimated time when work at the work site is estimated to be completed. As various jobs are called in from various users and safety check numbers providing those users with permission to access a work site to carry out a service are issued, details of these jobs will be entered in a database at the remote station. A display of ongoing jobs may be displayed on a further user terminal in a call center. The jobs may be listed by either the times when the jobs are called in or in an order associated with the estimated finishing time of the jobs. As the real time progress past or approaches, an estimated finishing time this can be flagged up on the display in some appropriate manner. For example by adding flag icons to the image or by placing the text on a background of different colours. For example green indicating that the timing is ok, amber indicating that the estimated finishing time is close to the real time and red indicating that the estimated finishing time is either very close to the current time or that the job has overrun. In this way a supervisor or further operator may monitor all ongoing work being carried out at relevant work sites and identify possible problems. For example when a job is clearly taking longer than expected, as would be indicated by the current time exceeding the estimated completion time, a call can be made from the remote call center to the mobile terminal of the user associated with that job to check whether there is any problem.

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Details such as this may be monitored using web pages linked to the processors of the call center. Details of the web pages which may be displayed to an operator follow on the next few pages.

The above-described system not only provides a system which can reduce risk of accident at a work site but also can be used in conjunction with a method of planning work on a rail network or other environment where work sites need to be set up in dangerous conditions. Projects have been suggested which will reduce the amount of red zone working with respect to the amount of green zone working. One such project is the Rimini project. The aim of such projects is to place the emphasis on contractors seeking to carry out services at work sites to pre-plan when those works are going to be carried out. In this way steps can be taken to reduce the number of times when users need to access work sites under dangerous conditions. For example by pre-planning arrangements can be made to place blockages such as traffic lights on track or roadways to prevent fast moving vehicles from being in that area. Embodiments of the present invention can be used to enable such pre-planning of work to be carried out.

Embodiments of the present invention provide a method and system therefor by which services to be carried out at work sites can be pre-planned. Each particular job is allocated a unique identifier which may be a number and by pre-planning arrangements may be made with further operators who control parameters of the work site. For example in relation to rail networks certain operators will be responsible for the running of trains whilst

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other operators will be responsible for controlling signalling whilst other operators will be responsible for maintaining track. The pre-planning procedures provided by embodiments of the present invention enable an operator who is to maintain a portion of track to pre-plan a job. This may then be submitted to the operators running train and/or the operators controlling signalling in advance of a job being carried out. In this way the flow of trains past a work site may either be terminated or controlled so that a job which may have otherwise been a red zone task is carried out under green zone conditions. Personnel are provided who carry out the tasks of pre-planning work. The planners submit a pre-planned task and these plans are reviewed/validated by a further administrator on screen. If details provided by the planner are acceptable the job is allocated a job number and may be forwarded to the further operators who may be affected by the nature of the task. This may be via a call, fax, e-mail or other means. In this way those operators will be forewarned of a task being carried out in the future and may take steps to modify parameters at that work site. For example by controlling traffic lights in the region, controlling the speed of trains or preventing trains from running.

A bulletin board enables pre-planned jobs to be monitored. This may be in the form of a large display unit which enables personnel to easily observe which jobs have been pre-planned, where, when and other characteristics associated with the job.

As will be understood by those skilled in the art embodiments of the present invention provide advantage over prior art systems in that granting of permission for

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users seeking to access a work site to carry out a service is automated. This not only means that information detailing each permission or authorisation granted will be stored, which may be later analysed for detecting trends, but also means that the system is less prone to error.

By placing the emphasis on users for correctly analysing potential risks and other parameters associated with a work site safety can be improved and thereby risk reduced. This is at least partly because a risk assessment officer who will typically be COSS approved can be located close to the work site where an assessment of potential risks is best carried out. An operator at a remote station may however be provided with all sorts of other information that the user at the work site could not practically be provided with. In addition the method and apparatus of the present invention places the emphasis for providing correct information on the work site dangers assessor. This inherently improves the expertise of such a user since they quickly become aware of the fact that without correctly being able to do the job they will not be able to carry out any parts of it.

It will be understood to the skilled reader that the above-described embodiment describes only an example of how the present invention may be carried out. It will be understood that a similar process and apparatus could be used to control access of any user to a location where restricted access is desirable. For example where that location contains valuable goods or contains other inherent dangers such as at an airport or on a roadway. In this sense embodiments of the present invention provide a method and apparatus which helps maintain

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safety and/or security at a target location. Alternatively embodiments of the present invention improve safety/security over prior art techniques.

It will also be understood that the above embodiments are given by way of example only and that modifications could be made without departing from the scope of the present invention.

Further details of embodiments of the invention follow. Firstly details of how users may be taught to carry out risk assessment and obtain an SCN. Next details which can be accessed by an operator at the remote station. Finally details of embodiments used for pre-planning work are shown.

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CLAIMS:

1. A method for increasing safety at a work site which a user is required to access to carry out a service, comprising the steps of:

said user determining at least one parameter associated with said work site;

said user calling a remote station and providing user data to an operator at said remote station;

responsive to said user information, verifying that said user has correctly determined each said at least one parameter; and

subsequently providing said user with an access code for permitting said user to carry out said service.

2. The method as claimed in claim 1 wherein access to said work site is otherwise not prevented by any physical barrier.

3. The method as claimed in claim 1 or claim 2 wherein said user data identifies said users determination of each said at least one parameter, said method further comprising the steps of:

comparing said user data with corresponding data generated at said remote station; and

terminating the call between said user and said remote station if any of said user data is incorrect.

4. The method as claimed in claim 3 wherein said user data is determined to be incorrect if it does not match said corresponding data.

5. The method as claimed in claim 3 wherein said call is terminated by an operator at said remote station when

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the operator identifies that at least one parameter determined by said user is incorrect.

6. The method as claimed in claim 5 further comprising:

preventing an operator, at said remote station, from providing assistance to said user, when said user provides said user data, thereby placing the emphasis on said user to ensure the user data provided to the operator is correct.

7. The method as claimed in any one of claims 1 to 6 further comprising:

said user initiating a call to said remote station;

said user providing an employee ID code identifying said user;

an operator at said remote station inputting said ID code at a terminal;

responsive to said ID code determining at least one characteristic of said user;

the user providing further user data identifying said at least one characteristic of said user; and

verifying that said further user data correctly identifies said at least one characteristic of said user.

8. The method as claimed in any one of claims 1 to 6 further comprising:

said user providing said operator with user data identifying a location of said work site;

providing said operator with a schematic image of said work site;

said operator requesting said user for still further user data defining at least one characteristic, identified by the operator, and illustrated on said schematic image;

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receiving still further user data from said user responsive to said requests; and

verifying that said still further data supplied by said user correctly defines said at least one characteristic of said work site.

9. The method as claimed in any one of claims 1 to 8 wherein said method comprises a method for increasing safety in a rail network and said work site comprises a portion of said rail network.

10. A method for increasing safety at a work site comprising the steps of:

where a user needs to access a work site to carry out a service, and access to said work site is not prevented by virtue of a physical barrier;

providing instructions to said user for preventing the user from accessing said work site without obtaining prior permission from a remote station.

11. The method as claimed in claim 10 further comprising the steps of:

if said user is identified at said work site without valid permission, penalising said user.

12. The method as claimed in claim 11 further comprising penalising said user by providing a warning to said user.

13. The method as claimed in any one of claims 10 to 12 further comprising the steps of:

providing permission to said user only after a step of verification during which said users determination of at least one parameter associated with said work site is checked.

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14. The method as claimed in claim 13 further comprising the steps of:

providing said user with a unique access code associated with the particular service to be carried out by said user.

15. The method as claimed in claim 14 further comprising permitting said user to access said work site subsequent to issuance of said access code.

16. A call center for processing calls from users requesting a permit to carry out a service at a work site, comprising:

an operator terminal, located remote from said work site, arranged to receive a call from a user and for relaying said call to an operator;

a database for holding records associated with a plurality of users;

processing means for processing user data provided by said user to said operator and input by said operator; wherein

a unique access code is provided to said user if user data provided said user satisfies at least one predetermined condition.

17. The apparatus as claimed in claim 16 wherein said unique access code provides a permit for said user to access said work site.

18. Apparatus as claimed in claim 16 and 17 wherein said processing means is arranged to receive location data identifying the location of said work site and responsive

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to receipt of said location data to provide said operator with further information relating to said work site.

19. Apparatus as claimed in any one of claims 16, 17 or 18 further comprising a user display on which said further information is displayable.

20. A method for improving safety at a work site comprising the steps of:

identifying a service to be carried out at a work site;

prior to said service being carried out, assessing at least one parameter associated with the service;

providing data associated with said assessment to a review officer;

if said assessment satisfies at least one predetermined condition issuing a unique identifier associated with said service; and

notifying a controller of said forthcoming service prior to said service being carried out, whereby said controller can vary at least one condition associated with said work site to reduce the risk of injury at said work site when said service is carried out.

21. A method for performing a task at a target location which a user must access to perform said task, comprising the steps of:

a user determining at least one parameter associated with said target location;

via a user terminal, said user calling a remote station and providing user data to an operator at said remote station;

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responsive to said user information, verifying that said a user has correctly determined each said at least one parameter; and

if each said at least one parameter is correctly determined, providing said a user with an access code authorising access to said target location.

22. The method as claimed in claim 21 further comprising the steps of:

prior to said step of said user determining at least one parameter and remote from said work site, offering a user a plurality of options for a method for protecting a user carrying out said task at said target location;

selecting one of said plurality of options, said selected option indicating a method of protection which is to be applied when said task is carried out; and

providing a unique job number identifying at least one characteristic associated with the task to be carried out and said selected method of protection.

23. The method as claimed in any one of claims 21 or 22 further comprising the steps of only allowing said user to access said target location when provided with said access code.

24. The method as claimed in any one of claims 21 to 23 further comprising the steps of offering said options of a method of protection successively in a decreasing order of protection starting with the most protected method of protection.

25. The method as claimed in claim 24 wherein if a user wishes to select a level of protection less than a currently offered level of protection, forcing said user

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to select one reason for that selection from a list of possible reasons.

26. The method as claimed in claim 25 wherein said list is an exhaustive list of acceptable reasons.

27. The method as claimed in any one of claims 23 to 26 further comprising the steps of:

offering said options via a net based web page including pre-selected questions displayed and associated data input boxes arranged to receive user data.

28. A method substantially as hereinbefore described with reference to the accompanying drawings.

29. Apparatus constructed and arrange substantially as hereinbefore described with reference to the accompanying drawings.

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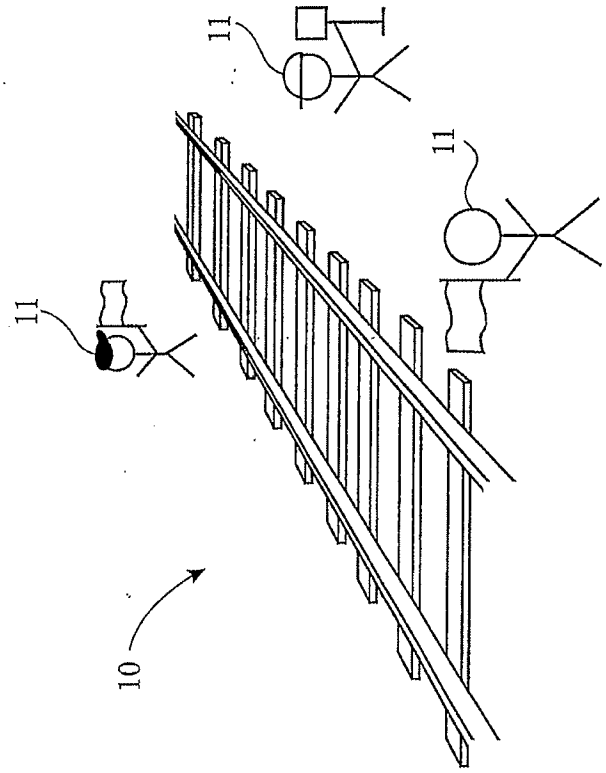


Fig. 1

WABTEC EX1002

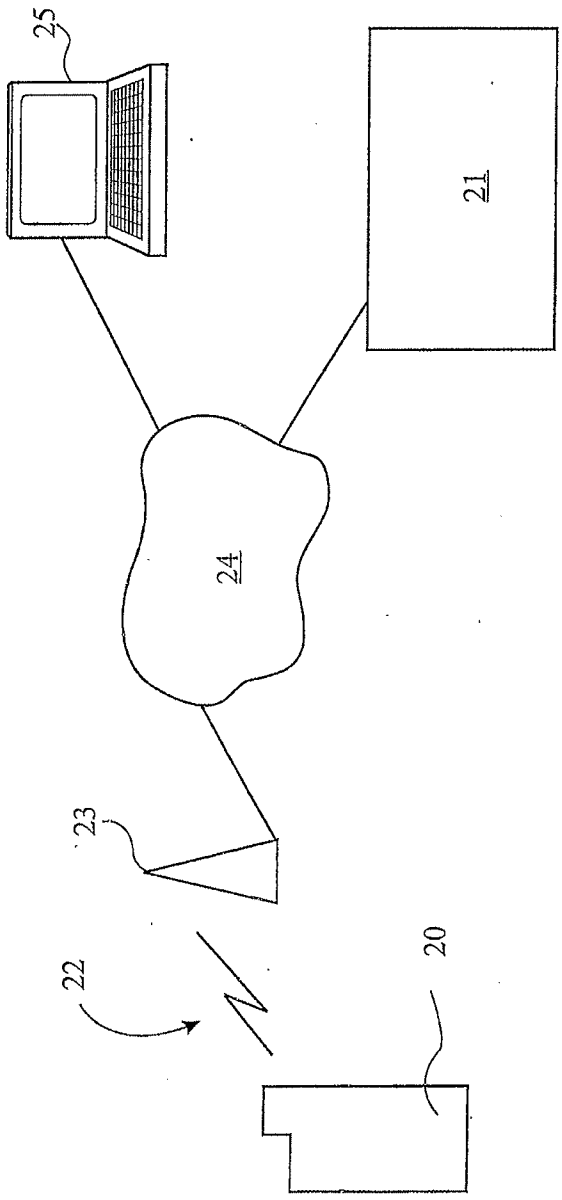


Fig. 2

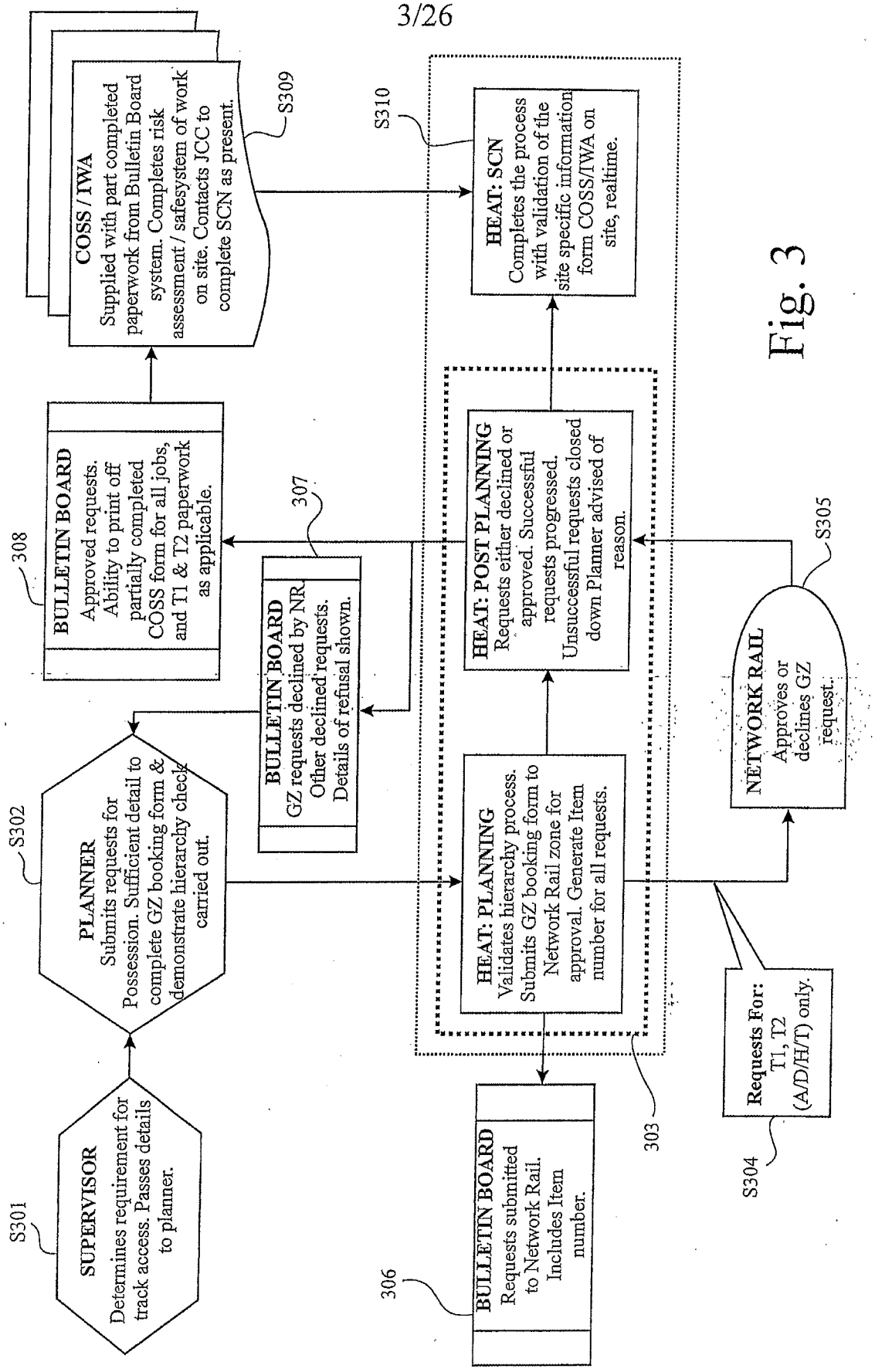


Fig. 3

WABTEC EX1002

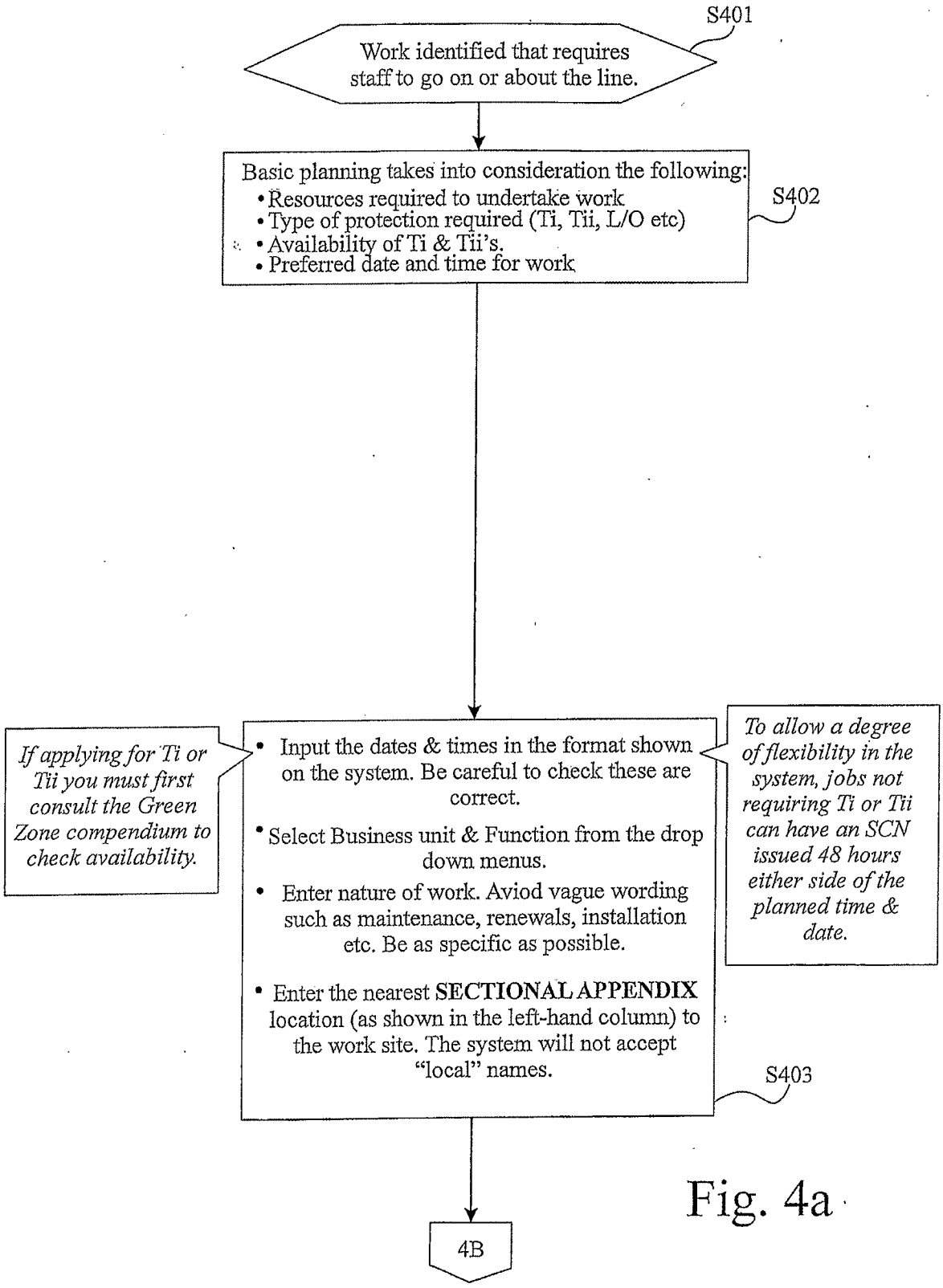

S401
Work identified that requires staff to go on or about the line.
Basic planning takes into consideration the following:
• Resources required to undertake work
• Type of protection required (Ti, Tii, L/O etc)
• Availability of Ti & Tii's.
• Preferred date and time for work
S402
If applying for Ti or Tii you must first consult the Green Zone compendium to check availability.
• Input the dates & times in the format shown on the system. Be careful to check these are correct.
• Select Business unit & Function from the drop down menus.
• Enter nature of work. Aviod vague wording such as maintenance, renewals, installation etc. Be as specific as possible.
• Enter the nearest SECTIONAL APPENDIX location (as shown in the left-hand column) to the work site. The system will not accept "local" names.
To allow a degree of flexibility in the system, jobs not requiring Ti or Tii can have an SCN issued 48 hours either side of the planned time & date.
S403
4B

Fig. 4a

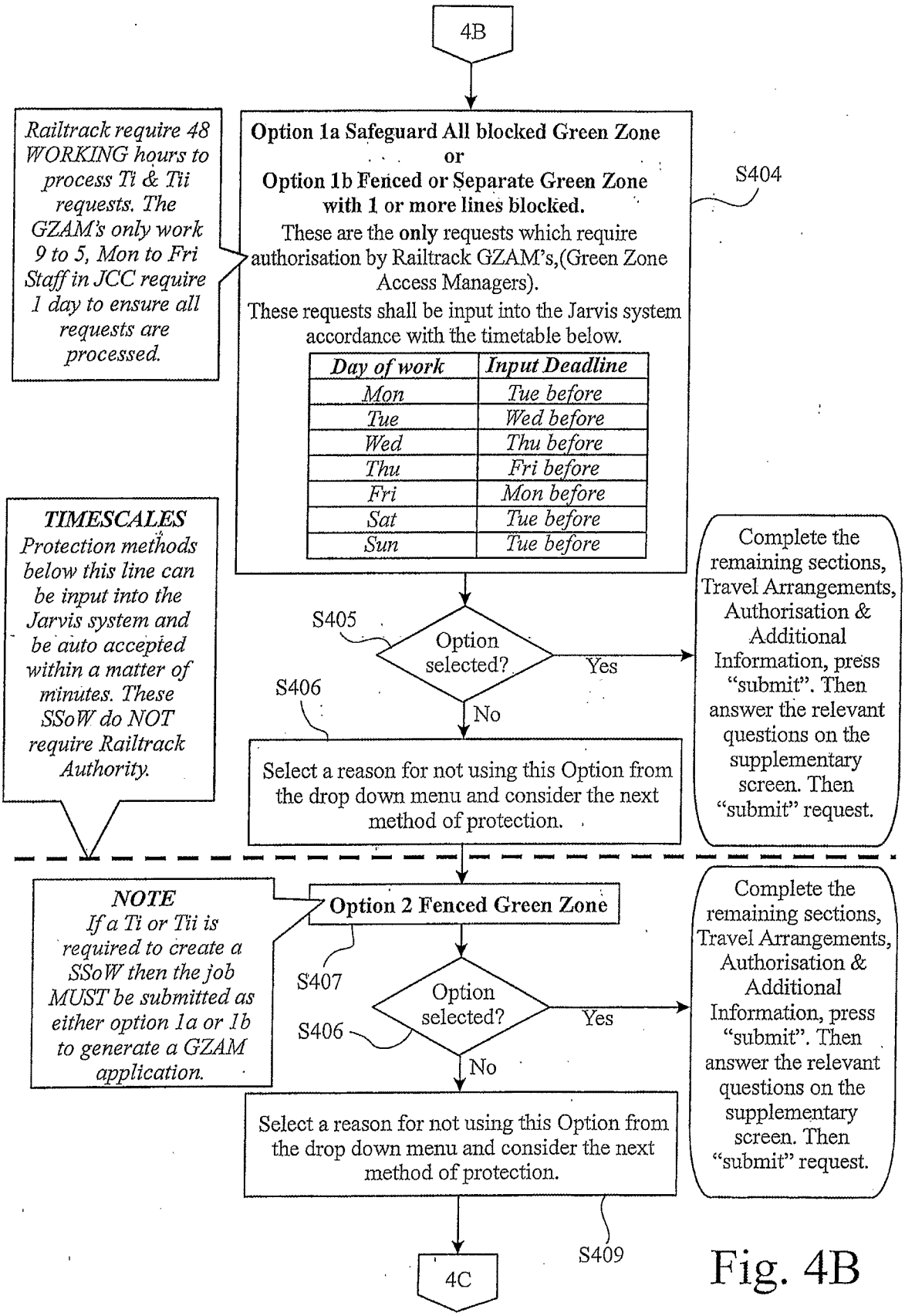

4B
Railtrack require 48 WORKING hours to process Ti & Tii requests. The GZAM's only work 9 to 5, Mon to Fri Staff in JCC require 1 day to ensure all requests are processed.
Option 1a Safeguard All blocked Green Zone
or
Option 1b Fenced or Separate Green Zone with 1 or more lines blocked.
These are the only requests which require authorisation by Railtrack GZAM's,(Green Zone Access Managers).
These requests shall be input into the Jarvis system accordance with the timetable below.
S404
Day of work | Input Deadline
Mon | Tue before
Tue | Wed before
Wed | Thu before
Thu | Fri before
Fri | Mon before
Sat | Tue before
Sun | Tue before
S405
Option selected?
Yes
No
S406
Select a reason for not using this Option from the drop down menu and consider the next method of protection.
Complete the remaining sections, Travel Arrangements, Authorisation & Additional Information, press "submit". Then answer the relevant questions on the supplementary screen. Then "submit" request.
TIMESCALES
Protection methods below this line can be input into the Jarvis system and be auto accepted within a matter of minutes. These SSoW do NOT require Railtrack Authority.
NOTE
If a Ti or Tii is required to create a SSoW then the job MUST be submitted as either option 1a or 1b to generate a GZAM application.
Option 2 Fenced Green Zone
S407
S406
Option selected?
Yes
No
Select a reason for not using this Option from the drop down menu and consider the next method of protection.
Complete the remaining sections, Travel Arrangements, Authorisation & Additional Information, press "submit". Then answer the relevant questions on the supplementary screen. Then "submit" request.
S409
4C

Fig. 4B

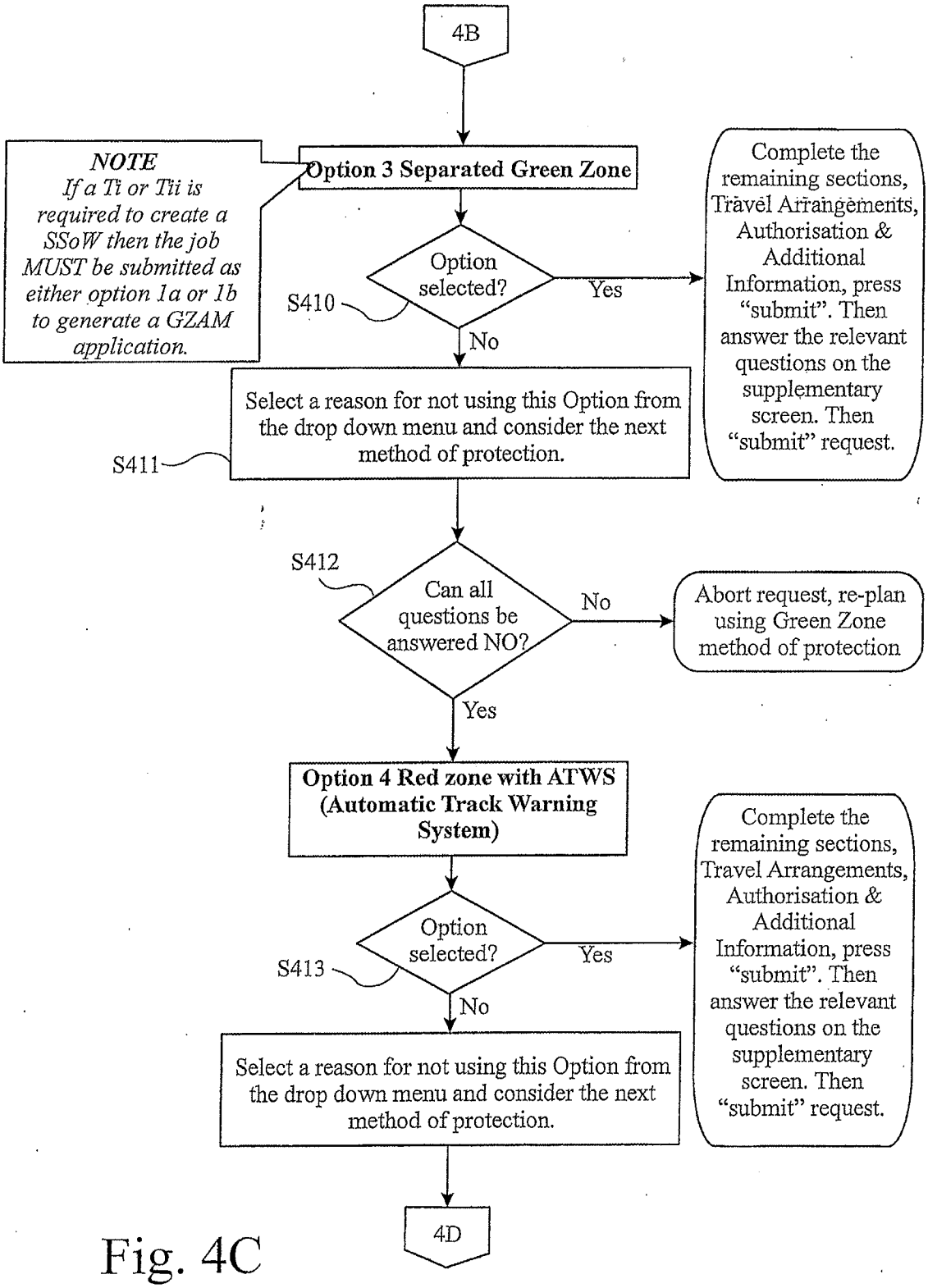

4B
NOTE
If a Ti or Tii is required to create a SSoW then the job MUST be submitted as either option 1a or 1b to generate a GZAM application.
Option 3 Separated Green Zone
Option selected?
S410
Yes
No
Complete the remaining sections, Travel Arrangements, Authorisation & Additional Information, press "submit". Then answer the relevant questions on the supplementary screen. Then "submit" request.
Select a reason for not using this Option from the drop down menu and consider the next method of protection.
S411
S412
Can all questions be answered NO?
No
Abort request, re-plan using Green Zone method of protection
Yes
Option 4 Red zone with ATWS (Automatic Track Warning System)
Option selected?
S413
Yes
No
Complete the remaining sections, Travel Arrangements, Authorisation & Additional Information, press "submit". Then answer the relevant questions on the supplementary screen. Then "submit" request.
Select a reason for not using this Option from the drop down menu and consider the next method of protection.
4D

Fig. 4C

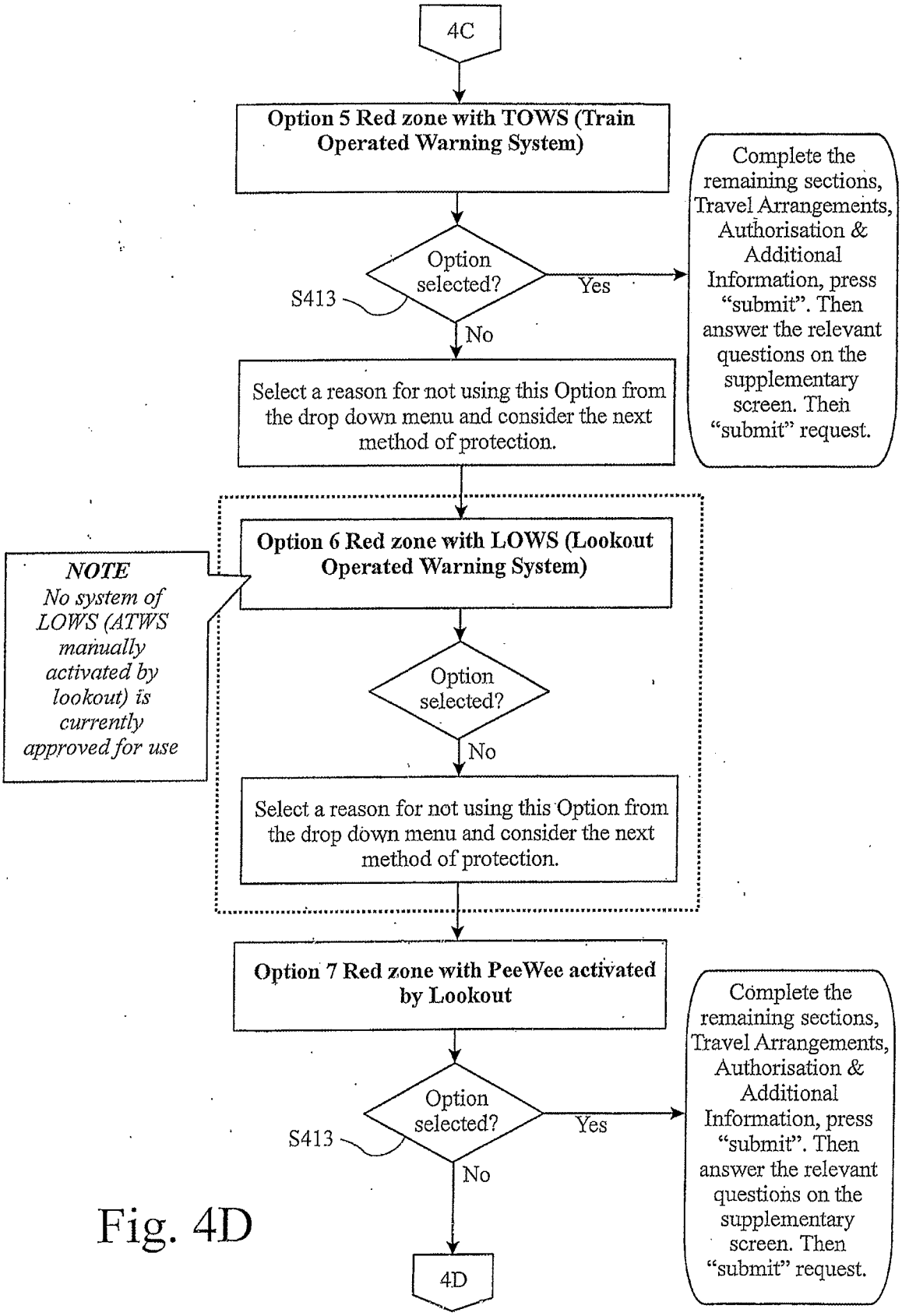

4C
Option 5 Red zone with TOWS (Train Operated Warning System)
Option selected?
S413
Yes
No
Complete the remaining sections, Travel Arrangements, Authorisation & Additional Information, press "submit". Then answer the relevant questions on the supplementary screen. Then "submit" request.
Select a reason for not using this Option from the drop down menu and consider the next method of protection.
Option 6 Red zone with LOWS (Lookout Operated Warning System)
NOTE
No system of LOWS (ATWS manually activated by lookout) is currently approved for use
Option selected?
No
Select a reason for not using this Option from the drop down menu and consider the next method of protection.
Option 7 Red zone with PeeWee activated by Lookout
Option selected?
S413
Yes
No
Complete the remaining sections, Travel Arrangements, Authorisation & Additional Information, press "submit". Then answer the relevant questions on the supplementary screen. Then "submit" request.
4D

Fig. 4D

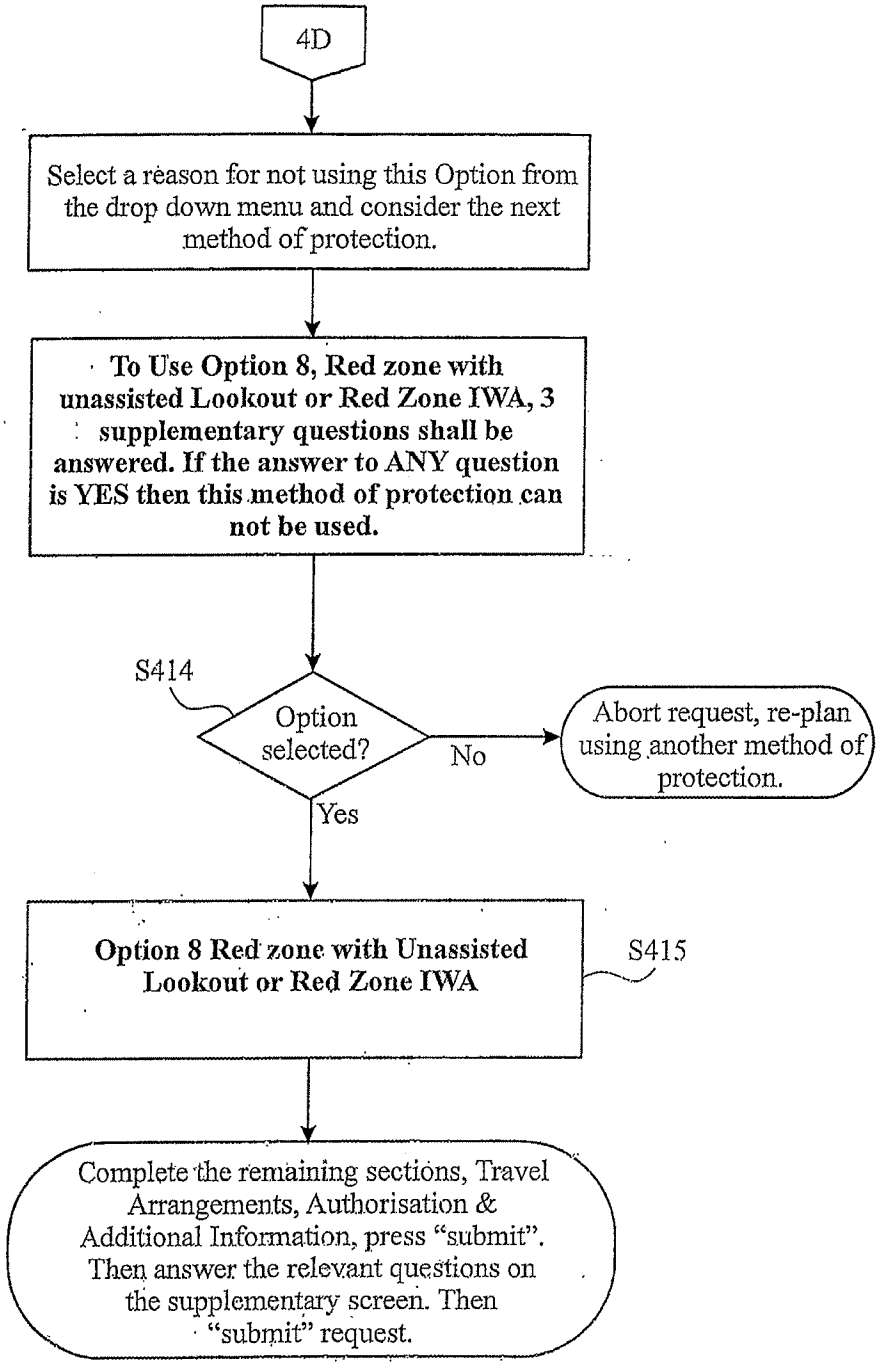

4D
Select a reason for not using this Option from the drop down menu and consider the next method of protection.
To Use Option 8, Red zone with unassisted Lookout or Red Zone IWA, 3 supplementary questions shall be answered. If the answer to ANY question is YES then this method of protection can not be used.
S414
Option selected?
No
Abort request, re-plan using another method of protection.
Yes
Option 8 Red zone with Unassisted Lookout or Red Zone IWA
S415
Complete the remaining sections, Travel Arrangements, Authorisation & Additional Information, press "submit". Then answer the relevant questions on the supplementary screen. Then "submit" request.

Fig. 4E

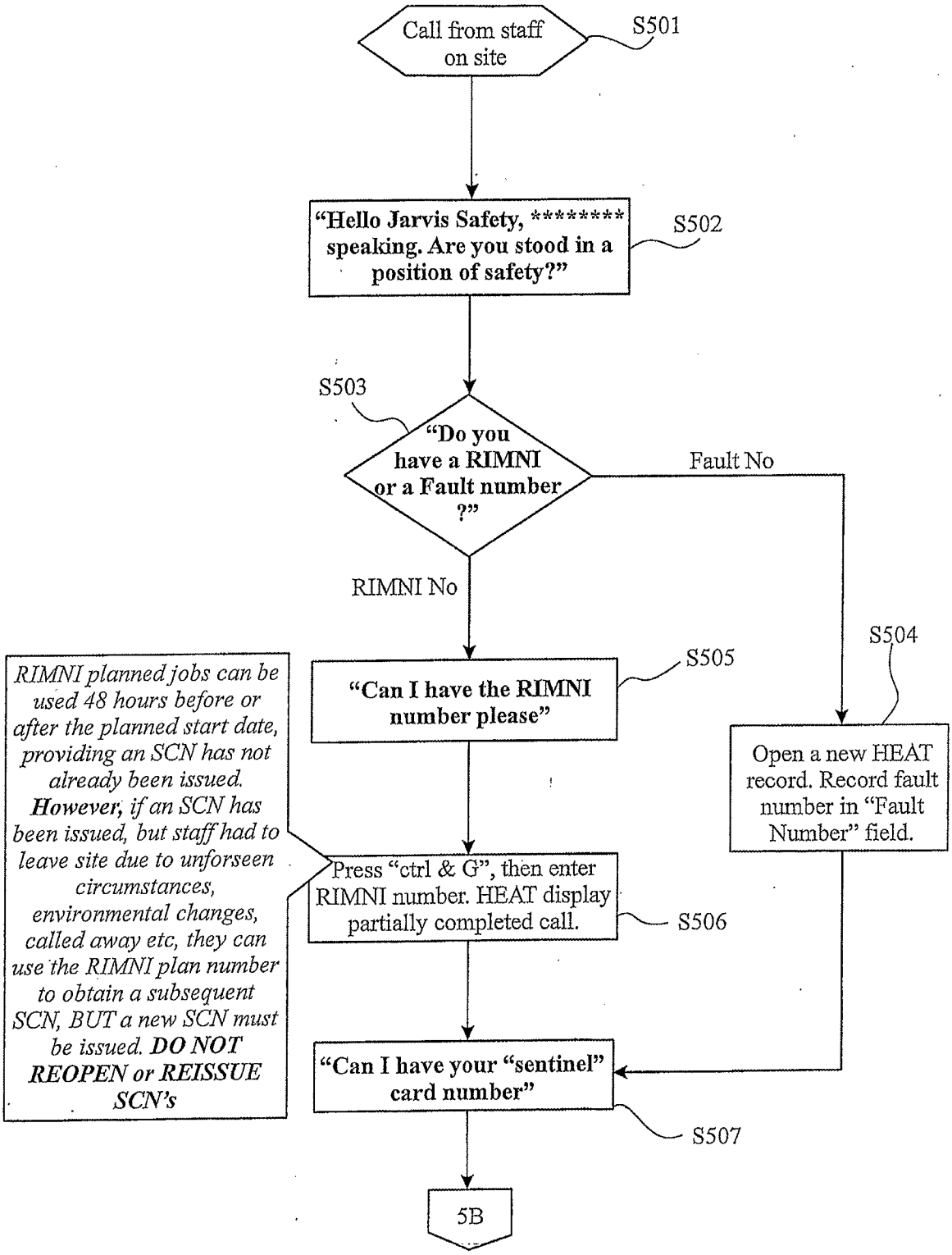

Call from staff on site
S501
"Hello Jarvis Safety, ******** speaking. Are you stood in a position of safety?"
S502
S503
"Do you have a RIMNI or a Fault number ?"
Fault No
RIMNI No
S504
S505
"Can I have the RIMNI number please"
Open a new HEAT record. Record fault number in "Fault Number" field.
RIMNI planned jobs can be used 48 hours before or after the planned start date, providing an SCN has not already been issued. However, if an SCN has been issued, but staff had to leave site due to unforseen circumstances, environmental changes, called away etc, they can use the RIMNI plan number to obtain a subsequent SCN, BUT a new SCN must be issued. DO NOT REOPEN or REISSUE SCN's
Press "ctrl & G", then enter RIMNI number. HEAT display partially completed call.
S506
"Can I have your "sentinel" card number"
S507
5B

Fig. 5A

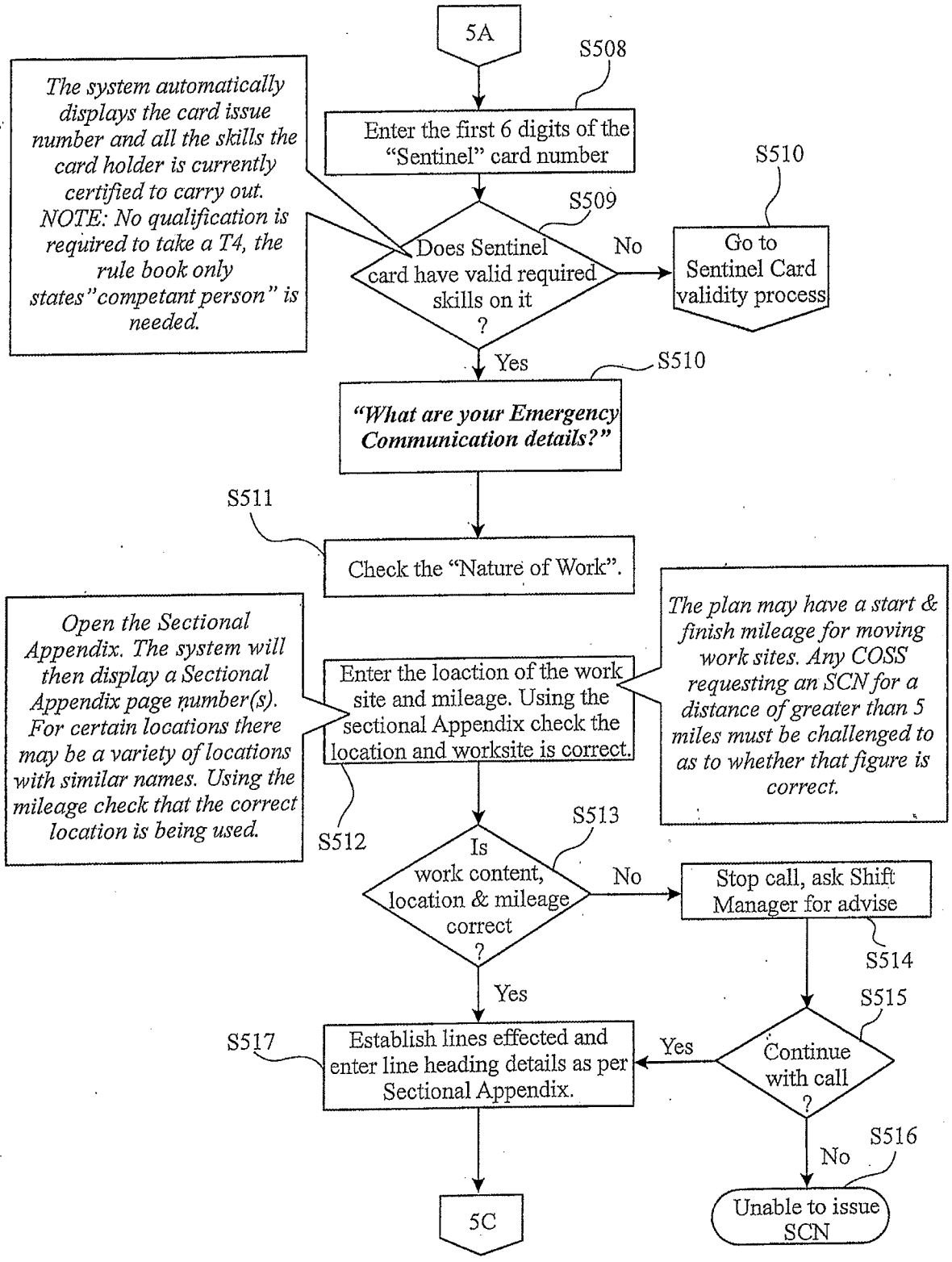

5A
S508
Enter the first 6 digits of the "Sentinel" card number
S509
Does Sentinel card have valid required skills on it ?
No
S510
Go to Sentinel Card validity process
The system automatically displays the card issue number and all the skills the card holder is currently certified to carry out. NOTE: No qualification is required to take a T4, the rule book only states "competant person" is needed.
Yes
S510
"What are your Emergency Communication details?"
S511
Check the "Nature of Work".
Open the Sectional Appendix. The system will then display a Sectional Appendix page number(s). For certain locations there may be a variety of locations with similar names. Using the mileage check that the correct location is being used.
Enter the loaction of the work site and mileage. Using the sectional Appendix check the location and worksite is correct.
The plan may have a start & finish mileage for moving work sites. Any COSS requesting an SCN for a distance of greater than 5 miles must be challenged to as to whether that figure is correct.
S512
S513
Is work content, location & mileage correct ?
No
Stop call, ask Shift Manager for advise
S514
S515
Yes
S517
Establish lines effected and enter line heading details as per Sectional Appendix.
Yes
Continue with call ?
No
S516
Unable to issue SCN
5C

Fig. 5B

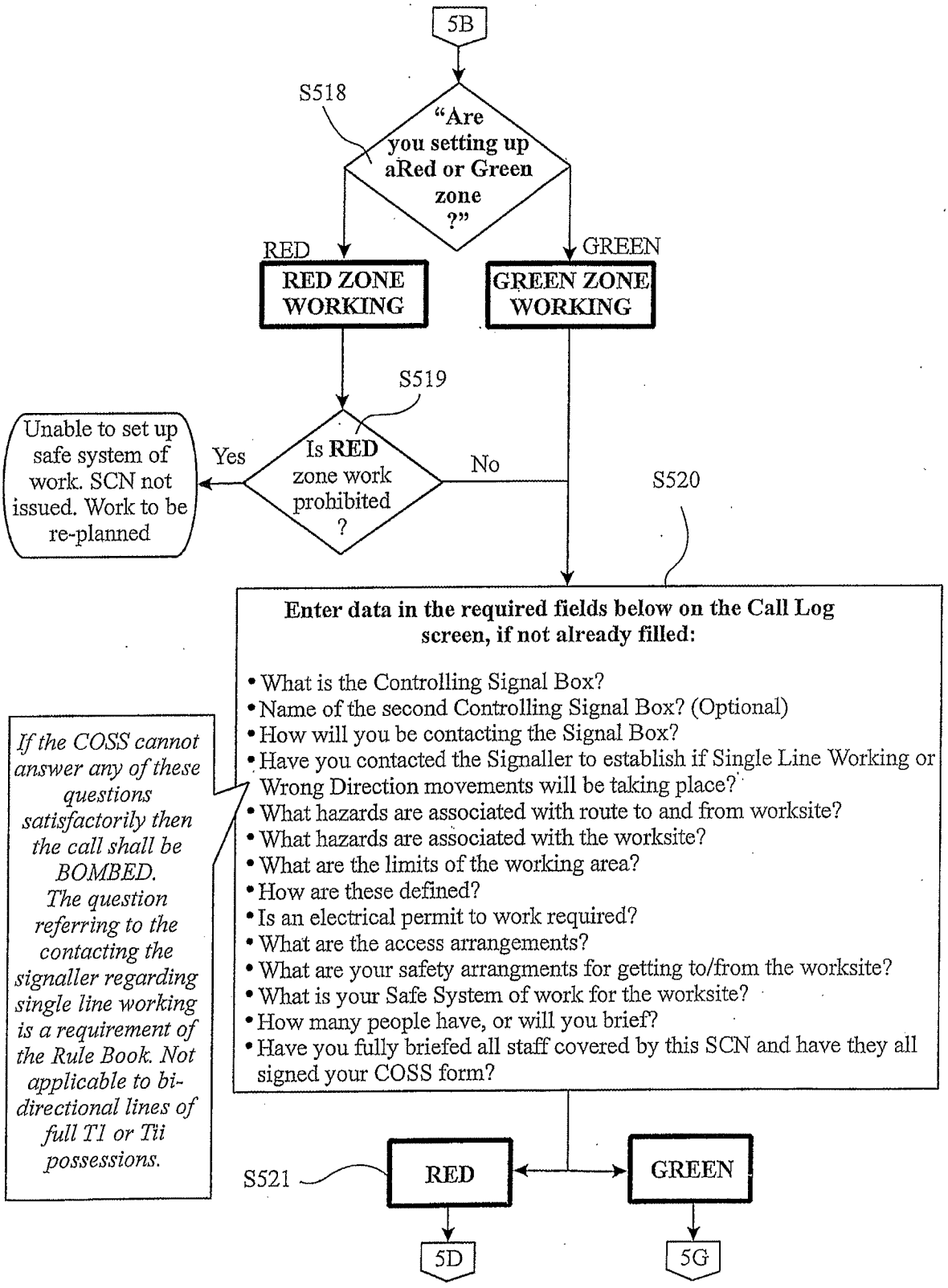

5B
S518
"Are you setting up aRed or Green zone ?"
RED
GREEN
RED ZONE WORKING
GREEN ZONE WORKING
S519
Unable to set up safe system of work. SCN not issued. Work to be re-planned
Yes
Is RED zone work prohibited ?
No
S520
Enter data in the required fields below on the Call Log screen, if not already filled:
• What is the Controlling Signal Box?
• Name of the second Controlling Signal Box? (Optional)
• How will you be contacting the Signal Box?
• Have you contacted the Signaller to establish if Single Line Working or Wrong Direction movements will be taking place?
• What hazards are associated with route to and from worksite?
• What hazards are associated with the worksite?
• What are the limits of the working area?
• How are these defined?
• Is an electrical permit to work required?
• What are the access arrangements?
• What are your safety arrangments for getting to/from the worksite?
• What is your Safe System of work for the worksite?
• How many people have, or will you brief?
• Have you fully briefed all staff covered by this SCN and have they all signed your COSS form?
If the COSS cannot answer any of these questions satisfactorily then the call shall be BOMBED. The question referring to the contacting the signaller regarding single line working is a requirement of the Rule Book. Not applicable to bi-directional lines of full T1 or Tii possessions.
S521
RED
GREEN
5D
5G

Fig. 5C

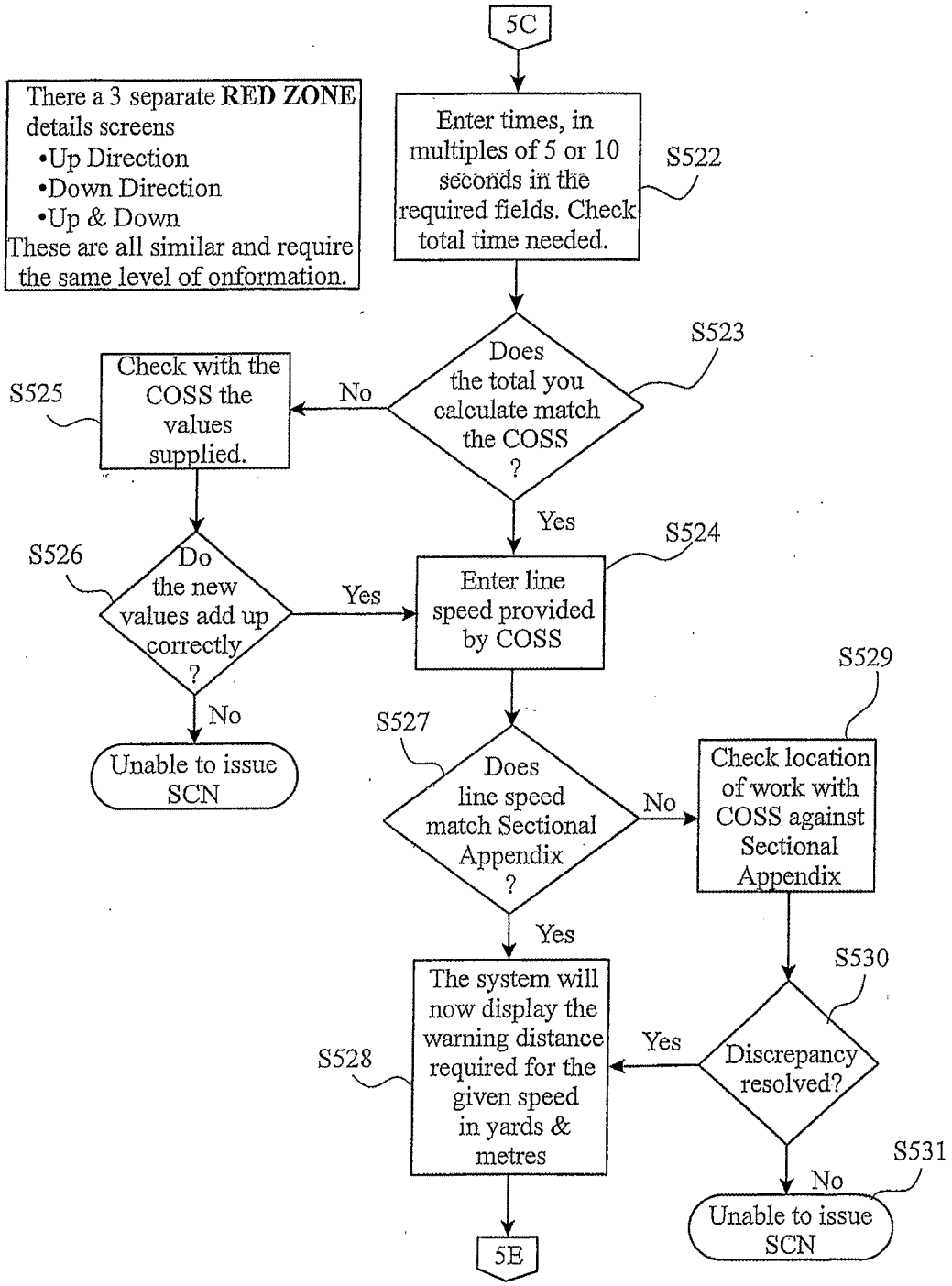


Fig. 5D

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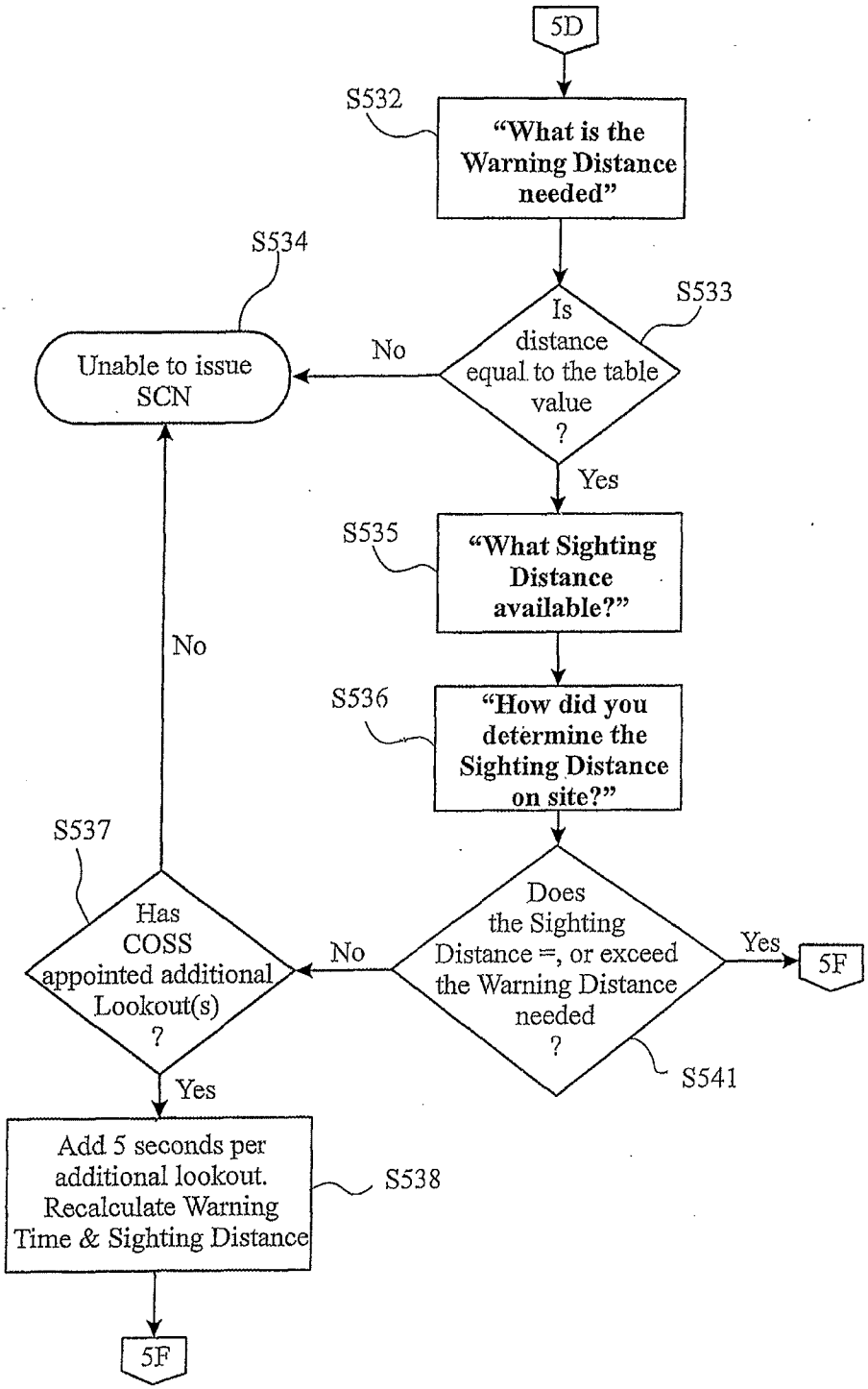

5D
S532
"What is the Warning Distance needed"
S534
S533
Is distance equal to the table value ?
No
Unable to issue SCN
Yes
S535
"What Sighting Distance available?"
No
S536
"How did you determine the Sighting Distance on site?"
S537
Has COSS appointed additional Lookout(s) ?
No
Does the Sighting Distance =, or exceed the Warning Distance needed ?
Yes
5F
S541
Yes
Add 5 seconds per additional lookout. Recalculate Warning Time & Sighting Distance
S538
5F

Fig. 5E

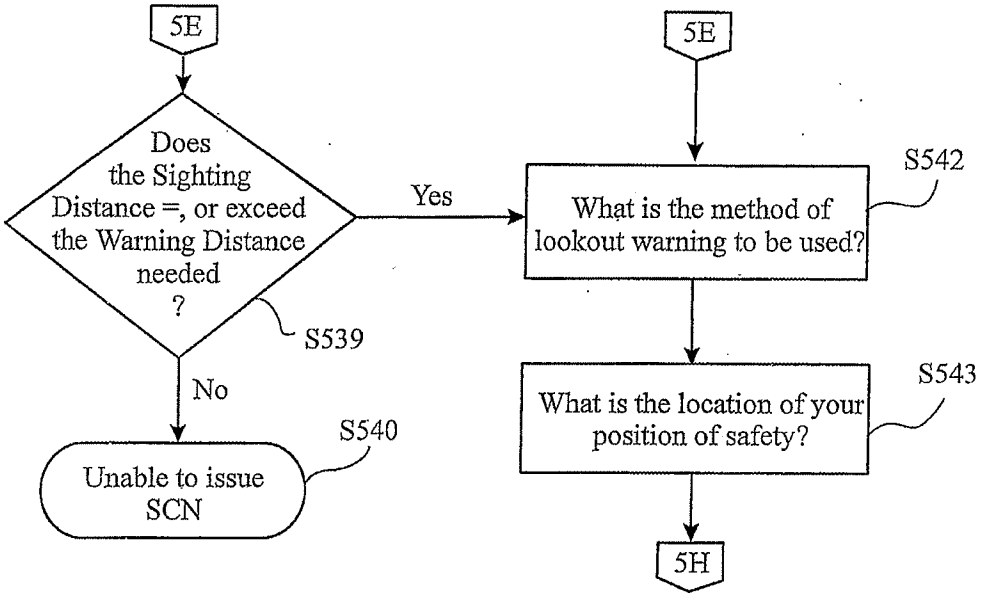

5E
Does the Sighting Distance =, or exceed the Warning Distance needed ?
S539
Yes
No
S540
Unable to issue SCN
5E
What is the method of lookout warning to be used?
S542
What is the location of your position of safety?
S543
5H

Fig. 5F

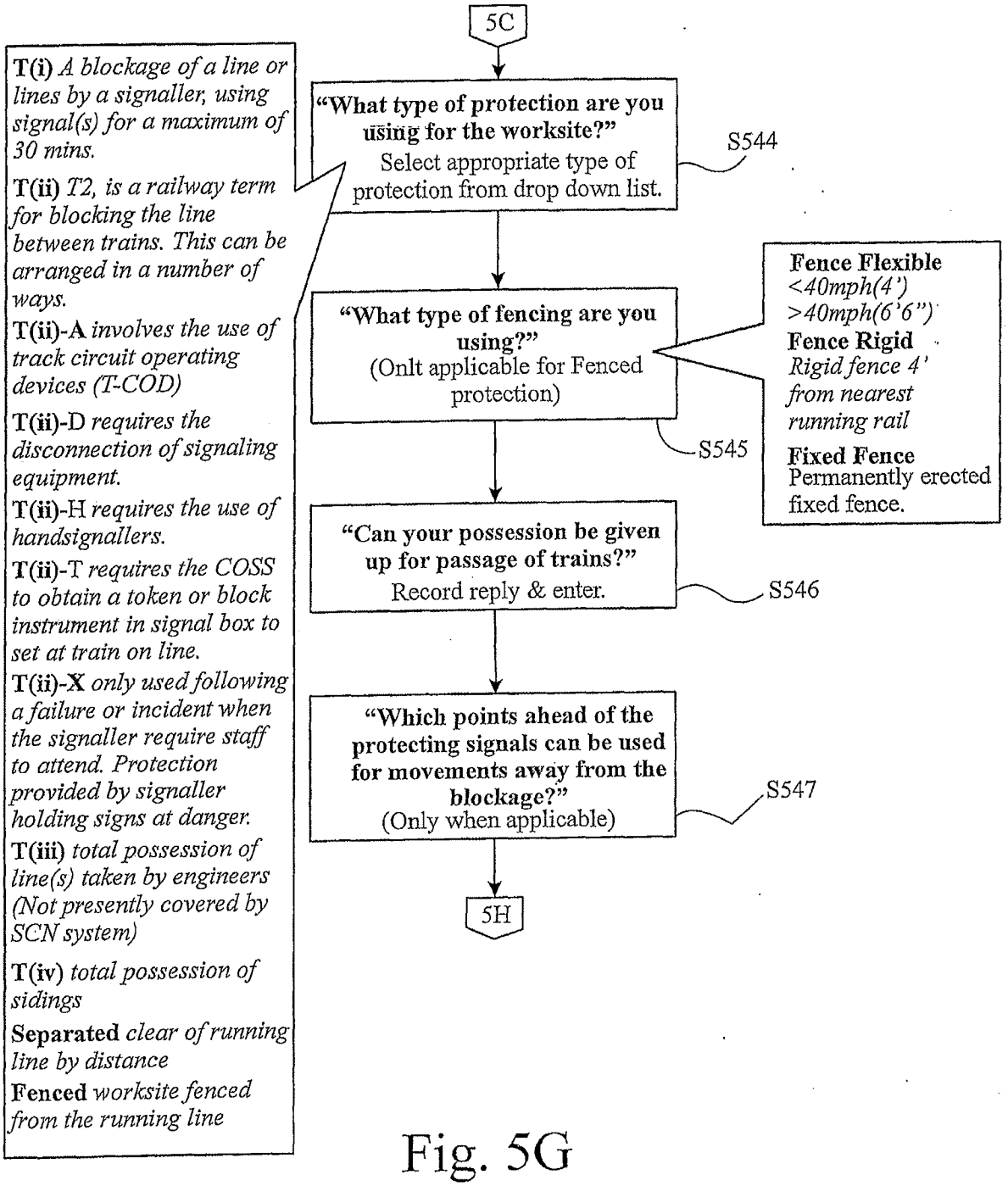

5C
"What type of protection are you using for the worksite?"
Select appropriate type of protection from drop down list.
S544
"What type of fencing are you using?"
(Onlt applicable for Fenced protection)
S545
Fence Flexible
<40mph(4')
>40mph(6'6")
Fence Rigid
Rigid fence 4' from nearest running rail
Fixed Fence
Permanently erected fixed fence.
"Can your possession be given up for passage of trains?"
Record reply & enter.
S546
"Which points ahead of the protecting signals can be used for movements away from the blockage?"
(Only when applicable)
S547
5H
T(i) A blockage of a line or lines by a signaller, using signal(s) for a maximum of 30 mins.
T(ii) T2, is a railway term for blocking the line between trains. This can be arranged in a number of ways.
T(ii)-A involves the use of track circuit operating devices (T-COD)
T(ii)-D requires the disconnection of signaling equipment.
T(ii)-H requires the use of handsignallers.
T(ii)-T requires the COSS to obtain a token or block instrument in signal box to set at train on line.
T(ii)-X only used following a failure or incident when the signaller require staff to attend. Protection provided by signaller holding signs at danger.
T(iii) total possession of line(s) taken by engineers (Not presently covered by SCN system)
T(iv) total possession of sidings
Separated clear of running line by distance
Fenced worksite fenced from the running line

Fig. 5G

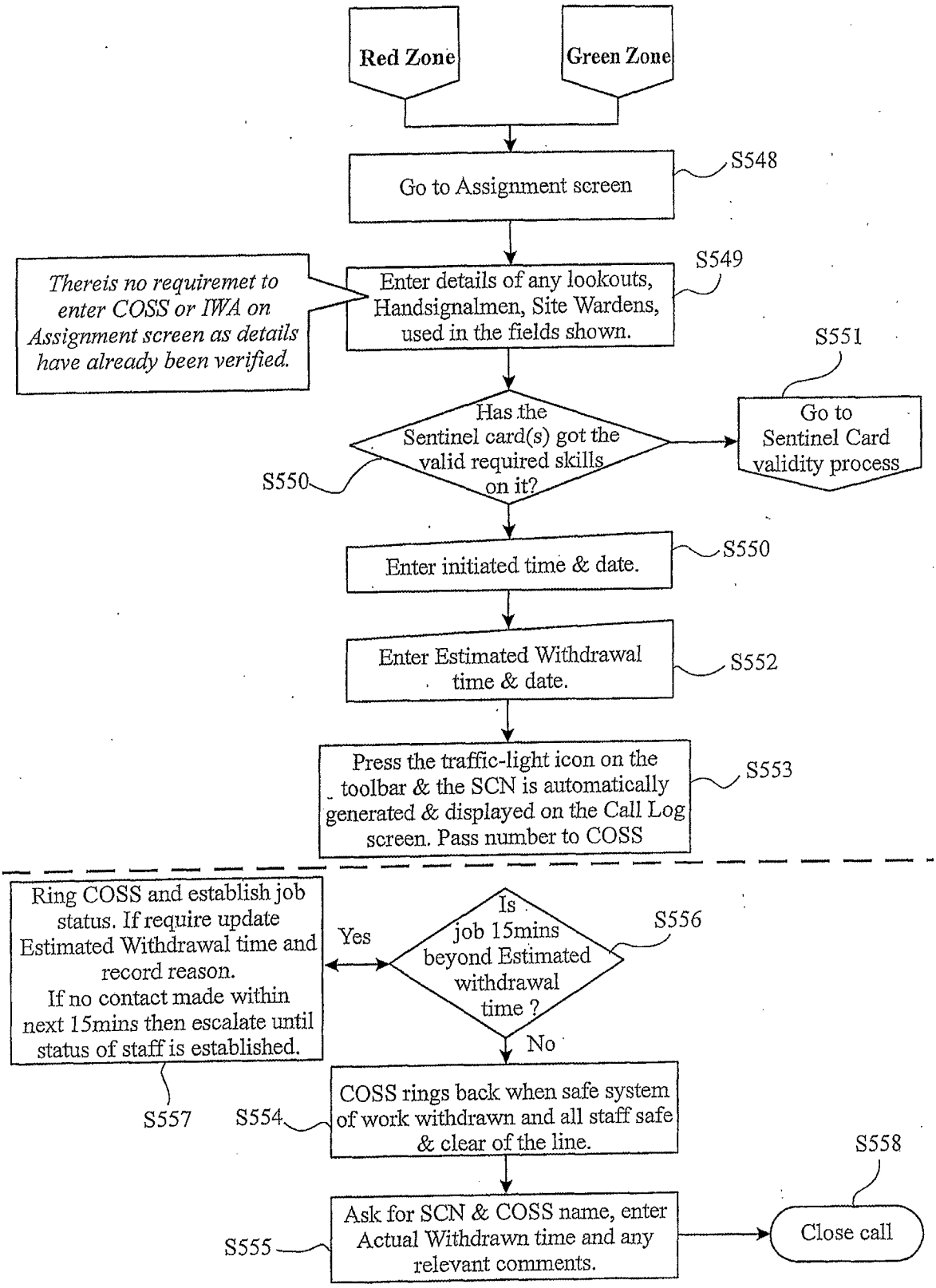

Red Zone
Green Zone
Go to Assignment screen
S548
Thereis no requiremet to enter COSS or IWA on Assignment screen as details have already been verified.
Enter details of any lookouts, Handsignalmen, Site Wardens, used in the fields shown.
S549
S551
Has the Sentinel card(s) got the valid required skills on it?
S550
Go to Sentinel Card validity process
Enter initiated time & date.
S550
Enter Estimated Withdrawal time & date.
S552
Press the traffic-light icon on the toolbar & the SCN is automatically generated & displayed on the Call Log screen. Pass number to COSS
S553
Ring COSS and establish job status. If require update Estimated Withdrawal time and record reason.
If no contact made within next 15mins then escalate until status of staff is established.
S557
Yes
Is job 15mins beyond Estimated withdrawal time ?
S556
No
COSS rings back when safe system of work withdrawn and all staff safe & clear of the line.
S554
Ask for SCN & COSS name, enter Actual Withdrawn time and any relevant comments.
S555
S558
Close call

Fig. 5H

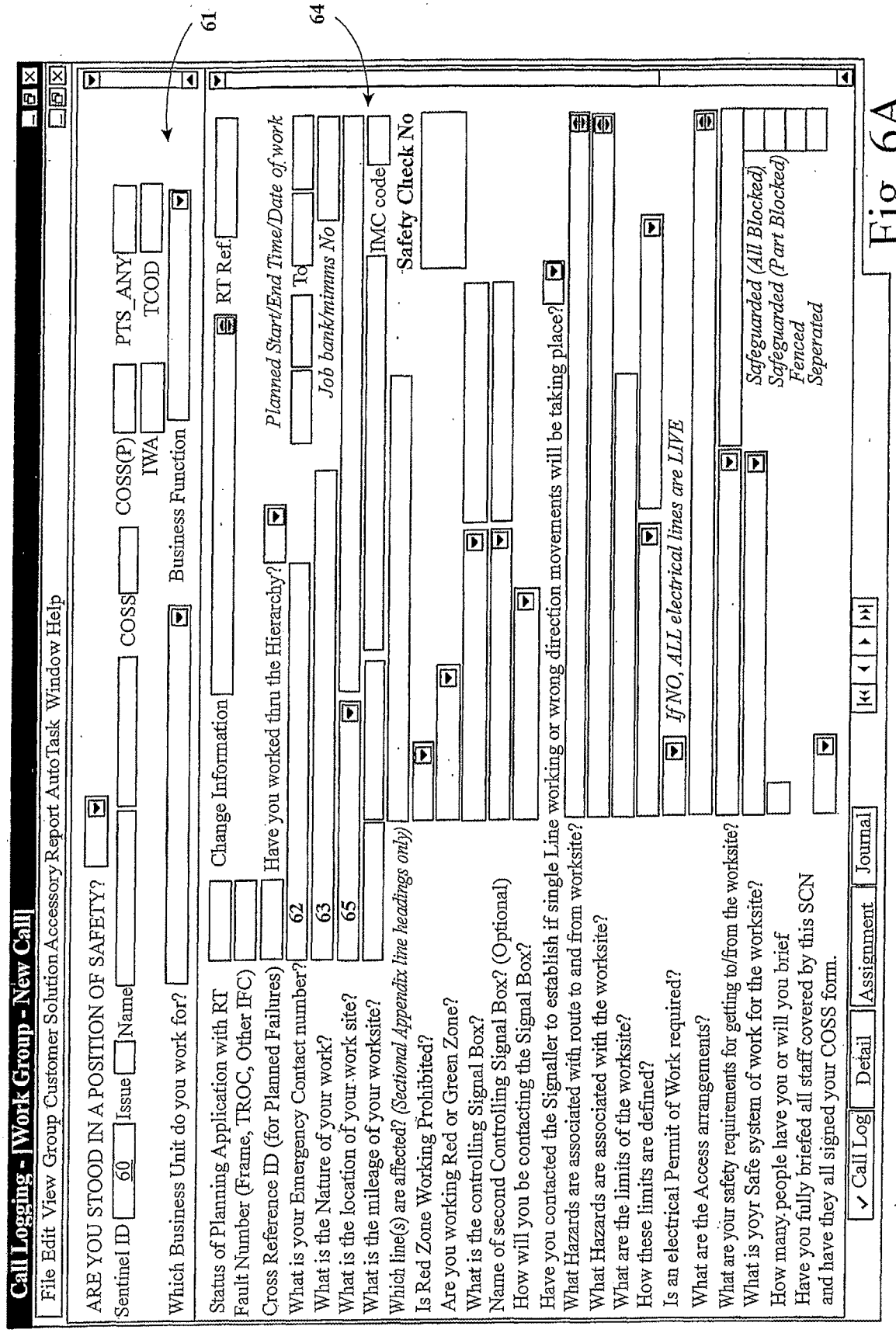


Fig. 6A

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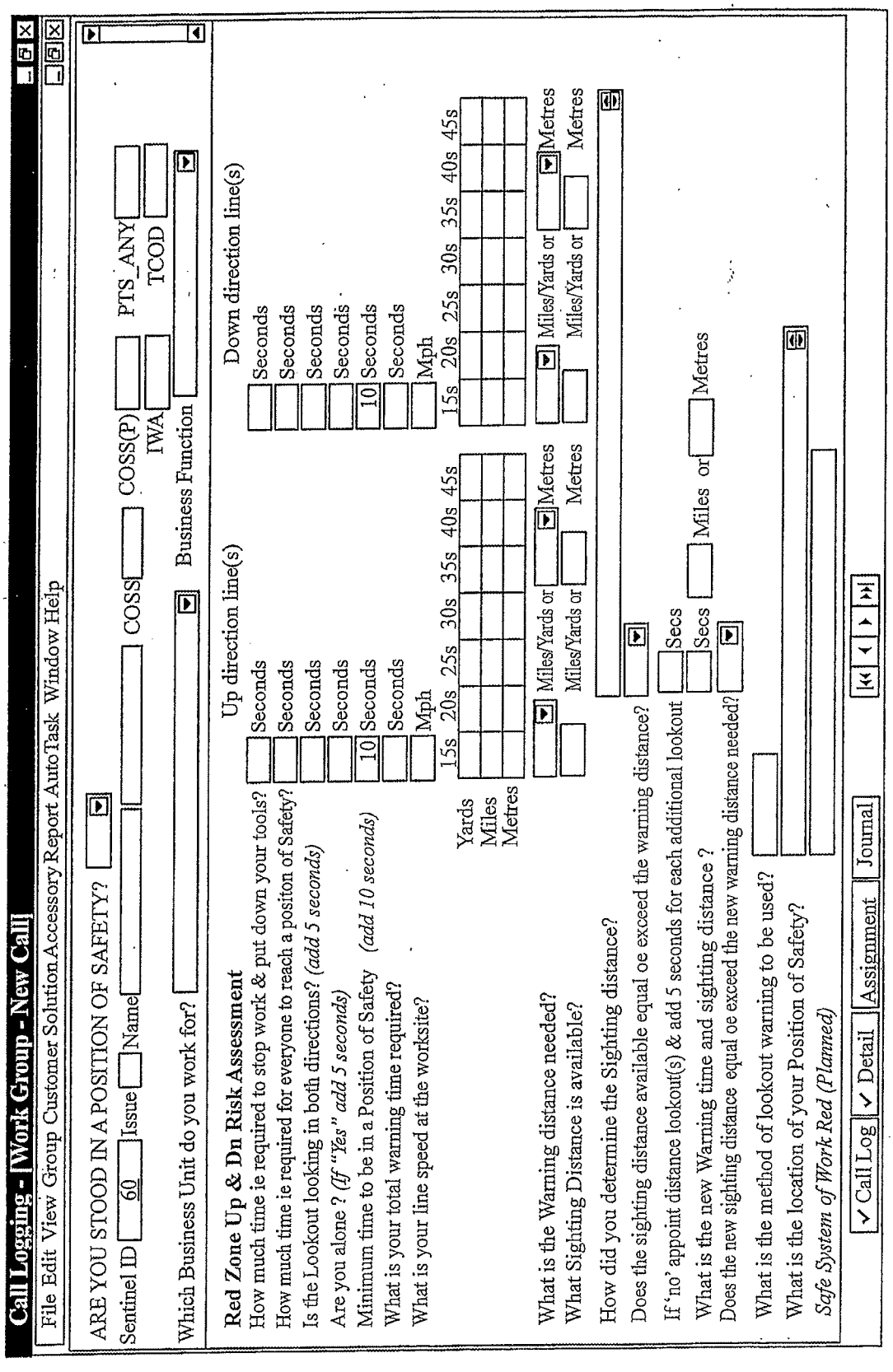


Fig. 6B

WABTEC EX1002

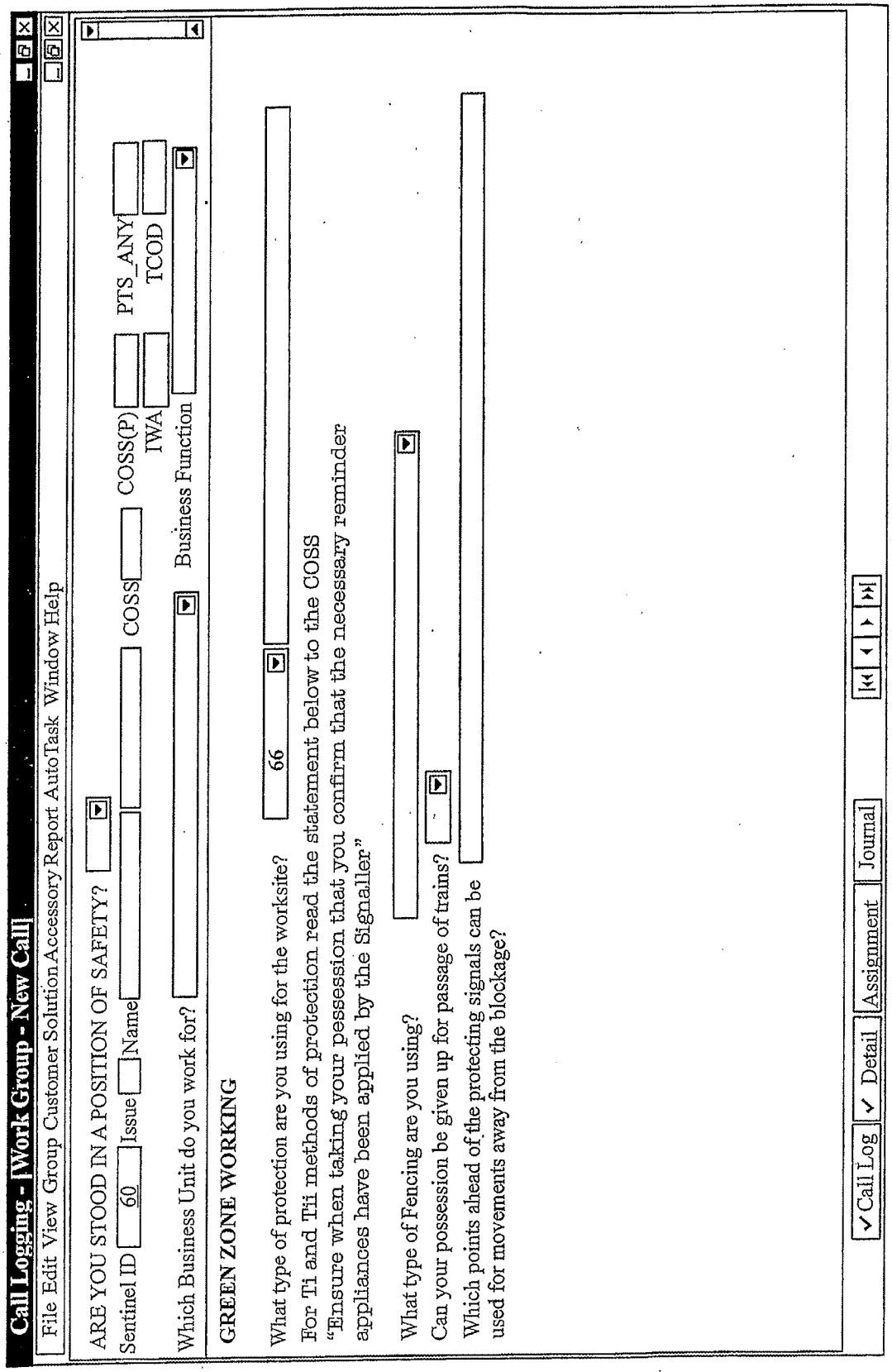


Fig. 6C

WABTEC EX1002

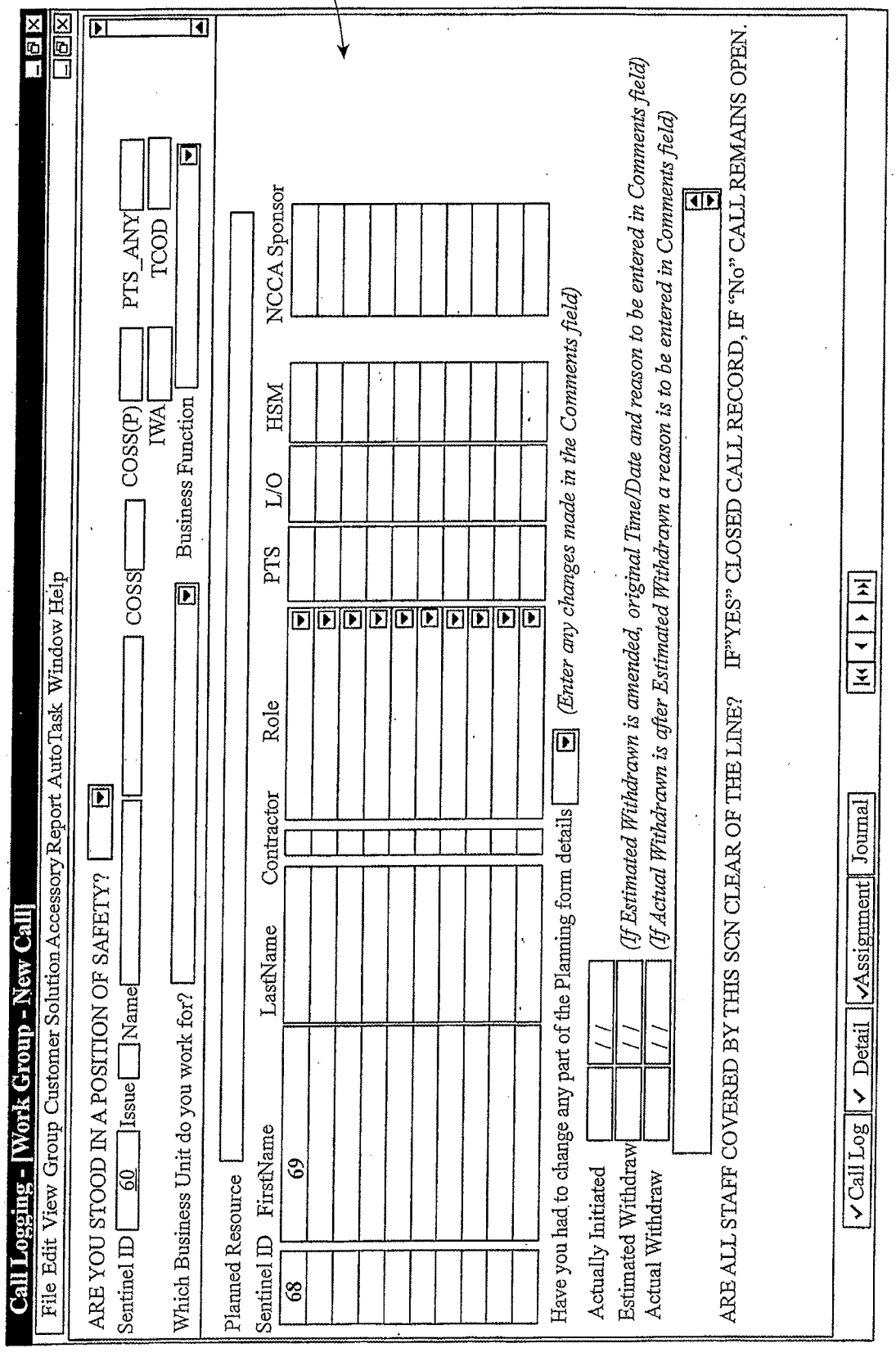


Fig. 6D

WABTEC EX1002

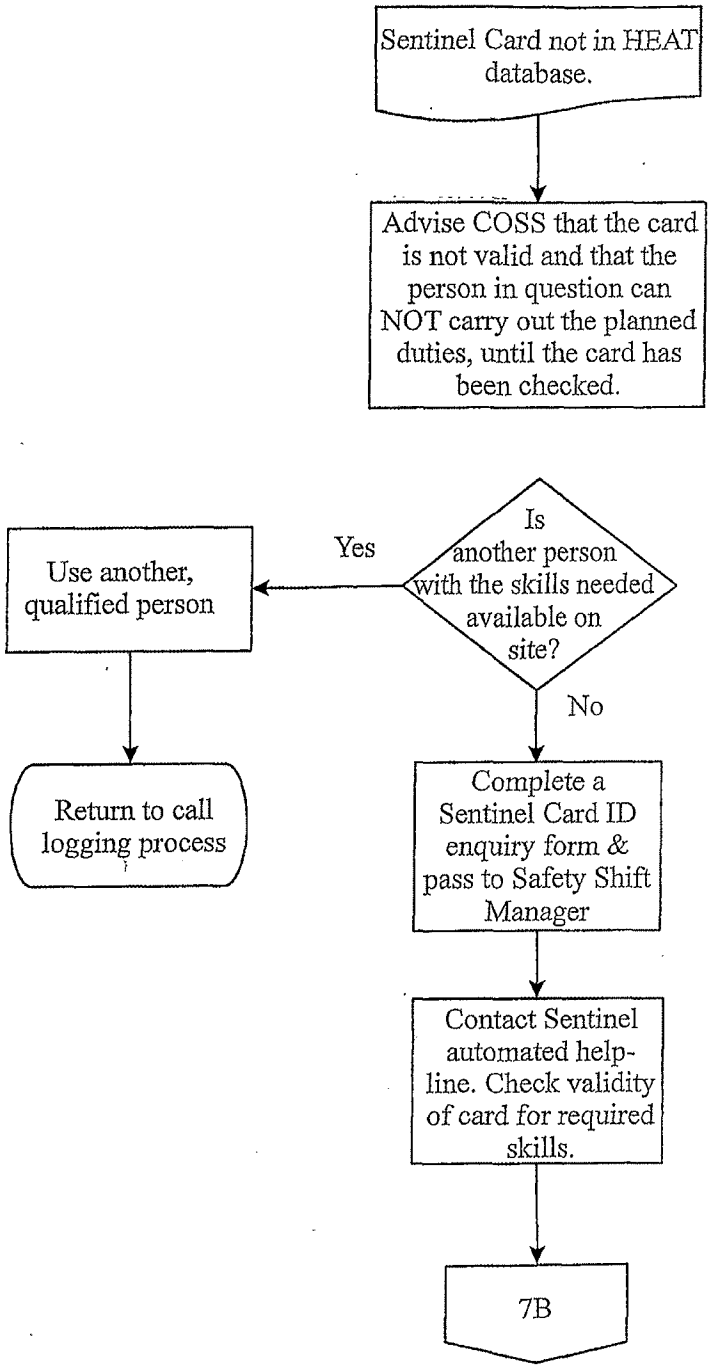

Sentinel Card not in HEAT database.
Advise COSS that the card is not valid and that the person in question can NOT carry out the planned duties, until the card has been checked.
Is another person with the skills needed available on site?
Yes
Use another, qualified person
Return to call logging process
No
Complete a Sentinel Card ID enquiry form & pass to Safety Shift Manager
Contact Sentinel automated help-line. Check validity of card for required skills.
7B

Fig. 7A

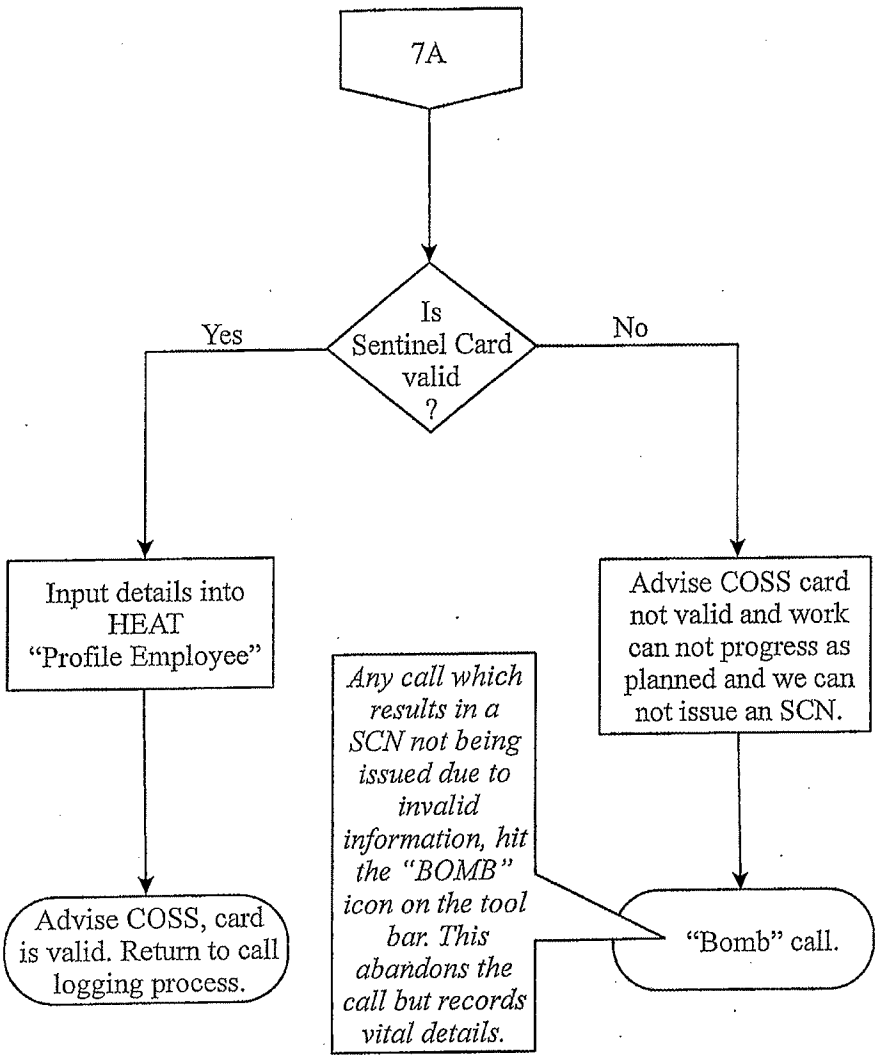

7A
Is Sentinel Card valid ?
Yes
No
Input details into HEAT "Profile Employee"
Advise COSS card not valid and work can not progress as planned and we can not issue an SCN.
Any call which results in a SCN not being issued due to invalid information, hit the "BOMB" icon on the tool bar. This abandons the call but records vital details.
Advise COSS, card is valid. Return to call logging process.
"Bomb" call.

Fig. 7B

Rail Safety Check Number System Sectional Appendix Page

Matching Sectional Appendix Page (Next Page)
Zone Location Mileage 0 Miles & Chains
Table Section Page ELR ECM1

LOCATION	DISTANCE	LINES & SPEED RESTRICTION
		KINGS CROSS TO SHAFTHOLME JN
KINGS X	0 00	
KINGS X (K)	0 20	
Gaseworks Tunnel (528 yards)		

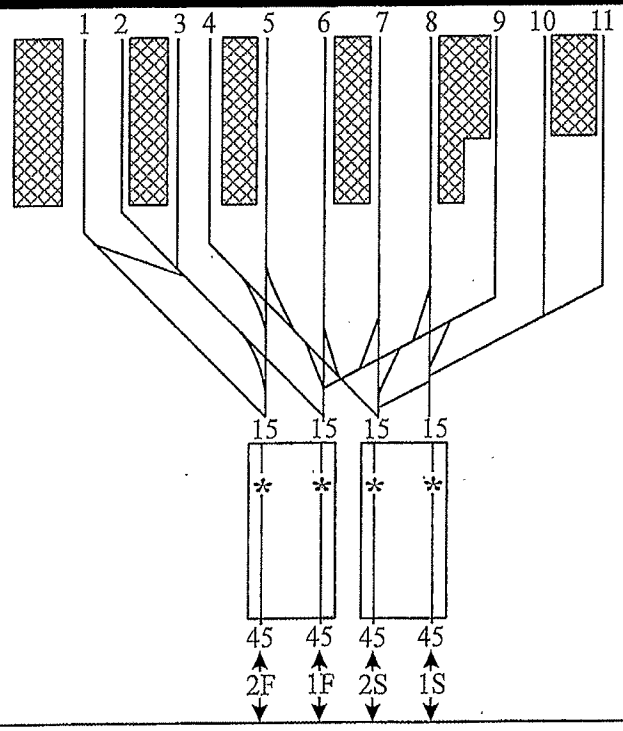
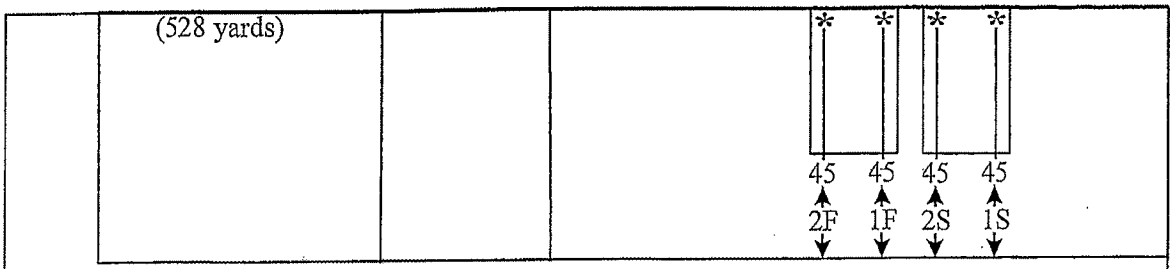


Fig. 8A



National Hazard Directory Detail

Please note the following distances are in miles and yards,
All hazards for this ELR and Mileage Specific Haz:

Zone Track Pos	**ELR** ECM1	**Loc** **Start Dist** 0 **End Dist** 0
Zone Track Pos	**ELR** ECM1	**Loc** Kings Cross Diesel Depot: Staff Accom Electrical **Start Dist** 0 **End Dist** 0
Zone Track Pos	**ELR** ECM1	**Loc** Kings Cross Diesel Service Depot: Drainage Pumpin **Start Dist** 0 **End Dist** 0
Zone Track Pos	**ELR** ECM1	**Loc** Kings Cross New Medical Centre: Heating Installat **Start Dist** 0 **End Dist** 0
Zone Track Pos	**ELR** ECM1	**Loc** Kings Cross New Medical Centre: Hot Water Installat **Start Dist** 0 **End Dist** 0
Zone Track Pos	**ELR** ECM1	**Loc** Kings Cross Stage 2: TempSandwich Preparation Ro **Start Dist** 0 **End Dist** 0
Zone Track Pos	**ELR** ECM1	**Loc** Kings Cross /St Pancras: Action Area Plan/proposed **Start Dist** 0 **End Dist** 0
Zone Track Pos	**ELR** ECM1	**Loc** Kings Cross : Water Distribution Systems E F And **Start Dist** 0 **End Dist** 0

Fig. 8B

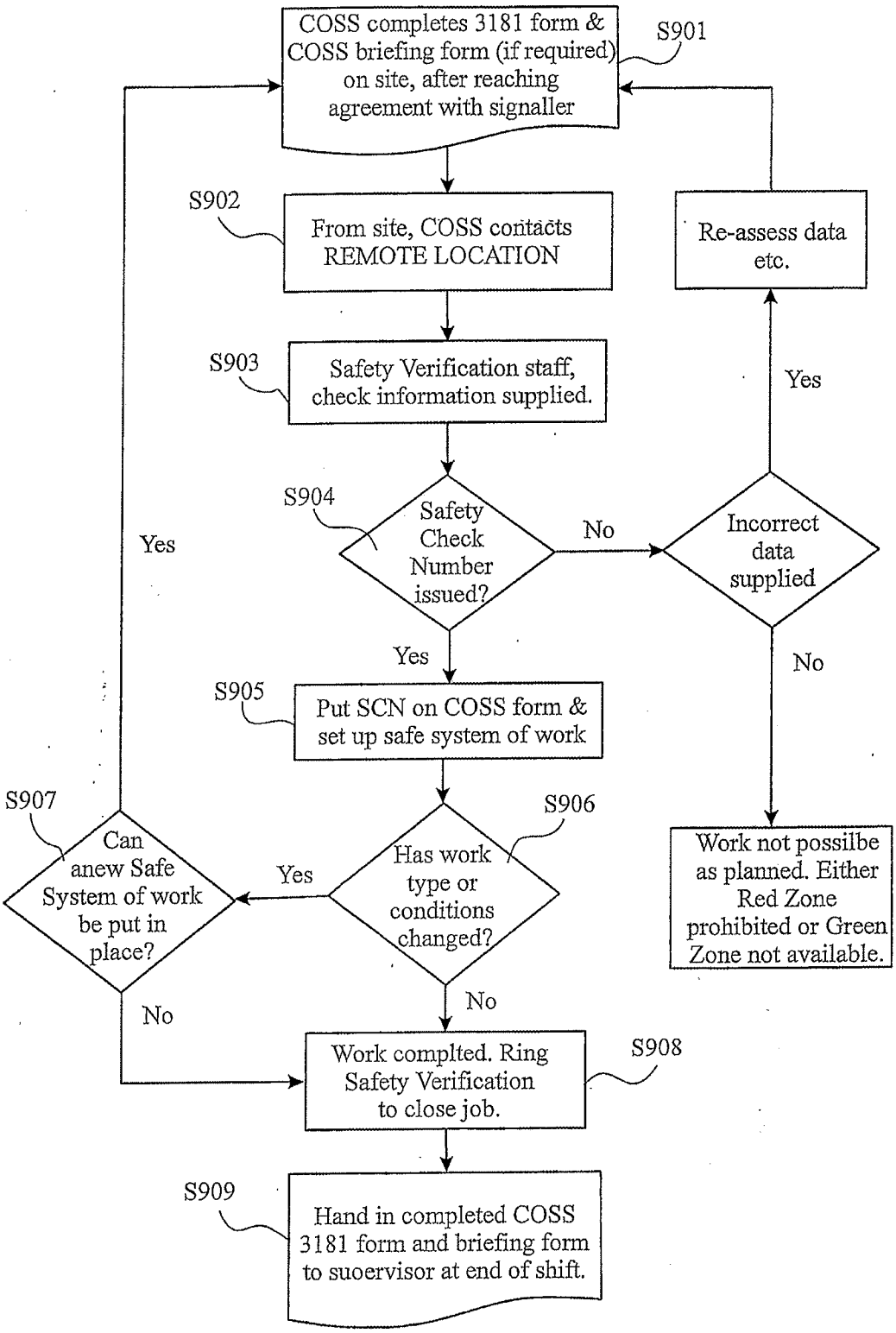

COSS completes 3181 form & COSS briefing form (if required) on site, after reaching agreement with signaller
S901
S902
From site, COSS contacts REMOTE LOCATION
Re-assess data etc.
S903
Safety Verification staff, check information supplied.
Yes
S904
Safety Check Number issued?
No
Incorrect data supplied
Yes
No
Yes
S905
Put SCN on COSS form & set up safe system of work
S907
S906
Can anew Safe System of work be put in place?
Yes
Has work type or conditions changed?
Work not possilbe as planned. Either Red Zone prohibited or Green Zone not available.
No
No
Work complted. Ring Safety Verification to close job.
S908
S909
Hand in completed COSS 3181 form and briefing form to suoervisor at end of shift.

Fig. 9

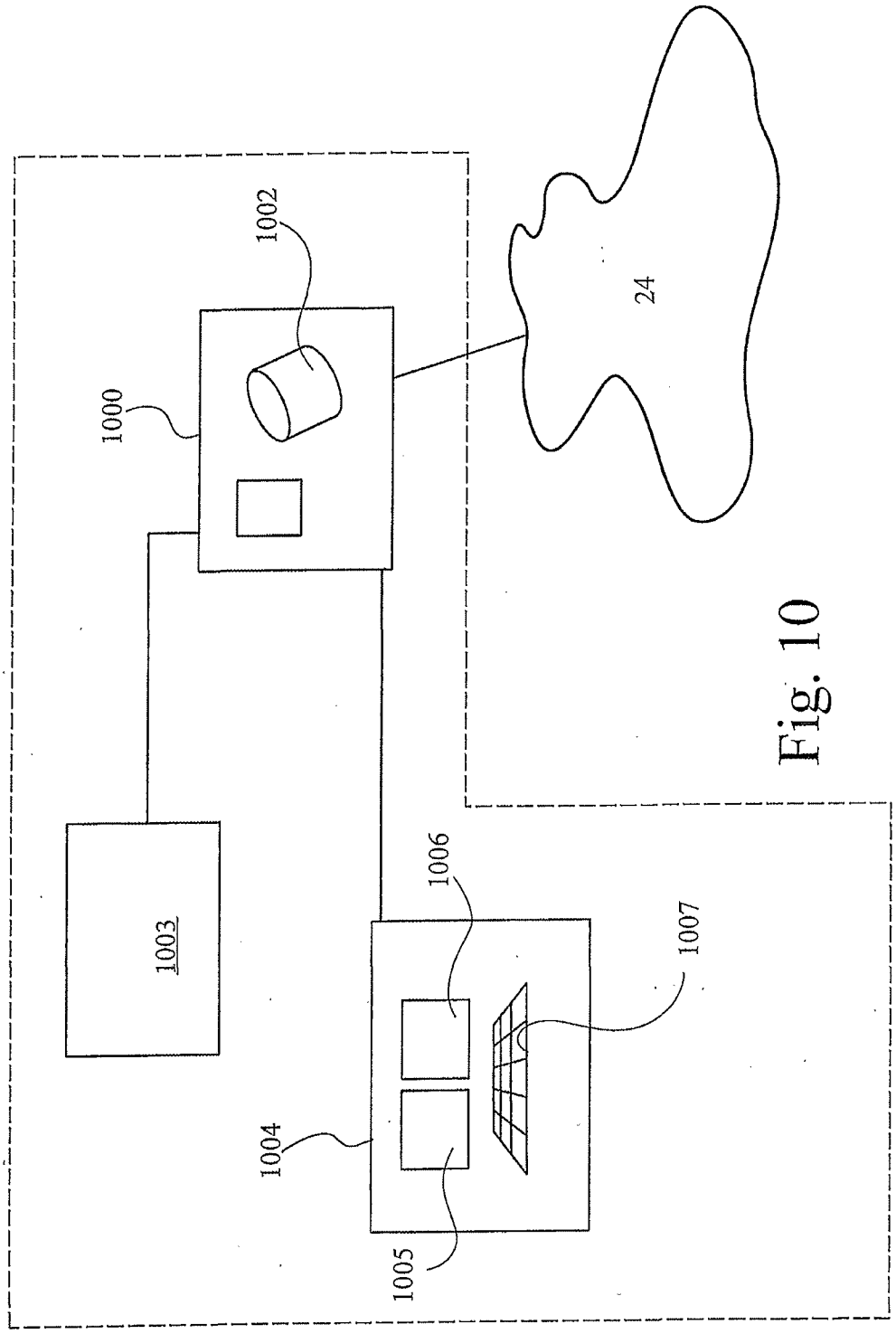


Fig. 10

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 03/04830

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G07C1/10 G07C9/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 93/14571 A (SUPRA PROD INC) 22 July 1993 (1993-07-22)	1-5,7, 16-19, 21,23, 28,29
Y	page 3, line 19 -page 4, line 11	10-15, 20,22, 24-27
A	page 13, line 5 - line 25 figures 1,3	3-9
Y	US 6 417 760 B1 (HIRAYAMA HIROKAZU ET AL) 9 July 2002 (2002-07-09)	10-15, 20,22, 24-27
A	column 20, line 56 -column 22, line 51 figures 19-24	1,2

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 April 2004	23/04/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Paraf, E

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 03/04830

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 344 670 A (IBM) 14 June 2000 (2000-06-14) page 5, line 26 - line 36 page 6, line 27 -page 7, line 2	1-5,7, 21,23, 28,29
A	figures	3-9, 16-19

X	GB 2 372 126 A (CODED ACCESS LTD) 14 August 2002 (2002-08-14)	1-5,7, 21,23, 28,29
A	page 18, paragraph 2; figure 3	3-9, 16-19

Form PCT/ISA/210 (continuation of second sheet) (January 2004)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/GB 03/04830

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(54) **Vorrichtung zur Rottenwarnung**

Warning device for work gangs

Dispositif d'avertissement de personnes travaillant sur la voie

(84) Benannte Vertragsstaaten:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

(43) Veröffentlichungstag der Anmeldung:
07.05.2003 Patentblatt 2003/19

(73) Patentinhaber: **ALCATEL**
75008 Paris (FR)

(72) Erfinder: **Rahn, Wolf-Helmut**
74376 Gemmrigheim (DE)

(74) Vertreter: **Menzietti, Domenico et al**
Alcatel
Intellectual Property Department, Stuttgart
70430 Stuttgart (DE)

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- **PATENT ABSTRACTS OF JAPAN vol. 013, no. 567 (M-908), 15. Dezember 1989 (1989-12-15) & JP 01 237261 A (MITSUBISHI ELECTRIC CORP), 21. September 1989 (1989-09-21)**

Anmerkung: Innerhalb von neun Monaten nach der Bekanntmachung des Hinweises auf die Erteilung des europäischen Patents kann jedermann beim Europäischen Patentamt gegen das erteilte europäische Patent Einspruch einlegen. Der Einspruch ist schriftlich einzureichen und zu begründen. Er gilt erst als eingelegt, wenn die Einspruchsgebühr entrichtet worden ist. (Art. 99(1) Europäisches Patentübereinkommen).

EP 1 308 366 B1

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Beschreibung

[0001] Die Erfindung betrifft eine Vorrichtung zur Rottenwarnung.

[0002] Rottenwarnanlagen zur Warnung von Gleisarbeitern vor herannahenden Zügen werden unterschieden in signalunabhängige Warnanlagen und signalabhängige Warnanlagen. In Deutschland und anderen europäischen Ländern sind gemäß der Unfallverhütungsvorschriften für Geschwindigkeiten > 200 km/h signalabhängige Warnanlagen vorgeschrieben. Bei diesen Anlagen kann das den Baustellenbereich deckende Hauptsignal oder Blocksignal erst gestellt werden, wenn die Rotte eine Meldung zum Stellwerk generiert hat, die aussagt, dass das Gleis geräumt ist. Die bekannten Anlagen haben den Nachteil, dass unfangreiche Änderungen und Erweiterungen am Stellwerk vorgenommen werden müssen und eine Kabelverbindung zwischen Stellwerk und Arbeitsstelle am Gleis hergestellt werden muss.

[0003] Aus EP 0 286 627 A2 ist eine Einrichtung zum Warnen von Rotten bekannt, bei der Stellbefehle von der Stellwerkschaltung als Rottenwarnmeldung mittels einer stellwerkseitigen Innenanlage an eine baustellenseitigen Außenanloge übertragen werden und der Sicherungsposten noch Durchführung der Sicherungsmaßnahmen auf der Baustelle eine Quittierungsmeldung von der Außenonlage zur Innenanlage absendet. Die Arbeiterrotte ist signaltechnisch sicher durch das von der Innenanlage gesteuerte Ausfahr- oder Blocksignal geschützt. Ein vom Fahrdienstleiter initiierter Stellbefehl für das Ausfahr- oder Blocksignal wird erst durch die Quittierungsmeldung des Sicherungspostens ausgelöst. Für jeden Stellwerkstyp muss eine Anpassschaltung entwickelt werden, die pro Gleis vorhanden sein muss. Bei Relaisstellwerken müssen spezielle Relaisgruppen entwickelt werden, die für jedes Gleis der Strecke einmal vorhanden sein müssen. Dazu ist erheblicher Entwicklungsaufwand nötig und zudem wird eine teure, zusätzliche Hardware benötigt.

[0004] Aufgabe der Erfindung ist es, eine einfachere Vorrichtung zur Rottenwarnung zu schaffen sowie ein zugehöriges Verfahren zur Rotten-Warnung.

[0005] Gelöst wird diese Aufgabe durch eine Vorrichtung gemäß Patentanspruch 1 und ein Verfahren nach Patentanspruch 7.

[0006] Die erfindungsgemäße Vorrichtung hat eine Schnittstelle zu einem Funknetz, über die automatisch mindestens eine Funkstation kontaktierbar ist, zwecks Warnung von Gleisarbeitern über Funk über das Herannahen eines Zuges. Die erfindungsgemäße Vorrichtung ist in vorteilhafter Weise als ESTW-Schnittstellenmodul ausgeführt, das über eine Schnittstelle mit einem ESTW verbunden ist. Das ESTW informiert das ESTW-Schnittstellenmodul über die aktuellen Orte, die Belegung der Gleisabschnitte und/oder bei ETCS den Positionsmeldungen der herannahenden Züge inklusive der zugehörigen Gleisnummern. Das ESTW-Schnittstellenmodul vergleicht die empfangenen Informationen mit zuvor gespeicherten Informationen über Gleise, an denen Gleisarbeiter tätig sind, z.B. an einer Baustelle. Wenn sich ein Zug der Baustelle nähert, wird gesteuert durch das ESTW-Schnittstellenmodul ein Warnsignal zu den Gleisarbeitern via Funk, z.B. GSM-R, übermittelt. Die Gleisarbeiter sind mit Standard-Mobiltelefonen ausgerüstet, z.B. GSM-Handys. Das Warnsignal kann einem zuvor festgelegten Telefon, z.B. dem des Baustellenleiters, und/oder im Broadcast-Verfahren allen Gleisarbeitern gleichzeitig übermittelt werden. Nur nach Erhalt eines Quittierungssignals vom Baustellenleiter, das bestätigt, dass kein Gleisarbeiter sich mehr in der Gefahrenzone befindet, wird das relevante Gleis freigegeben und der herannahende Zug kann passieren. Die Sicherheit kann dadurch erhöht werden, das für die Kommunikation zwischen Baustellenleiter und ESTW-Schnittstellenmodul eine kodierte Funkübertragung verwendet wird. Auf einfache Art und Weise können für die Kodierung Zufallszahlen verwendet werden, die vor der Übertragung festgelegt werden und nur dem Baustellenleiter und dem ESTW-Schnittstellenmodul bekannt sind.

[0007] Die Erfindung ist insbesondere geeignet für den Einsatz im neuen ETCS-System, ETCS=European Train Control System. Bei ETCS Level 3 können die ESTW durch RBC ersetzt sein und der ESTW-Bedienplatz durch einen RBC-Bedienplatz, RBC = Radio Block Center. Im Unterschied zu ESTW, bei denen Informationen über die Züge dem ESTW mittels Achszähler und elektrischen und/oder optischen Leitungen übertragen werden, werden beim RBC die Informationen über die Züge dem RBC über Funk - mittels GSM-R - von den Zügen direkt übermittelt, wobei die Züge Informationen über Balisen einlesen.

[0008] Pro Stellwerk wird lediglich eine erfindungsgemäße Vorrichtung benötigt. Der Eingriff in das Stellwerk bezieht sich lediglich auf eine neue Schnittstelle. Die Befehle zum Sperren/Entsperren der Gleise werden konform zu den Befehlen des vorhandenen ESTW generiert. Auf diese Art und Weise sind keine speziellen Software-Erweiterungen oder Software-Veränderungen im ESTW erforderlich. Auf eine Kabelverbindung vom Stellwerk zur Strecke kann durch den Einsatz von GSM verzichtet werden. Baustellenleiter und Gleisarbeiter haben jeweils ein Handy, wodurch die Informationsübertragung zum einen zeitlich sehr beschleunigt wird und individuell erfolgen kann und zum anderen ein örtlich flexibler Einsatz der Arbeiter möglich ist, auch außerhalb der Rufweite. Beim Stand der Technik gibt es nicht an allen Punkte entlang der Strecke Zugriff auf die Kabelverbindung zum Stellwerk. Dadurch ist eine Kette von Sicherungsposten bis zum nächsten Zugriffspunkt nötig. Durch die Verwendung der Handys ist ein Arbeiten an jedem beliebigen Punkt der Strecke durch eine Minimalzahl von Gleisarbeitern möglich; eine Kette von Sicherungsposten entfällt. Durch den Einsatz einer speziellen Übertragungsmethode zur Sicherung der Übertragung - in vorteilhafterweise mittels TAN-Nummern, TAN = Transaction Number - können Standard-Mobilfunkstationen

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verwendet werden. Damit wird durch die Erfindung eine kostengünstige und sichere Implementierung einer Rottenwarnung erreicht.

[0009] Die erfindungsgemäße Vorrichtung zur Rottenwarnung ist, dadurch gekennzeichnet, dass eine Schnittstelle zu einem Elektronischen Stellwerkmodul und eine Schnittstelle zu einem Funknetz vorgesehen ist, dass die Vorrichtung geeignet ist, Informationen über mindestens einen Zug vom Elektronischen Stellwerkmodul zu empfangen und mit abgespeicherten Informationen über mindestens einen Boustellenbereich zu vergleichen, und dass die Vorrichtung geeignet ist, für den Fall, dass sich ein Zug einem Baustellenbereich nähert, automatisch ein Warnsignal über die Funkschnittstelle zu mindestens einem Funktelefon auszusenden dessen Rufnummer in der Vorrichtung gespeichert ist. Die Informationen über eine aktuelle Baustelle, z.B. Datum, Zeit, Gleisabschnitt, werden vor Inbetriebnahme in die Vorrichtung eingegeben. Der Bediener (Fahrdienstleiter) des ESTW sperrt den relevanten Gleisabschnitt für die eingegebene Zeitspanne, z.B. 8.00 Uhr bis 10.00 Uhr oder 7.00 Uhr bis Ende offen. Gleisarbeiter, die sich während der Zeitspanne im Gefahrenbereich befinden werden über das Warnsignal über einen herannahenden Zug gewarnt. Das Warnsignal wird über Funk ausgesendet, zumindest ein Gleisarbeiter, z.B. der Baustellenleiter, hat ein Funktelefon mittels dessen er das Warnsignal empfangen kann.

[0010] Die erfindungsgemäße Vorrichtung ist vorteilhafterweise dadurch gekennzeichnet, dass die Vorrichtung geeignet ist, für den Fall des Empfangs eines Quittierungsignals auf das Warnsignal, automatisch einen ESTW-Befehl zur Freigabe des zuvor-automatisch gesperrten Gleisabschnittes auf dem sich der Zug nähert zu generieren und zum Elektronischen Stellwerkmodul zu senden. Der Baustellenleiter weist seine Gleisarbeiter an, den Gefahrenbereich zu verlassen. Ist dies geschehen, sendet er ein Quittierungssignal über Funk zur Vorrichtung. Diese ist nun darüber informiert, dass sich kein Gleisarbeiter mehr im Gefahrenbereich befindet. Das entsprechende Gleis kann freigegeben werden, der herannahende Zug passieren.

[0011] Die erfindungsgemäße Vorrichtung ist ferner vorteilhafterweise dadurch gekennzeichnet, dass die Vorrichtung geeignet ist, zumindest einen Teil des empfangenen Quittierungssignals mit abgespeicherten Nummern oder einem abgespeicherten Kode zu vergleichen und den ESTW-Befehl nur zu generieren, wenn der zumindest eine Teil des empfangenen Quittierungssignals mit einer abgespeicherten Nummer bzw. dem abgespeicherten Kode übereinstimmt. Zur Erhöhung der Sicherheit wird die Kommunikation zwischen Vorrichtung und Baustellenleiter gesichert. Auf einfachste Weise durch Nummern, die nur der Vorrichtung und dem Baustellenleiter bekannt sind und die auszugsweise bei jeder Übertragung mitgesendet werden. Alternativ werden Buchstaben, Sonderzeichen, eine spezielle Kodierung oder eine, z.B. asymmetrische Verschlüsselung verwendet.

[0012] Die erfindungsgemäße Vorrichtung ist des weiteren vorteilhafterweise dadurch gekennzeichnet, dass das Elektronische Stellwerkmodul als ESTW-Bedienplatz, als ESTW-Bedienplatz-Server oder als ESTW ausgeführt ist.

[0013] In einer bevorzugten Ausgestaltung der Erfindung ist die Vorrichtung als ESTW-Schnittstellenmodul oder als ESTW-Bedienplatz ausgeführt.

[0014] In einer weiteren bevorzugten Ausgestaltung der Erfindung ist die erfindungsgemäße Vorrichtung dadurch gekennzeichnet, dass anstelle der Schnittstelle zum Elektronischen Stellwerkmodul eine Schnittstelle zu einem RBC-Modul vorgesehen ist, und dass die Vorrichtung geeignet ist, Informationen über mindestens einen Zug vom RBC-Modul zu empfangen und mit abgespeicherten Informationen über mindestens einen Baustellenbereich zu vergleichen, dass das RBC-Modul als RBC-Bedienplatz, als RBC-Bedienplatz-Server oder als RBC ausgeführt ist, und dass die Vorrichtung als RBC-Schnittstellenmodul oder als RBC-Bedienplatz ausgeführt ist; RBC = Radio Block Center. Die Erfindung ist auf alle ETCS-Systeme anwendbar.

[0015] Bei einem automatischen Betrieb könnte die Vorrichtung auch in einem Zug eingebaut sein. Die Erfindung ist selbst bei fahrerlosem Betrieb anwendbar. Die Vorrichtung im Zug empfängt z.B. über Balisen und/oder Funk die Information über einen wegen Bauarbeiten gesperrten Baustellenbereich und sendet ein Warnsignal über Funk aus, wenn er sich diesem Bereich nähert. Empfängt er kein Quittierungssignal stoppt er. Empfängt er ein Quittierungssignal, so kann er die Baustelle passieren.

[0016] Das erfindungsgemäße Verfahren zum Überwachen eines . Baustellenbereichs einer Schienenanlage ist dadurch gekennzeichnet, dass Informationen über mindestens einen Zug von einem Elektronischen Stellwerkmodul oder einem RBC-Modul einer Vorrichtung bereitgestellt werden, dass in der Vorrichtung die empfangenen Informationen mit in der Vorrichtung abgespeicherten Informationen über mindestens einen Baustellenbereich verglichen werden, und dass automatisch ein, über Funk zu mindestens einem Funktelefon dessen Rufnummer in der Vorrichtung abgespeichert ist auszusendendes Warnsignal generiert wird, wenn der Vergleich ergibt, dass sich ein Zug einem Baustellenbereich nähert.

[0017] Das erfindungsgemäße Verfahren ist vorteilhafterweise Verfahren ist dadurch gekennzeichnet, dass nach Empfang eines Quittierungsignals auf das Warnsignal, automatisch ein ESTW-Befehl oder ein RBC-Befehl zur Freigabe des Gleisabschnittes auf dem sich der Zug nähert generiert und zum Elektronischen Stellwerkmodul bzw. RBC-Modul gesendet wird.

[0018] Das erfindungsgemäße Computerprodukt beinhaltend Computerprogrammkodemittel, die derart ausgestaltet sind, die Schritte des erfindungsgemäßen Verfahrens durchzuführen, wenn das Computerprogramm auf einem Computer abläuft. Die Erfindung ist beispielsweise durch Software realisiert. Dazu ist ein spezielles

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Computerprogramm, z.B. in Programmiersprache C++, vorgesehen.

[0019] Das Computerprodukt ist vorteilhafterweise als Computerprogramm oder als Computer lesbares Speichermedium ausgeführt ist. Das erfindungsgemäße Computerprogramm wird z.B. über CD-ROM vertrieben.

[0020] Vorteilhafte Ausgestaltungen der Erfindung sind den abhängigen Ansprüchen und der nachfolgenden Beschreibung zu entnehmen.

[0021] Im folgenden werden fünf Ausführungsbeispiele der Erfindung anhand von sechs Figuren erläutert. Es zeigen:

Fig. 1 eine schematische Darstellung eines ESTW-Bedienplatzes und eine erfindungsgemäßen Vorrichtung,

Fig. 2 eine schematische Darstellung von zwei Mobilgeräten,

Fig. 3 eine schematische Darstellung einer weiteren erfindungsgemäßen Vorrichtung und deren Anbindung,

Fig. 4 eine schematische Darstellung einer weiteren erfindungsgemäßen Vorrichtung und deren Anbindung,

Fig. 5 eine schematische Darstellung einer weiteren erfindungsgemäßen Vorrichtung und deren Anbindung,

Fig. 6 eine schematische Darstellung einer weiteren erfindungsgemäßen Vorrichtung und deren Anbindung.

[0022] Das erste Ausführungsbeispiel wird anhand von Fig. 1 und Fig. 2 erläutert. Fig. 1 zeigt eine schematische Darstellung eines ESTW-Bedienplatzes und einer erfindungsgemäßen Vorrichtung.

[0023] Fig. 1 zeigt die Anordnung der benötigten Geräte für eine automatische Rottenwarnung über GSM-Mobiltelefone. Die Erfindung betrifft Schnellbahnstrecken, die mit signalabhängigen Warnanlagen ausgerüstet werden müssen und die von Elektronischen Stellwerken (ESTW) gesteuert werden. Das Elektronische Stellwerk enthält unabhängig von der Bauform in der Regel immer einen Bedienplatz und Monitore sowie eine Eingabemöglichkeit über Maus oder Tastatur. Der vorhandene ESTW-Bedienplatz 8, der auch als ESTW-Arbeitsplatz oder ESTW-Anzeigemodul bezeichnet werden kann, ist mit der erfindungsgemäßen Vorrichtung 7 verbunden, die als ESTW-Schnittstellenmodul ausgeführt ist. Je noch Stellwerksbauform kann die Schnittstelle zwischen ESTW-Bedienplatz 8 und ESTW-Schnittstellenmodul als LAN Verbindung oder serielle Schnittstelle ausgeführt sein. Über diese Schnittstelle erhält das ESTW-Schnittstellenmodul die Standorte der Züge. Hierzu muss der ESTW-Bedienplatz 8 nicht geändert werden, da das ESTW-Schnittstellenmodul am Datenstrom lediglich mithört. Falls eine Geschwindigkeitsinformation der Züge im ESTW-Bedienplatz 8 zur Verfügung steht, wird diese ebenfalls übertragen. Weiterhin ist das ESTW-Schnittstellenmodul z.B. über eine ISDN-Schnittstelle oder direkt mit einem GSM-Modul 6 verbunden, das eine Schnittstelle zum GSM-Netz aufweist. Das GSM-Netz ist z.B. das für das Rottenwarn-Verfahren ausgewählte Netz eines Providers bzw. das Netz mehreren Provider. Das ESTW-Schnittstellenmodul und das GSM-Modul 6 können auch in einem Gerät integriert sein.

[0024] Als Funknetz kann anstelle des GSM auch verwendet werden: GSM-R, GPRS, EDGE, UMTS, Betriebsfunk, etc.

[0025] Der ESTW-Bedienplatz 8 ist ferner mit mehreren Modulen 3, 4, 5 verbunden, die wahlweise ausgeführt sein können als: Ein-/Ausgabemittel, Monitor, Tastatur, Computermaus, Drucker, etc. Der ESTW-Bedienplatz 8 ist z.B. Bestandteil eines Stellwerks-Bedienraumes, einer Leitstelle oder einer Betriebszentrale und ist z.B. als Rechner mit entsprechend spezieller Software ausgeführt. Anstelle eines Rechners kann auch ein Rechnersystem mit mindestens zwei Rechnern, z.B. drei Rechnern, vorgesehen sein.

[0026] Das ESTW-Schnittstellenmodul ist ferner mit mehreren Modulen 1, 2 verbunden, die wahlweise ausgeführt sein können als: Ein-/Ausgabemittel, Monitor, Tastatur, Computermaus, Drucker, etc. Das ESTW-Schnittstellenmodul ist z.B. als Rechner mit entsprechend spezieller Software ausgeführt. Anstelle eines Rechners kann auch ein Rechnersystem mit mindestens zwei Rechnern, z.B. drei Rechnern, vorgesehen sein. Das ESTW-Schnittstellenmodul ist derart programmiert, dass es die entsprechenden Funktionen ousführen kann. Die Programmierung erfolgt z.B. mittels der Programmiersprache C++.

[0027] Fig. 2 zeigt eine schematische Darstellung von zwei Mobilgeräten.

[0028] Das eine Mobilgerät 10 ist eine GSM-Mobilfunkstation mit einer Schnittstelle zu einem tragbaren Rechner 11, der z.B. als Laptop ausgeführt ist. Das andere Mobilgerät 9 ist eine GSM-Mobilfunkstation. Das Mobilgerät 10 dient als A-Handy, das Mobilgerät 9 als B-Handy. Für das Rottenwarn-Verfahren ist ein A-Handy und mindestens ein B-Handy vorgesehen, also z.B. zwei, drei, vier oder fünf B-Handys.

[0029] Soll eine Baustelle am Gleis eingerichtet werden, so wird das betroffene Gleis über ein Eingabemittel, z.B. Computermaus oder Tastatur, am ESTW-Schnittstellenmodul eingegeben. Zusätzlich wird ein A-Handy für die Baustelle ausgewählt und die Rufnummer des A-Handys zusammen mit dem Baustellengleis abgespeichert. Im ESTW-Schnittstellenmodul werden ferner vorteilhafterweise eine Anzahl von sogenannten TAN-Nummern über ein Programm für Zufallszahlen generiert, ausgedruckt und zusammen mit der Rufnummer des

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A-Handys abgespeichert. Der für die Baustelle zuständige Bauleiter nimmt die ausgedruckte TAN-Nummern-Liste mit auf die Baustelle. Auf eine elektronische Übertragung der TAN-Nummern wird aus Sicherheitsgründen verzichtet, da die Verbindung abgehört werden könnte. Wird eine zweite Baustelle am gleichen Stellwerk eingerichtet, so wird für diese ebenfalls die Rufnummer eines ausgewählten, anderen A-Handys und das oder die Baustellengleise abgespeichert sowie eine Liste mit neuen TAN-Nummern generiert, ausgedruckt und abgespeichert, wobei das ESTW-Schnittstellenmodul diejenigen TAN-Nummern, die zufallig auch in der ersten Baustelle vorkommen, nicht akzeptiert. In einer bevorzugten Ausführungsform sind zusätzlich zur Rufnummer des A-Handys die Rufnummern der dem A-Handy zugehörigen B-Handys abgespeichert, zwecks Ermöglichung eines Sammelrufs.

[0030] Betrifft die Baustelle mehrere, z.B. hintereinander angeordnete Gleisabschnitte (z.B. wandernde Baustelle) oder sollen mehrere Baustellen auf unterschiedlichen Gleisabschnitten zeitlich nacheinander abgearbeitet werden, so werden für jeden Gleisabschnitt separate TAN-Nummern vergeben und ausgelesen. Die letzte TAN-Nummer eines Gleisabschnitts hebt dann die Sperrung dieses Abschnitts dauerhaft auf. Sind die Arbeiten an dem betreffenden Gleisabschnitt beendet, so übermittelt der Baustellenleiter dem Fahrdienstleiter die letzte TAN-Nummer via Funk. Anstelle der letzten kann auch eine andere TAN-Nummer der dem jeweiligen Gleisabschnitt zugeordneten TAN-Nummern als Signal zur Aufhebung der Sperrung verwendet werden.

[0031] Die erste TAN-Nummer des nächsten, zu bearbeitenden Gleisabschnitts sperrt diesen bevor die Gleisarbeiten in diesem Abschnitt begonnen werden. Vor Beginn der Arbeiten übermittelt der Baustellenleiter dem Fahrdienstleiter die erste TAN-Nummer via Funk. Anstelle der ersten kann auch eine andere TAN-Nummer der dem jeweiligen Gleisabschnitt zugeordneten TAN-Nummern als Signal zur Sperrung verwendet werden. Der Fahrdienstleiter übermittelt dem Baustellenleiter eine Quittung via Funk. Die Quittung vom Stellwerk bestätigt die Wirksamkeit der Sperrung und dass sich kein Zug mehr in dem und vor dem gesperrten Abschnitt befindet.

[0032] Durch diese Art der Sperrung und Freischaltung wird die Dauer der Sperrung minimiert auf die tatsächliche Dauer der Gleisarbeiten.

[0033] In dem erfindungsgemäßen Verfahren muss der jeweilige Baustellenleiter sich nur einmal zu Beginn der Bauarbeiten mit dem Fahrdienstleiter absprechen, danach laufen alle Warnvorgänge automatisch ob. In dieser Absprache teilt der Bauleiter den Beginn der Bauarbeiten mit und der Fahrdienstleiter sperrt die Strecke. Der Zeitpunkt der Sperrung und Aufhebung der Sperrung kann wie zur wandernden Baustelle beschrieben durch den Fahrdienstleiter via Funk vorgegeben werden, auch bei einer einzelnen Baustelle. Durch eine normale Eingabe in den ESTW-Bedienplatz 8 wird diese Strecke gegen Befahren gesperrt. Im ESTW kann diese Strecke als gesperrt markiert und mit einem Merkhinweis versehen und auf dem Bedienmonitor angezeigt werden. Der Merkhinweis lautet z.B. RO1 für Rotte 1 und RO2 für Rotte 2, etc.

[0034] An der Baustelle befindet sich der tragbare Rechner 11, der mit dem A-Handy verbunden ist. Im tragbaren Rechner 11 sind vorteilhafterweise die Nummern der B-Handys gespeichert. Die B-Handys können auch Analoggeräte sein, die vom tragbaren Rechner 11 und dem A-Handy oder direkt vom ESTW-Schnittstellenmodul über Sammelruf angewählt werden. Jeder Bauarbeiter am Gleis hat ein B-Handy, über das er zur Räumung der Baustelle aufgefordert werden kann. Die Warnung erfolgt durch Klingelton des Handys oder bei Tragen von Gehörschutz einem im Gehörschutz eingebauten und mit dem Handy verbundenen Kopfhörer oder die Vibratorfunktion des Handys.

[0035] Nähert sich nun ein Zug der Baustelle, so wird zu einem Zeitpunkt zu dem der Zug noch mehr als sein Bremsweg von dem die Baustelle deckende Hauptsignal entfernt ist, vom ESTW-Schnittstellenmodul eine Warnung in Form eines Datentelegramm mit der für die Signaltechnik üblichen Kodesicherung automatisch generiert und über das GSM-Modul 6 an das A-Handy des Baustellenleiters und den angeschlossenen tragbaren Rechner 11 übertragen. Zur Dokumentation wird dies am mit dem ESTW-Schnittstellenmodul verbundenen Drukker mit Uhrzeit ausgedruckt. Die Gleisarbeiter erhalten über die B-Handys eine Aufforderung, das Gleis zu räumen. Ist das Gleis geräumt, setzt der Baustellenleiter am A-Handy eine entsprechende Meldung mit der nächsten TAN-Nummer aus seiner TAN-Nummern-Liste ab, die über GSM zum ESTW-Schnittstellenmodul gelangt. Das ESTW-Schnittstellenmodul vergleicht die empfangene TAN-Nummer mit der erwarteten TAN-Nummer und generiert bei Übereinstimmung automatisch den ESTW-Befehl zum Aufheben der Gleissperrung und sendet ihn an das ESTW-Bedienplatz 8. Ist die Aufhebung wirksam, kann eine Fahrstraße über das die Baustelle deckende Signal gestellt werden. Wird im ESTW-Schnittstellenmodul festgestellt, dass der Zug die Fahrstraße aufgelöst hat, so veranlasst es automatisch eine neue Sperrung dieser Fahrstraße mit der Eintragung des Sperrgrundes, z.B. RO 1. Ist diese Sperrung wirksam und hat der Zug den kompletten Baustellenbereich geräumt, so wird vom ESTW-Schnittstellenmodul eine Meldung an das A-Handy zusammen mit der nächsten TAN Nummer übertragen, dass die Baustelle wieder betreten werden kann. Der Baustellenleiter vergleicht die TAN Nummer mit seiner Liste und gibt bei Übereinstimmung der empfangenen mit der erwarteten TAN-Nummer das Betreten des Gleises frei. Die TAN-Nummern-Liste kann auch im tragbaren Rechner 11 abgespeichert werden. Dann werden die Vergleiche mit den TAN-Nummern und das Aussenden der TAN-Nummern automatisiert. Der tragbare Rechner 11 ist z.B. so programmiert, dass er einen ankommenden Warnruf mit den abgespeicherten TAN-Nummern vergleicht und bei Übereinstimmung ei-

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nen Sammelruf zu allen B-Handys sendet. Ebenso wird bei Versenden eines Quittierungssignals automatisch die entsprechende TAN-Nummer mitgesendet. A-Handy und tragbarer Rechner 11 können auch in einem Gerät integriert sein, z.B. Nokia Communicator. Nokia Communicator und ESTW-Schnittstellenmodul weisen beispielsweise eine gemeinsame Datenschnittstelle auf, z.B. über Kabel oder Infrarot, über die die TAN-Nummern dem Nokia Communicator und/oder die Rufnummer des Nokia Communicators dem ESTW-Schnittstellenmodul mitgeteilt werden können.

[0036] Gegen unberechtigte Eingriffe schützen die TAN Nummern. Anstelle der TAN-Nummern kann auch ein anderes Sicherungsverfahren eingesetzt werden, z.B. eine kryptische Verschlüsselung über einen sogenannten "Security Translator" bei der Übertragung von und zum A-Handy. Anstelle von TAN-Nummern können auch andere Nummern verwendet werden oder Kodes, die z.B. auch Buchstaben oder nur Buchstaben oder Sonderzeichen enthalten.

[0037] Das ESTW-Schnittstellenmodul hat Sicherheitsverantwortung. Es muss jeden Zug der sich der Baustelle nähert erkennen und das die Baustelle deckende Signal oder die betroffenen Gleisabschnitte automatisch sperren.

[0038] Kommt die Warnung nicht an der Baustelle an oder die Räummeldung der Rotte nicht in der Zentrale, z.B. bei Netzüberlastung, so wird der Zug vor der Baustelle abgebremst, da die automatisch eingelegte Sperre wirksam bleibt.

[0039] Das zweite Ausführungsbeispiel wird anhand von Fig. 3 erläutert. Fig. 3 zeigt eine erfindungsgemäße Vorrichtung und deren Anbindung.

[0040] Die Vorrichtung 7 ist wie im ersten Ausführungsbeispiel als ESTW-Schnittstellenmodul ausgeführt und weist eine Schnittstelle zu einem Funknetz und eine Verbindung zum GSM-Modul 6 auf. Aufbau und Funktionsweise entsprechen der erfindungsgemäßen Vorrichtung des ersten Ausführungsbeispiels. Im Gegensatz zu Fig. 1 ist die Vorrichtung 7 aus Fig. 3 über eine Bussystem oder ein lokales Netz mit der ESTW-Bedienplatz 8 sowie mit einem ESTW-Bedienplatz-Server 12 und einem ESTW 13 verbunden.

[0041] Das lokale Netz ist z.B. durch ein Ethernet LAN ausgeführt. Als Protokoll ist z.B. TCP/IP verwendet. Anstelle eines Bussystems können die einzelnen Elemente auch über zwei, drei oder mehr Bussysteme miteinander verbunden sein. Ein Bussystem kann ein, zwei, drei oder mehr Busse aufweisen.

[0042] Im ESTW 13 werden die Daten der Achszähler oder Gleiskreise empfangen und ausgewertet. Das ESTW 13 stellt die relevanten Daten dem ESTW-Bedienplatz-Server über die LAN-Schnittstelle dem ESIW-Bedienplatz 12 zur Verfügung. Der ESTW-Bedienplatz organisiert die Verteilung der relevanten Daten zur Vorrichtung 7 und zum ESTW-Bedienplatz 8. Vorrichtung 7 empfängt somit Informationen über Züge vom ESTW 13 über den ESTW-Bedienplatz-Server 12 und sendet den generierten ESTW-Befehl entweder über die LAN-Schnittstelle zum ESTW-Bedienplatz 8 oder über die LAN-Schnittstelle zum ESTW-Bedienplatz-Server 12, der ihn zum ESTW 13 weiterleitet. Die Schnittstelle zwischen Vorrichtung 7 und ESTW-Bedienplatz 8 ist z.B. als SBS ausgelegt, SBS=Standard Bedien-Schnittstelle.

[0043] Das GSM-Modul 6 kann anstelle direkt auch über das LAN mit Vorrichtung 7 verbunden sein. Alternativ kann GSM-Modul 6 auch direkt mit ESTW 13 verbunden sein.

[0044] Anstelle eines ESTW-Bedienplatzes 8 können auch zwei, drei, vier oder mehr ans LAN angeschlossen sein.

[0045] Anstelle eines ESTW 13 kann auch ein RBC verwendet werden. In diesem Fall kann das GSM-Modul 6 entfallen und die Funkkommunikation zu den Arbeitern im Gleis über das RBC abgewickelt werden. Vorrichtung 7 sendet dazu das über Funk auszusendende Warnsignal über den dann als RBC-Bedienplatz-Server ausgestalteten Server oder direkt zum RBC. Der ESTW-Bedienplatz 8 ist durch einen RBC-Bedienplatz zu ersetzen.

[0046] Das dritte Ausführungsbeispiel wird anhand von Fig. 4 erläutert. Fig. 4 zeigt eine erfindungsgemäße Vorrichtung und deren Anbindung.

[0047] Im dritten Ausführungsbeispiel ist die Funktionalität der Vorrichtung 7 aus Fig. 3 in Vorrichtung 8', die als ESTW-Bedienplatz ausgestaltet ist, mit integriert. Die Funktionalität wird im wesentlichen durch Softwareprogrammierung bereitgestellt. Ein spezielle Computerprogramm übernimmt somit die Ausgabe der Rottenwarnung. Vorrichtung 8' weist eine Schnittstelle zu einem GSM-Modul 6 auf, das dem GSM-Modul aus Fig. 3 entspricht. Das GSM-Modul kann auch mit dem LAN verbunden und über das LAN mit Vorrichtung 8' verbunden sein. Vorrichtung 8' entspricht somit einem Standard-ESTW-Bedienplatz mit zusätzlicher Programmierung zwecks Ausführung der Rottenwarnung und Überwachung eines Baustellenbereichs.

[0048] Anstelle als ESTW-Bedienplatz kann Vorrichtung 8' auch als RBC-Bedienplatz ausgeführt sein. In diesem Fall kann GSM-Modul 6 entfallen.

[0049] Das vierte Ausführungsbeispiel wird anhand von Fig. 5 erläutert. Fig. 5 zeigt eine erfindungsgemäße Vorrichtung und deren Anbindung.

[0050] Die Elemente entsprechen ihrer Funktionalität noch den gleichnamigen Elementen aus Fig. 3.

[0051] Vorrichtung 7 aus Fig. 5 ist mit ESTW-Bedienplatz-Server 12, ESTW-Bedienplatz 8 sowie einem weiteren ESTW-Bedienplatz 14 über ein lokales Netz, ein Bussystem, zwei oder mehr lokale Netze oder zwei oder mehr Bussysteme verbunden.

[0052] ESTW 13 ist mit ESTW-Bedienplatz-Server 12 über eine Punkt-zu-Punkt Verbindung, ein lokales Netz, ein Bussystem, zwei oder mehr lokale Netze oder zwei oder mehr Bussysteme verbunden.

[0053] Das fünfte Ausführungsbeispiel wird anhand von Fig. 6 erläutert. Fig. 6 zeigt eine erfindungsgemäße Vorrichtung und deren Anbindung.

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[0054] Die Elemente entsprechen ihrer Funktionalität nach den gleichnamigen Elementen aus Fig. 3.

[0055] ESTW-Bedienplatz-Server 12 aus Fig. 6 ist mit Vorrichtung 7 und ESTW-Bedienplatz 8 über Punkt-zu-Punkt Verbindungen, ein lokales Netz, ein Bussystem, zwei oder mehr lokale Netze oder zwei oder mehr Bussysteme verbunden.

[0056] ESTW 13 ist mit ESTW-Bedienplatz-Server 12 über eine Punkt-zu-Punkt Verbindung, ein lokales Netz, ein Bussystem, zwei oder mehr lokale Netze oder zwei oder mehr Bussysteme verbunden.

Kombinationen einzelner oder mehrerer Merkmale aus verschiedenen Ausführungsbeispielen sind möglich.

Patentansprüche

1. Vorrichtung (7, 8') zur Rottenwarnung, **dadurch gekennzeichnet, dass** eine Schnittstelle zu einem Elektronischen Stellwerkmodul (8, 12, 13, 14) und eine Schnittstelle zu einem Funknetz vorgesehen ist, dass die Vorrichtung (7, 8') geeignet ist, Informationen über mindestens einen Zug vom Elektronischen Stellwerkmodul zu empfangen und mit abgespeicherten Informationen über mindestens einen Baustellenbereich zu vergleichen, und dass die Vorrichtung (7, 8') geeignet ist, für den Fall, dass sich ein Zug einem Baustellenbereich nähert, automatisch ein Warnsignal über die Funkschnittstelle zu mindestens einem Funktelefon (10, 9) auszusenden dessen Rufnummer in der Vorrichtung (7, 8') gespeichert ist.

2. Vorrichtung (7, 8') nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung (7, 8') geeignet ist, für den Fall des Empfangs eines Quittierungsignals auf das Warnsignal, automatisch einen ESTW-Befehl zur Freigabe des zuvor automatisch gesperrten Gleisabschnittes auf dem sich der Zug nähert zu generieren und zum Elektronischen Stellwerkmodul zu senden.

3. Vorrichtung (7, 8') nach Anspruch 2, **dadurch gekennzeichnet, dass** die Vorrichtung (7, 8') geeignet ist, zumindest einen Teil des empfangenen Quittierungssignals mit abgespeicherten Nummern oder einem abgespeicherten Kode zu vergleichen und den ESTW-Befehl nur zu generieren, wenn der zumindest eine Teil des empfangenen Quittierungssignals mit einer abgespeicherten Nummer bzw. dem abgespeicherten Kode übereinstimmt.

4. Vorrichtung (7, 8') nach Anspruch 1, **dadurch gekennzeichnet, dass** das Elektronische Stellwerkmodul (8, 12, 13, 14) als ESTW-Bedienplatz (8, 14), als ESTW-Bedienplatz-Server (12) oder als ESTW (13) ausgeführt ist.

5. Vorrichtung (7, 8') nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung (7, 8') als ESTW-Schnittstellenmodul oder als ESTW-Bedienplatz (8') ausgeführt ist.

6. Vorrichtung (7, 8') nach Anspruch 1, **dadurch gekennzeichnet, dass** anstelle der Schnittstelle zum Elektronischen Stellwerkmodul (8, 12, 13, 14) eine Schnittstelle zu einem RBC-Modul vorgesehen ist, und dass die Vorrichtung (7, 8') geeignet ist, Informationen über mindestens einen Zug vom RBC-Modul zu empfangen und mit abgespeicherten Informationen über mindestens einen Baustellenbereich zu vergleichen, dass das RBC-Modul als RBC-Bedienplatz, als RBC-Bedienplatz-Server oder als RBC (13) ausgeführt ist, und dass die Vorrichtung (7, 8') als RBC-Schnittstellenmodul oder als RBC-Bedienplatz ausgeführt ist.

7. Verfahren zum Überwachen eines Baustellenbereichs einer Schienenanlage, **dadurch gekennzeichnet, dass** Informationen über mindestens einen Zug von einem Elektronischen Stellwerkmodul (8, 12, 13, 14) oder einem RBC-Modul einer Vorrichtung (7, 8') bereitgestellt werden, dass in der Vorrichtung (7, 8') die empfangenen Informationen mit in der Vorrichtung (7, 8') abgespeicherten Informationen über mindestens einen Baustellenbereich verglichen werden, und dass automatisch ein, über Funk zu mindestens einem Funktelefon (10, 9) dessen Rufnummer in der Vorrichtung (7, 8') abgespeichert ist auszusendendes Warnsignal generiert wird, wenn der Vergleich ergibt, dass sich ein Zug einem Baustellenbereich nähert.

8. Verfahren nach Anspruch 7, **dadurch gekennzeichnet, dass** noch Empfang eines Quittierungsignals auf das Warnsignal, automatisch ein ESTW-Befehl oder RBC-Befehl zur Freigabe des zuvor automatisch gesperrten Gleisabschnittes auf dem sich der Zug nähert generiert und zum Elektronischen Stellwerkmodul bzw. RBC-Modul gesendet wird.

9. Computerprodukt beinhaltend Computerprogrammkodemittel, die derart ausgestaltet sind, die Schritte des Verfahrens nach Anspruch 7 durchzuführen, wenn das Computerprogramm auf einem Computer abläuft.

10. Computerprodukt nach Anspruch 9, **dadurch gekennzeichnet, dass** das Computerprodukt als Computerprogramm oder als Computer lesbares Speichermedium ausgeführt ist.

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Claims

1. Device (7, 8') for warning work gangs, **characterised in that** an interface to an electronic signal box module (8, 12, 13, 14) and an interface to a radio network are provided, the device (7, 8') is suitable for receiving information about at least one train from the electronic signal box module and comparing it with stored information about at least one construction site area and that the device (7, 8') is suitable for automatically transmitting a warning signal via the radio interface to at least one radio telephone (10, 9), the call number of which is stored in the device (7, 8'), in the event of a train approaching a construction site area.

2. Device (7, 8') according to claim 1, **characterised in that** the device (7, 8') is suitable for automatically generating an ESTW command to release the previously automatically blocked track section on which the train is approaching and sending it to the electronic signal box module in the event of receipt of an acknowledgement signal in response to the warning signal.

3. Device (7, 8') according to claim 2, **characterised in that** the device (7, 8') is suitable for comparing at least part of the received acknowledgement signal with stored numbers or a stored code and generating the ESTW command only if the at least one part of the received acknowledgement signal coincides with a stored number or the stored code.

4. Device (7, 8') according to claim 1, **characterised in that** the electronic signal box module (8, 12, 13, 14) is designed as an ESTW operator terminal (8, 14), an ESTW operator terminal server (12) or an ESTW (13).

5. Device (7, 8') according to claim 1, **characterised in that** the device (7, 8') is designed as an ESTW interface module or as an ESTW operator terminal (8').

6. Device (7, 8') according to claim 1, **characterised in that** an interface to an RBC module is provided instead of the interface to the electronic signal box module (8, 12, 13, 14) and that the device (7, 8') is suitable for receiving information about at least one train from the RBC module and comparing it with stored information about at least one construction site area, that the RBC module is designed as an RBC operator terminal, an RBC operator terminal server or an RBC (13) and that the device (7, 8') is designed as an RBC interface module or as an RBC operator terminal.

7. Method for monitoring a construction site area of a rail system, **characterised in that** information about at least one train is provided to a device (7, 8') by an electronic signal box module (8, 12, 13, 14) or an RBC module, that in the device (7, 8') the received information is compared with information stored in the device (7, 8') about at least one construction site area and that a warning-signal to be transmitted via radio to at least one radio telephone (10, 9), the call number of which is stored in the device (7, 8'), is automatically generated if it emerges from the comparison that a train is approaching a construction site area.

8. Method according to claim 7, **characterised in that** after receipt of an acknowledgement signal in response to the warning signal, an ESTW command or RBC command for release of the previously automatically blocked track section on which the train is approaching is automatically generated and sent to the electronic signal box module or RBC module.

9. Computer product containing computer program code means configured so as to perform the steps of the method according to claim 7 when the computer program is running on a computer.

10. Computer product according to claim 9, **characterised in that** the computer product is designed as a computer program or as a computer-readable storage medium.

Revendications

1. Dispositif (7, 8') pour l'avertissement des personnes travaillant sur la voie, **caractérisé en ce qu'**une interface pour un module électronique de poste d'aiguillage (8, 12, 13, 14) et une interface pour un réseau radio sont prévues, **en ce que** le dispositif (7, 8') est approprié pour recevoir des informations sur au moins un train du module électronique du poste d'aiguillage et pour les comparer avec des informations mémorisées sur au moins une zone de chantier, et **en ce que** le dispositif (7, 8') est approprié, dans le cas où un train s'approche d'une zone de chantier, pour émettre automatiquement un signal d'avertissement par l'interface radio à au moins un téléphone radio (10, 9), dont le numéro d'appel est mémorisé dans le dispositif (7, 8').

2. Dispositif (7, 8') selon la revendication 1, **caractérisé en ce que** le dispositif (7, 8') est approprié, dans le cas où l'on reçoit un signal d'acquittement du signal d'avertissement, pour générer automatiquement une instruction ESTW pour la libération de la section de voie bloquée automatiquement auparavant sur laquelle le train s'approche et pour l'envoyer au module électronique du poste d'aiguillage.

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3. Dispositif (7, 8') selon la revendication 2, **caractérisé en ce que** le dispositif (7, 8') est approprié pour comparer au moins une partie du signal d'acquittement reçu avec des numéros mémorisés au un code mémorisé et pour générer l'instruction ESTW seulement lorsque la au moins une partie du signal d'acquittement reçu coïncide avec un numéro mémorisé ou le code mémorisé.

4. Dispositif (7, 8') selon la revendication 1. **caractérisé en ce que** le module électronique du poste d'aiguillage (8, 12, 13, 14) est réalisé comme un poste de commande ESTW (8, 14), comme un serveur de poste de commande ESTW (12) ou comme ESTW (13).

5. Dispositif (7, 8') selon la revendication 1, **caractérisé en** cc que le dispositif (7, 8') est réalisé sous la forme d'un module d'interface ESTW ou d'un poste de commande ESTW (8').

6. Dispositif (7, 8') selon la revendication 1, **caractérisé en ce que**, à la place de l'interface avec le module électronique du poste d'aiguillage (8, 12, 13, 14), il est prévue une interface avec un module RBC et **en ce que** le dispositif (7, 8') est approprié pour recevoir des informations sur au moins un train du module RBC et les comparer avec des informations mémorisées sur au moins une zone de chantier, **en ce que** le module RBC est réalisé sous la forme d'un poste de commande RBC, d'un serveur de poste de commande RBC ou de RBC (13) et **en ce que** le dispositif (7, 8') est réalisé sous la forme d'un module d'interface RBC ou d'un poste de commande RBC.

7. Procédé pour contrôler une zone de chantier d'une installation de rails, **caractérisé en ce que** des informations sur au moins un train sont mises à la disposition d'un dispositif (7, 8') par un module électronique de poste d'aiguillage (8, 12, 13, 14) ou un module RBC, **en ce que** les informations reçues sont comparées dans le dispositif (7, 8') avec des informations mémorisées dans le dispositif (7, 8') sur au moins une zone de chantier, et **en ce qu'**un signal d'avertissement à envoyer par radio à au moins un téléphone par radio (10, 9), dont le numéro d'appel est mémorisé dans le dispositif (7, 8'), est généré automatiquement lorsque la comparaison montre qu'un train s'approche d'une zone de chantier.

8. Procédé selon la revendication 7, **caractérisé en ce que**, après la réception d'un signal d'acquittement du signal d'avertissement, une instruction ESTW ou une instruction RBC est générée automatiquement pour la libération de la section de voie bloquée automatiquement auparavant sur laquelle le train s'approche et est envoyée au module électronique du poste d'aiguillage ou au module RBC.

9. Produit informatique contenant des moyens de codage de programme informatique qui sont conçus de manière à exécuter les étapes du procédé selon la revendication 7 lorsque le programme informatique se déroule sur un ordinateur.

10. Produit informatique selon la revendication 9, **caractérisé en ce que** le produit informatique est réalisé sous la forme d'un programme informatique ou sous la forme d'un support de mémorisation pouvant être lu par l'ordinateur.

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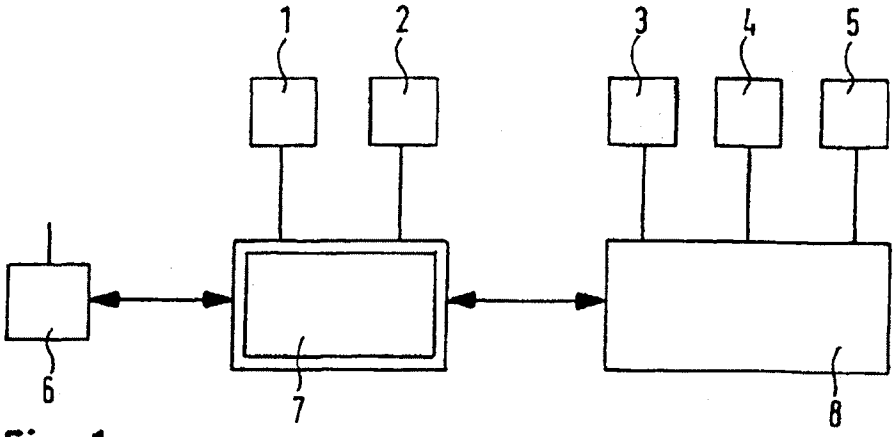


Fig. 1

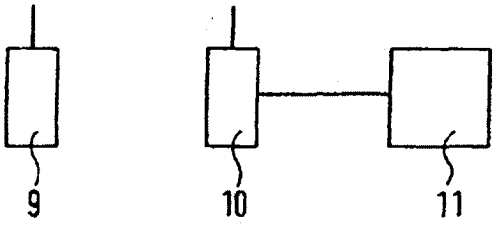


Fig. 2

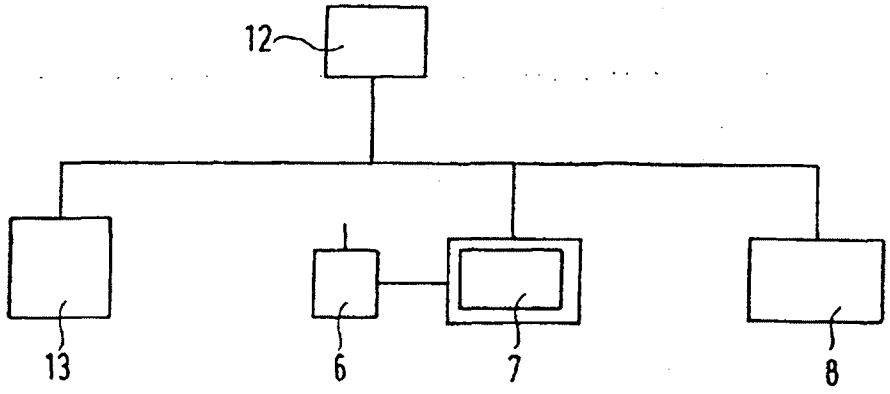


Fig. 3

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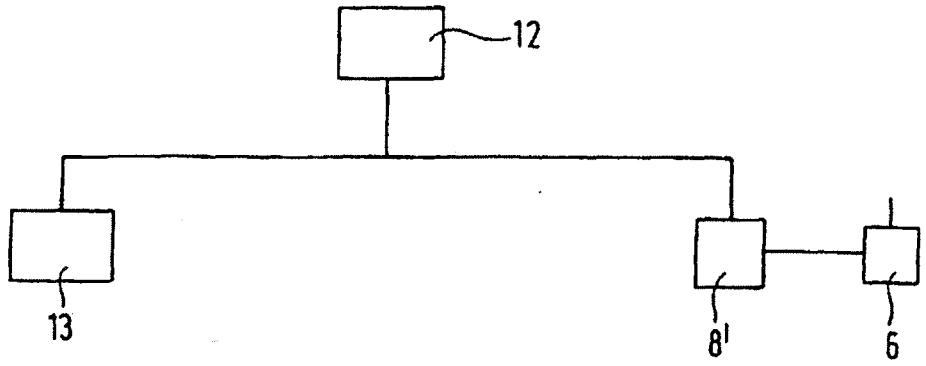


Fig. 4

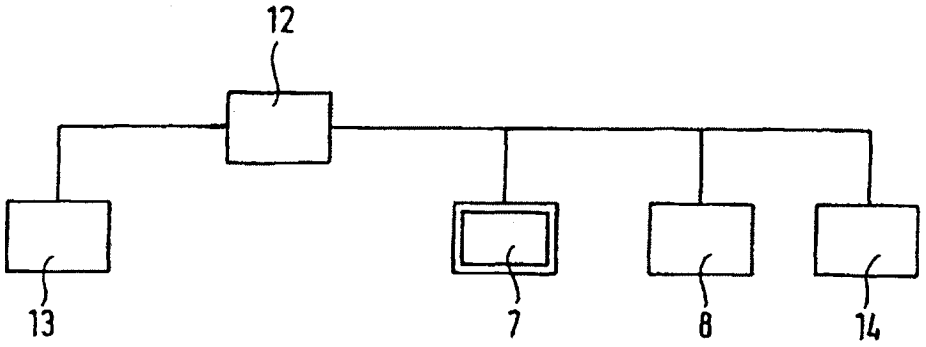


Fig. 5

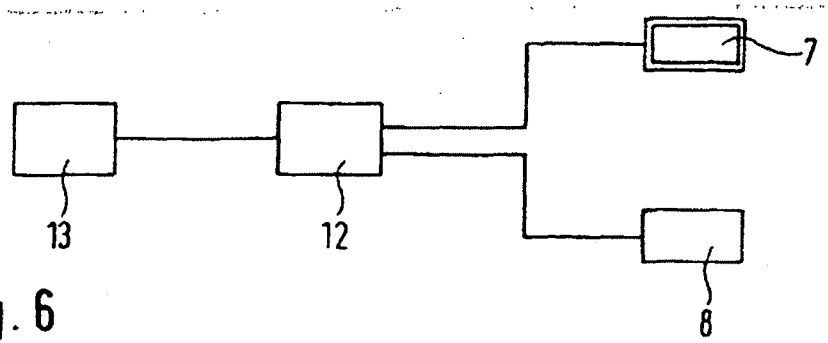


Fig. 6

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(73) Patent holder: **ALCATEL**
75008 Paris (FR)

(72) Inventor: **Rahn, Wolf-Helmut**
74376 Gemmrigheim (DE)

(74) Assignee: **Menzietti, Domenico et al**
Alcatel
Intellectual Property Department, Stuttgart
70430 Stuttgart (DE)

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EP-A- 0 286 627 **EP-A- 1 060 972**
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- **PATENT ABSTRACTS OF JAPAN vol. 013, no. 567 (M-908), 15 December 1989 (1989-12-15) & JP 01 237261 A (MITSUBISHI ELECTRIC CORP), 21 September 1989 (1989-09-21)**

Note: Within nine months after the publication of the mention of the grant of the European patent, anyone can file a notice of opposition to the granted European patent in the European Patent Office. The notice of opposition must be submitted and justified in writing. It is only considered filed after the patent opposition fee has been paid (Art. 99(1) European Patent Convention).

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Description

[0001] The invention relates to a device for warning work crews.

[0002] Work crew warning systems for warning track workers of approaching trains are differentiated into signal-independent and signal-dependent warning systems. In Germany and in other European countries, signal-dependent warning systems are required under the accident prevention regulations for speeds > 200 km/h. In the case of these systems, the main signal or blocking signal covering the construction site area can be provided once the work crew has generated a message to the interlocking unit stating that the track has been cleared. The prior art systems have the disadvantage that extensive modifications and expansions must be made to the interlocking unit and that a cable connection between the interlocking unit and the work site must be established on the track.

[0003] EP 0 286 627 A2 discloses a mechanism for warning work crews in which control commands are transmitted from the interlocking unit circuit as a work crew warning message by means of an internal system on the interlocking unit side to an external system on the construction site side and, after the implementation of the safety measures on the construction site, the safety station transmits an acknowledgement from the external system to the internal system. The work crew is protected in a manner which is secure in terms of signalling technology by the exit or blocking signal controlled by the internal system. A control command, initiated by the station master, for the exit or blocking signal is only triggered by the acknowledgement of the safety station. A matching circuit, which must be present on each track, must be developed for each interlocking unit type. In the case of relay interlocking unites, specific relay groups, which must be present once for each track of the line, have to be developed. This requires considerable development effort, plus expensive additional hardware is needed.

[0004] The problem addressed by the invention is that of creating a simpler device for warning work crews and also an associated method for warning work crews.

[0005] This problem is solved by a device according to claim 1 and by a method according to claim 7.

[0006] The device according to the invention has an interface with a radio network, via which at least one radio station can be contacted automatically for the purpose of warning track workers via radio about the approach of a train. The device according to the invention is configured in an advantageous manner as a CBI interface module, which is connected via an interface to a CBI unit [CBI = Computer-Based (or Electronic) Interlocking, Ger.: *Elektronische Stellwerk, ESTW*]. The CBI unit informs the CBI interface of the current sites, the occupation of the track sections, and/or in the case of the ETCS, the position reports of the approaching trains, including the relevant track numbers. The CBI interface module compares the information received to previously stored information about tracks on which track workers are working, e.g., at a construction site. If a train is approaching the construction site, under the control of the CBI interface module a warning signal is transmitted to the track workers via radio, e.g., GSM-R. The track workers are equipped with standard mobile telephones such as GSM cell phones. The warning signal can be transmitted to a previously designated telephone, e.g., the construction site foreman's, and/or to all track workers simultaneously in a broadcasting procedure. The track in question will be released and the approaching train allowed to pass through only after receipt of an acknowledgement signal from the construction site foreman confirming that there are no longer any track workers in the danger zone. Security can be increased by using a coded radio transmission for communication between the construction site foreman and the CBI interface module. In an expedient manner, random numbers established prior to the transmission and known only to the construction site foreman and to the CBI interface module can be used for the coding.

[0007] The invention is particularly suited for use in the new ETCS (ETCS = European Train Control System). In the case of ETCS Level 3, the CBI unit can be replaced by an RBC and the CBI operator terminal can be replaced by an RBC operator terminal (RBC = Radio Block Center). In contrast to CBI units, in which information about the trains is transmitted by means of axle counters and electric and/or fiber optic cables, in the case of RBCs the information about the trains is transmitted directly to the RBC via radio (by means of GSM-R) by the trains, wherein the trains read in information via balises.

[0008] Only one device according to the invention is needed per interlocking unit. The intervention in the interlocking unit solely concerns a new interface. The commands for blocking/releasing the tracks are generated in compliance with the commands of the existing CBI unit. Hence specific software upgrades or software modifications in the CBI unit are not required. By using GSM, it is possible to dispense with a cable connection from the interlocking unit to the line. The construction site foreman and the track workers each have a cell phone, whereby the information transfer is greatly accelerated in time and can take place individually on the one hand, and a locally flexible deployment of the workers is possible on the other hand, even outside the call range. In the case of the prior art, access to the cable connection to the interlocking unit is not available at every point along the line. As a result it is necessary to have a chain of safety stations to the next access point. By using cell phones, work can be performed on any point of the line by a minimum number of track workers; a chain of safety posts is no longer necessary. By using a specific transmission method for securing the transmission (in an

advantageous manner by means of TANs (TAN = Transaction Authentication Number), standard mobile radio stations can be used. A cost-effective and secure implementation of a work crew warning system is thus achieved by the invention.

[0009] The device according to the invention for warning work crews is characterized in that provision is made of an interface with an electronic interlocking module and of an interface with a radio network, that the device is suitable for receiving information about at least one train from the electronic interlocking module and comparing it with stored information about at least one construction site area, and that the device is suitable, for the case in which a train is approaching a construction site area, for automatically sending out a warning signal via the radio interface to at least one radio telephone, the call number of which is stored in the device. The information about a current construction site, e.g., date, time, track section, is input in the device before it is put in operation. The operator (station master) of the CBI unit blocks the relevant track section for the input time period, e.g., 8 o'clock to 10 o'clock or 7 o'clock to whenever. Track workers who are in the danger zone during the time period are warned via the warning signal about the approaching train. The warning signal is sent out by radio; at least one track worker, e.g., the construction site foreman, has a radio telephone by means of which he can receive the warning signal.

[0010] The device according to the invention is advantageously characterized in that the device is suitable, for the case in which an acknowledgement signal is received in response to the warning signal, for automatically generating a CBI command to release the previously automatically blocked track section on which the train is approaching and sending it to the electronic interlocking module. The construction site foreman instructs his track workers to leave the danger zone. When this is accomplished, he sends an acknowledgement signal by radio to the device. This device is now informed that there are no longer any track workers in the danger zone. The track in question can now be released and the approaching train can pass through.

[0011] The device according to the invention is further advantageously characterized in that the device is suitable for comparing at least a portion of the received acknowledgement signal with stored numbers or a stored code and only generating the CBI command if at least the portion of the received acknowledgement signal matches a stored number and/or the stored code. To increase security, the communication between the device and the construction site foreman is secured, in the most expedient manner by numbers which are known only to the device and to the construction site foreman and which are sent in excerpts with every transmission. As an alternative, use can be made of letters, of special characters, of a specific coding or of an asymmetric encryption, for example.

[0012] The device according to the invention is furthermore advantageously characterized in that the electronic interlocking module is configured as a CBI operator terminal server or as a CBI unit.

[0013] In a preferred design of the invention, the device is configured as a CBI interface module or as a CBI operator terminal.

[0014] In another preferred design of the invention, the device according to the invention is characterized in that an interface with an RBC module is provided in lieu of the interface with the electronic interlocking module, and that the device is suitable for receiving information about at least one train from the RBC module and comparing it to stored information about at least one construction site area, that the RBC module is configured as an RBC operator terminal, as an RBC operator terminal server, or as an RBC unit, and that the device is configured as an RBC interface module or as an RBC operator terminal (RBC = Radio Block Center). The device can be used on all ETCS systems.

[0015] In the case of automatic operation, the device could also be built into a train. The invention can even be used with driverless operation. The device in the train receives (e.g., via balises and/or radio) the information about a construction site area that is blocked because of construction work and sends out a warning signal via radio if the train is approaching this area. The train stops if it does not receive an acknowledgement signal. If the train receives an acknowledgement signal, it can then pass through the construction site.

[0016] The method according to the invention for monitoring a construction site area of a railway system is characterized in that information about at least one train is provided by an electronic interlocking module or by an RBC module of a device, that the received information is compared in the device to information about at least one construction site area stored in the device, and that a warning signal to be sent out via radio to at least one radio telephone of which the call number is stored in the device is generated automatically if it emerges from the comparison that a train is approaching the construction site area.

[0017] The method according to the invention is advantageously characterized in that, after receiving an acknowledgement signal in response to the warning signal, a CBI command or an RBC command for releasing the track section on which the train is approaching is automatically generated and sent to the electronic interlocking module or to the RBC module.

[0018] The computer product according to the invention contains computer program coding means, which are designed in such a way as to carry out the steps of the method according to the invention if the computer program is running on a computer. The invention is

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implemented by software, for example. To this end, provision is made of a specific computer program in, for example, C++ programing language.

[0019] The computer product is advantageously configured as a computer program or as a computer-readable storage medium. The computer program according to the invention is distributed via CD ROM, for example.

[0020] Advantageous designs of the invention can be deduced from the dependent claims and the following description.

[0021] In the following, five exemplary embodiments of the invention shall be explained with reference to six figures, wherein:

Fig. 1 shows a schematic depiction of a CBI operator terminal and a device according to the invention,

Fig. 2 shows a schematic depiction of two mobile devices,

Fig. 3 shows a schematic depiction of another device according to the invention and the connection thereof,

Fig. 4 shows a schematic depiction of another device according to the invention and the connection thereof,

Fig. 5 shows a schematic depiction of another device according to the invention and the connection thereof,

Fig. 6 shows a schematic depiction of another device according to the invention and the connection thereof.

[0022] The first exemplary embodiment shall be explained with reference to Fig. 1 and Fig. 2. Fig. 1 shows a schematic depiction of a CBI operator terminal and of a device according to the invention.

[0023] Fig. 1 shows the arrangement of the devices needed for an automatic warning of work crews via GSM mobile telephones. The invention relates to rapid transit lines that have to be equipped with signal-dependent warning systems and that are controlled by electronic interlocking (computer-based interlocking, CBI) units. As a rule the electronic interlocking unit, regardless of the design, always contains an operator terminal and monitors, and also an input means via mouse or keyboard. The present CBI operator terminal 8, which can also be referred to as a CBI workstation or a CBI display module, is connected to the device 7 according to the invention, which is configured as a CBI interface module. Depending upon the interlocking unit design, the interface between the CBI operator terminal 8 and the CBI interface module can be configured as a LAN connection or as a serial interface. The CBI interface module receives the locations of the trains via this interface. It is not necessary to modify the CBI operator terminal 8 for this purpose because the CBI interface module merely listens in on the data stream. If information about the speed of the trains is available in the CBI operator terminal 8, it too is transmitted. The CBI interface module is furthermore connected, e.g., via an ISDN interface or directly, to a GSM module 6, which has an interface with the GSM network. The GSM network, for example, is the network of a provider or the network of several providers selected for the work crew warning procedure. The CBI interface module and the GSM module 6 can also be integrated in one device.

[0024] Instead of the GSM, as a radio network use can also be made of: GSM-R, GPRS, EDGE, UMTS, Professional Mobile Radio (PMR), etc.

[0025] The CBI operator terminal 8 is furthermore connected to several modules 3, 4, 5, which can be selectively configured as: input/output means, monitors, keyboards, computer mouse devices, printers, etc. The CBI operator terminal 8, for example, is a component of an interlocking operator terminal, a control station, or operation center and is configured as, for example, a data processor with appropriate specific software. A data processing system with at least two data processors, e.g., three data processors, can be also provided instead of one data processor.

[0026] The CBI interface module is furthermore connected to several modules 1, 2, which can be selectively configured as: input/output means, monitors, keyboards, computer mouse devices, printers, etc. The CBI interface module is configured as, for example, a data processor with appropriate specific software. A computer system with at least two data processors, e.g., three data processors, can also be provided instead of one data processor. The CBI interface module is programed in such a way that it can carry out the corresponding functions. It is programmed by means of, for example, the programing language C++.

[0027] Fig. 2 shows a schematic depiction of two mobile devices.

[0028] One mobile device 10 is a GSM mobile radio station with an interface with a portable data processor 11 configured as, for example, a laptop. The other mobile device 9 is a GSM mobile radio station. The mobile device 10 serves as an A-cell phone; the mobile device 9 serves as a B-cell phone. For the work crew warning procedure, provision is made of one A-cell phone and at least one B-cell phone, i.e., two, three, four, or five B-cell phones, for example.

[0029] If a construction site is to be set up on the track, the track in question is input via an input means (e.g., computer mouse or keyboard) on the CBI interface module. In addition, an A-cell phone is selected for the construction site and the call number of the A-cell phone is stored together with the construction site track. Furthermore, a number of so-called TANs are advantageously generated in the CBI interface module via a random number program, printed out, and stored

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together with the call number of the A-cell phone. The foreman in charge of the construction site takes the printed-out TAN list with him to the construction site. For security reasons there is no electronic transmission of TANs because the connection could be bugged. If a second construction site is set up on the same interlocking unit, then for this construction site the call number of another selected A-cell phone and the construction site track or tracks will also be stored and a list with new TANs will also be generated, printed out, and stored, wherein the CBI interface module will not accept any TANs that coincidentally also exist in the first construction site. In a preferred embodiment, the call numbers of the B-cell phones associated with the A-cell phone are stored in addition to the call number of the A-cell phone so that a collective call can be made.

[0030] If the construction site concerns several, for example sequentially arranged, track sections (e.g., mobile construction site) or if several construction sites on different track sections are to be worked on one after another, then separate TANs will be assigned and read out for each track section. The last TAN of a track section then permanently cancels the blocking of this section. When the work on the track section in question is complete, the construction site foreman therefore radios the last TAN to the station master. Instead of the last one, another TAN of the TANs assigned to the track section in question can also be used as a signal for canceling the blocking.

[0031] The first TAN of the next track section to be worked on blocks this track section before the track work is begun on it. Before the start of the work, the construction site foreman radios the first TAN to the station master. Instead of the first one, another TAN of the TANs assigned to the track section in question can also be used as a signal for blocking. The station master radios an acknowledgement to the construction site foreman. The acknowledgement from the interlocking confirms the efficacy of the blocking and that no more trains are located in and before the blocked section.

[0032] This type of blocking and releasing minimizes the duration of the blocking to the actual duration of the track work.

[0033] In the method according to the invention, the construction site foreman in question only needs to communicate once with the station master upon the start of the construction work. Afterwards all warning processes run automatically. In this communication, the foreman informs the station master of the start of the work and the station master blocks the line. The station master can also specify the time of the blocking and cancellation of the blocking via radio for a single construction site in the same way as described for a mobile construction site. This line will be blocked for passage by a normal input in the CBI operator terminal 8. In the CBI unit, this line can be marked as blocked, provided with an identifier, and displayed on the operating monitor. The identifier reads, for example, RO1 for work crew (Ger.: *Rotte*) 1 and RO2 for work crew 2, etc.

[0034] The portable data processor 11, which is connected to the A-cell phone, is located at the construction site. The numbers of the B-cell phones are advantageously stored in the portable data processor 11. The B-cell phones can also be analog devices, which can be called by the portable data processor 11 and the A-cell phone or directly by the CBI interface module via a collective call. Each construction worker on the track has a B-cell phone via which he can be instructed to vacate the construction site. The warning is given by a ring tone of the cell phone or in the event that a hearing protector is being worn, by a headset integrated in the hearing protector and connected to the cell phone or by the vibration function of the cell phone.

[0035] If a train approaches the construction site, then a warning in the form of a data telegram with the code security typical of signaling technology will be automatically generated by the CBI interface module and transmitted via the GSM module 6 to the A-cell phone of the construction site foreman and to the connected portable data processor 11 at a point in time when the train is still further away than its braking distance from the main signal covering the construction site. For documentation purposes, this data telegram will be printed out, with the time, on the printer connected to the CBI interface module. The track workers receive an instruction via the B-cell phones to clear the track. Once the track is cleared, the construction site foreman uses the A-cell phone to send a corresponding message with the next TAN from his TAN list, which reaches the CBI interface module via GSM. The CBI interface module compares the received TAN to the expected TAN and if they match, automatically generates the CBI command to cancel the track blocking and sends it to the CBI operator terminal 8. If the cancellation is effective, a route can be set via the signal covering the construction site. If it is confirmed in the CBI interface module that the train has canceled the route, the CBI interface module automatically effects a new blocking of this route with the entry of the reason for the blocking, e.g. RO 1. If this blocking is effective and if the train has cleared the entire construction site area, the CBI interface module then transmits the message, along with the next TAN, to the A-cell phone that the construction site may be re-entered. The construction site foreman compares the TAN to his list and if the TAN received matches the TAN expected, he releases the track for entry. The TAN list can also be stored in the portable data processor 11. The TAN comparison and the sending out of TANs is then automated. For example, the portable data processor 11 is programmed in such a way that it compares an incoming warning to the stored TANs and sends out a collective call to all B-cell phones in the event of a match. The

corresponding TAN is also automatically transmitted along with the sending of an acknowledgement signal. The A-cell phone and the portable data processor 11 can also be integrated in a single device, e.g., a Nokia Communicator. The Nokia Communicator and the CBI interface module have, for example, a common data interface (e.g., via cable or infrared) via which the TANs can be communicated to the Nokia Communicator and/or the call numbers of the Nokia Communicator can be communicated to the CBI interface module.

[0036] The TANs protect against unauthorized access. Instead of TANs, use can also be made of another security procedure, such as cryptic encoding via a so-called "security translator", for the transmission to and from the A-cell phone. Instead of TANs, use can also be made of other numbers or codes, e.g., codes containing numbers and letters or only letters or special characters.

[0037] The CBI interface module is responsible for safety. It must recognize each train that approaches the construction site and automatically block the signal covering the construction site or the relevant track sections.

[0038] If the warning does not reach the construction site or if the message that the crew has cleared the tracks does not arrive at the center (in the event of network congestion, for example), the train will then be braked before it reaches the construction site because the automatically engaged blocking will remain in effect.

[0039] The second exemplary embodiment shall be explained with reference to Fig. 3. Fig. 3 shows a device according to the invention and the connection thereof.

[0040] As in the first exemplary embodiment, the device 7 is configured as a CBI interface module and has an interface with a radio network and a connection to the GSM module 6. The design and functionality correspond to the device according to the invention of the first exemplary embodiment. In contrast to Fig. 1, the device 7 from Fig. 3 is connected via a bus system or a local network to the CBI operator terminal 8 as well as to a CBI operator terminal server 12 and to a CBI unit 13.

[0041] The local network is embodied by, for example, an Ethernet LAN. TCP/IP, for example, is used as the protocol. Instead of one bus system, the individual elements can also be interconnected via two, three, or more bus systems. A bus system can have two, three, or more buses.

[0042] The data of the axle counters or track circuits are received and analyzed in the CBI unit 13. The CBI unit 13 supplies the relevant data to the CBI operator terminal server 12 via the LAN interface. The CBI operator terminal organizes the distribution of the relevant data to the device 7 and to the CBI operator terminal 8. The device 7 thus receives information about trains from the CBI unit 13 via the CBI operator terminal server 12 and sends the generated CBI command either via the LAN interface to the CBI operator terminal 8 or via the LAN interface to the CBI operator terminal server 12, which forwards it to the CBI unit 13. The interface between the device 7 and the CBI operator terminal 8 is designed as, for example, a SUI (SUI = standard user interface).

[0043] The GSM module 6 can also be connected to the device 7 via the LAN rather than directly. As an alternative, the GSM module 6 can also be connected directly to the CBI unit 13.

[0044] Two, three, four, or more rather than just one CBI operator terminal 8 can be hooked up to the LAN.

[0045] Instead of a CBI unit 13, use can also be made of an RBC. In this case the GSM module 6 can be omitted and radio communication with the workers on the track can be established via the RBC. To this end, the device 7 sends the warning signal to be sent by radio via the server designed in this case as an RBC operator terminal server or directly to the RBC. The CBI operator terminal 8 must be replaced by an RBC operator terminal.

[0046] The third exemplary embodiment shall be explained with reference to Fig. 4. Fig. 4 shows a device according to the invention and the connection thereof.

[0047] In the third exemplary embodiment, the functionality of the device 7 from Fig. 3 is also integrated in the device 8', which is designed as a CBI operator terminal. The functionality is essentially provided by software programming. A specific computer program is thus responsible for issuing the work crew warning. The device 8' has an interface with a GSM module 6, which corresponds to the GSM module from Fig. 3. The GSM module can also be connected to the LAN and via the LAN to the device 8'. The device 8' therefore corresponds to a standard CBI operator terminal with additional programming for the purpose of issuing the work crew warning and monitoring a construction site area.

[0048] The device 8' can also be configured as an RBC operator terminal rather than as a CBI operator terminal. The GSM module can be omitted in this case.

[0049] The fourth exemplary embodiment shall be explained with reference to Fig. 5. Fig. 5 shows a device according to the invention and the connection thereof.

[0050] In terms of their functionality, the elements correspond to the elements with the same names from Fig. 3.

[0051] The device 7 from Fig. 5 is connected to the CBI operator terminal server 12, the CBI operator terminal 8, and also to another CBI operator terminal 14 via a local network, a bus system, two or more local networks, or two or more bus systems.

[0052] The CBI unit 13 is connected to the CBI operator terminal server 12 via a point-to-point connection, a local network, a bus system, two or more local networks, or two or more bus systems.

[0053] The fifth exemplary embodiment shall be explained with reference to Fig. 6. Fig. 6 shows a device according to the invention and the connection thereof.

[0054] In terms of their functionality, the elements correspond to the elements with the same names from Fig. 3.

[0055] The CBI operator terminal server 12 from Fig. 6 is connected to the device 7 and to the CBI operator terminal 8 via point-to-point connections, a local network, a bus system, two or more local networks, or two or more bus systems.

[0056] The CBI unit 13 is connected to the CBI operator terminal server 12 via a point-to-point connection, a local network, a bus system, two or more local networks, or two or more bus systems.

Combinations of individual or several features from different exemplary embodiments are possible.

Claims

1. Device (7, 8') for warning work crews, **characterized in that** an interface to an electronic interlocking module (8, 12, 13, 14) and an interface to a radio network are provided, that the device (7, 8') is suitable for receiving information about at least one train from the electronic interlocking module and comparing it with stored information about at least one construction site area, and that the device (7, 8') is suitable for automatically transmitting a warning signal via the radio interface to at least one radio telephone (10, 9), the call number of which is stored in the device (7, 8'), in the event of a train approaching a construction site area.

2. Device (7, 8') according to Claim 1, **characterized in that** the device (7, 8') is suitable for automatically generating a CBI command to release the previously automatically blocked tracksection on which the train is approaching and sending it to the electronic interlocking module in the event of receipt of an acknowledgement signal in response to the warning signal.

3. Device (7, 8') according to claim 2, **characterized in that** the device (7, 8') is suitable for comparing at least part of the received acknowledgement signal with stored numbers or a stored code and generating the CBI command only if the at least one part of the received acknowledgement signal coincides with a stored number or the stored code.

4. Device (7, 8') according to claim 1, **characterized in that** the electronic interlocking module (8, 12, 13, 14) is designed as a CBI operator terminal (8, 14), a CBI operator terminal server (12) or a CBI unit (13).

5. Device (7, 8') according to claim 1, **characterized in that** the device (7, 8') is designed as a CBI interface module or as a CBI operator terminal (8').

6. Device (7, 8') according to claim 1, **characterized in that** an interface to an RBC module is provided instead of the interface to the electronic interlocking module (8, 12, 13, 14) and that the device (7, 8') is suitable for receiving information about at least one train from the RBC module and comparing it with stored information about at least one construction site area, that the RBC module is designed as an RBC operator terminal, an RBC operator terminal server or an RBC unit (13) and that the device (7, 8') is designed as an RBC interface module or as an RBC operator terminal.

7. Method for monitoring a construction site area of a rail system, **characterized in that** information about at least one train is provided to a device (7, 8') by an electronic interlocking module (8, 12, 13, 14) or an RBC module, that in the device (7, 8') the received information is compared with information stored in the device (7, 8') about at least one construction site area and that a warning signal to be transmitted via radio to at least one radio telephone (10, 9), the call number of which is stored in the device (7, 8'), is automatically generated if it emerges from the comparison that a train is approaching a construction site area.

8. Method according to claim 7, **characterized in that** after receipt of an acknowledgement signal in response to the warning signal, a CBI command or RBC command for release of the previously automatically blocked track section on which the train is approaching is automatically generated and sent to the electronic interlocking module or RBC module.

9. Computer product containing computer program code means configured so as to perform the steps of the method according to claim 7 when the computer program is running on a computer.

10. Computer product according to claim 9, **characterized in that** the computer product is designed as a computer program or as a computer-readable storage medium.

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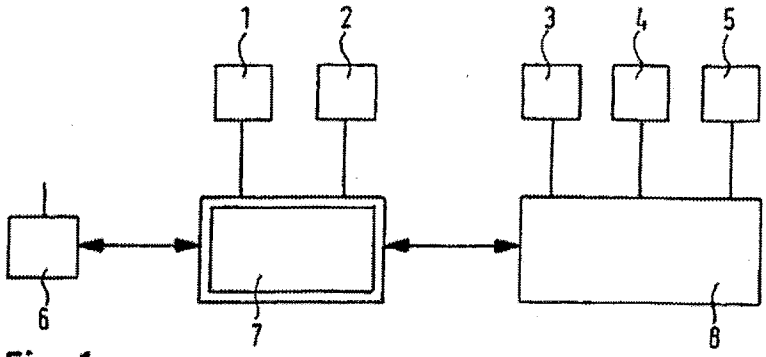


Fig. 1

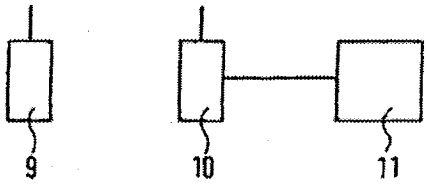


Fig. 2

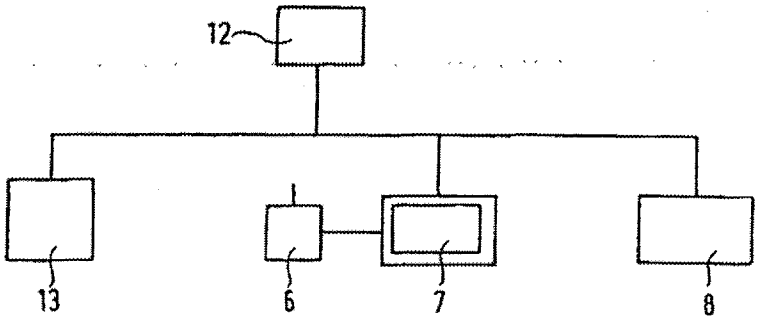


Fig. 3

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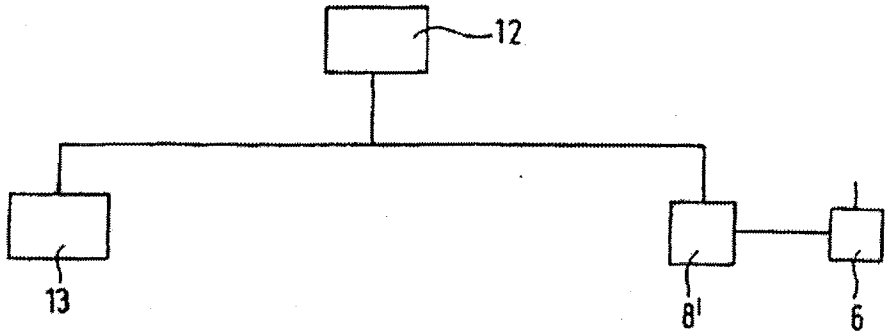


Fig. 4

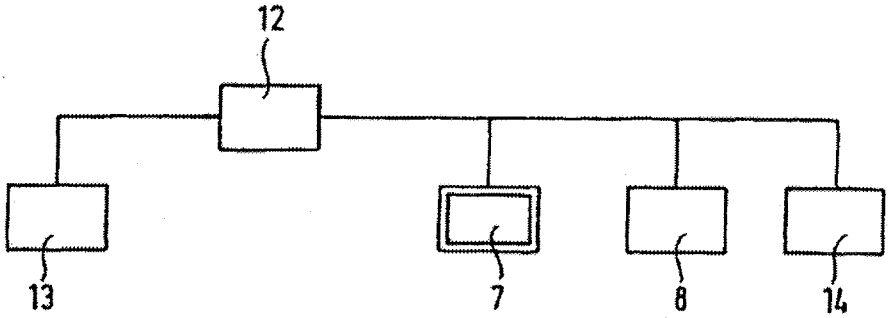


Fig. 5

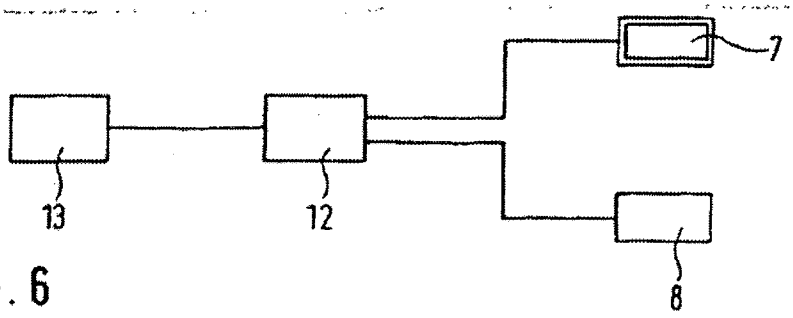


Fig. 6

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(73) 특허권자
대아티아이(주)
서울특별시 강남구 논현동 115-7 미성빌딩 6층
(72) 발명자
하승태
경기도 부천시 원미구 상3동 다정한마을 2101동 604호
(74) 대리인
홍성표

전체 청구항 수 : 총 7 항 심사관 : 조춘근

(54) 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호시스템 및 그 운용방법

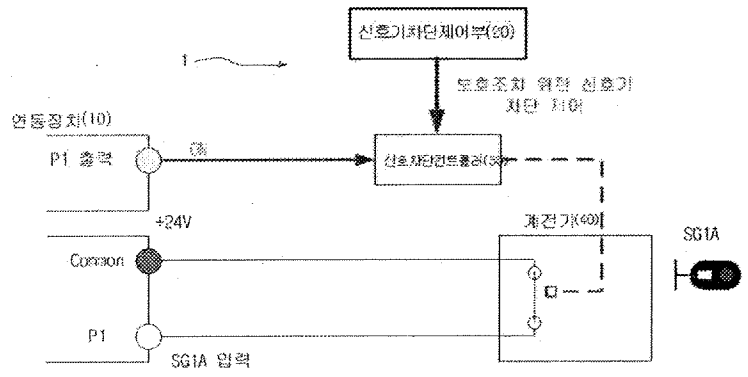
(57) 요 약

본 발명은 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호시스템 및 그 운용방법에 관한 것이다.

본 발명은 이를 위해 열차 운행 관제 시스템과 연동되며, 철도 현장 설비 관련 작업자들에 대하여 해당 작업구간으로의 열차 진입을 우선 차단하여 현장 작업자의 작업 안전도를 높일 수 있는 방호부(1)가 구비되어 구성된다.

상기와 같이 구성된 본 발명은 철도 선로변 설비의 유지/보수를 위해 작업하는 인원들에 대해 열차 운행관제 시스템이 작업 계획에 따라 자동으로 해당 구간으로의 열차 진입을 제한하는 것이고, 만일 열차의 진입이 발생되는 경우에는 자동으로 현장 작업자들에게 열차의 진입을 알려서 열차 사고를 미연에 방지할 수 있도록 한 것이며, 이로 인해 제품의 품질과 신뢰성을 대폭 향상시켜 작업자로 하여금 좋은 이미지를 심어줄 수 있도록 한 것이다.

대 표 도



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특허청구의 범위

청구항 1

삭제

청구항 2

열차 운행 관제 시스템과 연동되며, 철도 현장 설비 관련 작업자들에 대하여 해당 작업구간으로의 열차 진입을 우선 차단하여 현장 작업자의 작업 안전도를 높일 수 있는 방호부가 구비되어 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호시스템에 있어서,

상기 방호부(1)는,

열차 운행 관제 시스템에 적용된 연동장치(10)와 계전기(40)의 사이에 구비되며, 연동장치에서 출력된 전압이 신호설비의 입력에 해당되는 계전기를 거쳐 다시 연동장치의 입력부로 들어오는 방법을 이용하되 상기 계전기의 출력 전압에 따라서 연동장치는 해당 설비의 상태를 판단하게 되고 이로 인해 신호기를 온/오프시키는 신호차단 컨트롤러(30); 및

상기 신호차단 컨트롤러와 연결되며, 연동장치로 입력되는 계전기 입력 부분을 조작함은 물론 연동장치에서 출력된 신호기 제어를 무효시킬 수 있게 입력정보 변경을 콘트롤하는 신호기 차단 제어부(20);가 구비됨을 특징으로 하는 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호시스템.

청구항 3

철도 선로변 작업자를 보호하는 운용방법에 있어서,

해당 구간으로 진입하도록 허용하는 출발진로의 출발신호기를 연동장치의 신호기 제어 출력 전압이 방호부(1)의 신호차단 컨트롤러(30) 및 신호기 차단 제어부(20)를 제어하여 신호기를 GREEN→RED로 강제 전환함으로써 해당 열차가 출발할 수 없도록 함은 물론 열차 운전자와 선로변 작업자에게 모두 주위정보를 무선으로 알린 후 수동으로 열차를 출발시키도록 하여 선로변 작업자에 대한 인명 피해를 방지하도록 함을 특징으로 하는 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호 운용방법.

청구항 4

청구항 3 에 있어서,

상기 방호부(1)의 운용방법은,

현장 작업계획을 신호기 차단 제어부(20)에 등록하는 단계;

현장 작업자가 신호기 차단 제어부(20)에 지정된 위치 및 시간에 대해 승인을 요청하는 단계;

신호기 차단 제어부(20)가 관제사의 설정에 따라 자동 또는 수동으로 현장 작업에 대한 승인을 하는 단계;

열차가 지정시간 동안에 작업 현장으로 진입하고자 할 경우 신호차단 컨크롤러(30)는 계전기가 출력 전압에 따라서 연동장치의 해당 설비를 제어하게 되어 열차가 해당 작업 구간으로 출발할 수 없도록 출발 신호기를 강제로 RED 상태로 설정하는 단계; 및

현장 작업자는 작업이 완료되면 지정된 위치 및 시간에 대해 작업완료를 방호부(1)에 요청하는 단계;가 포함됨을 특징으로 하는 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호 운용방법.

청구항 5

청구항 4 에 있어서,

상기 작업완료를 방호부(1)에 요청하는 단계 이후 방호부(1)는 관제사의 설정에 따라 자동 또는 수동으로 현장

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작업에 대한 작업 완료를 승인하는 단계가 더 포함됨을 특징으로 하는 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호 운용방법.

청구항 6

삭제

청구항 7

청구항 4 에 있어서,

상기 방호부(1)는,

동일한 구간의 복수 작업 계획을 위해 각 작업별로 고유한 ID를 부여함을 특징으로 하는 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호 운용방법.

청구항 8

청구항 7 에 있어서,

상기 방호부(1)는,

선로변 작업이 승인되면 이 승인된 정보는 ID가 부여되며, 작업 완료시 선로변 작업자는 작업 ID와 작업에 대한 정보를 이용하여 작업 완료 요청을 수행함을 특징으로 하는 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호 운용방법.

청구항 9

청구항 7 에 있어서,

상기 방호부(1)는,

각 구간에 대하여 복수의 작업 ID를 등록할 수 있도록 하며, 해당 구간의 전체 작업 ID에 대해 작업 승인이 안되어 있는 경우에만 해당 구간에 열차를 진입할 수 있도록 함을 특징으로 하는 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호 운용방법.

명 세 서

발명의 상세한 설명

기 술 분 야

[0001] 본 발명은 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호시스템 및 그 운용방법에 관한 것으로, 보다 상세하게는 철도 선로변 설비의 유지/보수를 위해 작업하는 인원들에 대해 열차 운행관제 시스템이 작업 계획에 따라 자동으로 해당 구간으로의 열차 진입을 제한하는 것이고, 만일 열차의 진입이 발생되는 경우에는 자동으로 현장 작업자들에게 열차의 진입을 알려서 열차 사고를 미연에 방지할 수 있도록 한 것이며, 이로 인해 제품의 품질과 신뢰성을 대폭 향상시켜 작업자로 하여금 좋은 이미지를 심어줄 수 있도록 한 것이다.

배 경 기 술

[0002] 주지하다시피 열차는 선로(궤도)위에서 바퀴가 굴러 이동하도록 되어 있다. 이 중에서 열차는 이동이 가능한 물체이지만 궤도는 그 자리에서 움직이지 않도록 고정되어 있는 설비이며, 열차의 안전한 주행을 위해서는 궤도 이외에도 여러 가지 안전설비들이 사용된다.

[0003] 상기 설치되어 있는 설비는 안전을 확인하고 유지보수를 하기 위하여 현장 작업자가 해당 설비가 있는 위치로

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가서 육안으로 설비의 안전 유무를 확인하고 필요한 유지보수 작업을 하도록 되어 있다. 이 경우 문제가 되는 것이 바로 현장 유지보수원의 안전이다.

[0004] 상기 현장 유지보수원의 안전은 열차의 인명사고와 직접적으로 연결되는 치명적인 문제이다. 만일 유지보수원이 열차가 접근하는 것도 모르고 선로에서 작업하는데 열차는 고속으로 주행하고 유지보수원이 대피할 공간이 없거나 미처 대피할 시간이 없다면 열차와 유지보수원의 충돌은 불가피하게 되며 이는 바로 인명사고로 이어지게 된다.

[0005] 상기 현장 유지보수원이 현장에서 작업하기 위해서는 해당 구간을 관할하는 역에 무선으로 미리 작업을 보고하고 작업을 진행하고 있지만 열차의 운행관리를 담당하는 관제사의 실수로 해당 작업 구간으로 열차를 보내고 또한 열차 운전원이 해당 구간에 작업이 있는 것을 미리 알고 있지 못하다면 이러한 사고가 발생될 소지가 발생된다.

[0006] 기존 철도 역에 설치되어 있는 열차 운행 관제 시스템(TMS: Traffic Management System)은 열차가 운행되는 선로 및 각종 설비들에 대한 작업을 수행하는 작업자들에 대해서 시스템에서 자동으로 보호해주는 설비가 없다.

[0007] 즉, 도 1 에 도시된 바와 같이 선로 근처의 현장 작업자들은 역무원으로부터 무전을 통해 열차가 진입하고 있다는 정보를 듣거나 열차가 작업구간에 접근하면서 발생하는 경적을 통해서 열차의 진입을 알아차리고 작업을 중단하거나 대피하는 방법을 사용하고 있다.

[0008] 그러므로 열차 운행관제 시스템이 선로변을 따라 작업하는 작업자들을 자동으로 보호해 줄 수 있는 보호설비가 필요하나, 종래에는 이러한 기술이 없다는 커다란 문제점이 발생 되었다.

[0009] 한편, 도 2 는 종래 열차 안전운행을 위한 설비의 조건을 나타낸 것으로, 열차 1 이 3A 신호기를 출발하여 1B까지 안전하게 주행하도록 하기 위하여 열차 관제시스템 혹은 연동장치 콘솔은 3A→1B의 진행경로에 해당되는 진로설정을 연동장치에 요청하게 되고, 연동장치는 3A 신호기부터 1B 지점까지 궤도가 모두 열차가 없는 상태이고 선로전환기들이 LOCK 상태가 아닌 것을 확인한 후 선로전환기 SW22, SW21을 정방향으로 쇄정(LOCK)하고, 3A신호기를 RED→GREEN으로 변경하여 열차가 출발할 수 있음을 알린다. 이 경우 열차 운전원은 3A신호기가 GREEN으로 된 것을 육안으로 확인하고 열차를 출발시킨다. 만일 3A신호기가 RED상태를 유지한다면 열차 운전원은 관제사의 별도 명령 없이는 열차를 출발시킬 수 없다.

[0010] 따라서 상기한 종래의 기술은 도 3 과 같이 작업구간으로 진입하는 열차의 출발을 자동으로 방호하도록 한 기술적 구성이 없기 때문에 운전자는 녹색 신호만을 보고 앞으로 진행하기 때문에 안전사고를 미연에 방지할 수 없다는 커다란 문제점이 발생 되었다.

[0011] 특히 현재 철도 선로를 따라 많은 작업들이 이루어 지고 있으나 선로변 작업자에 대해 시스템이 자동으로 보호해 주지 않아서 인명 사고가 발생될 소지가 충분히 있다는 커다란 문제점 발생 되었다.

발명의 내용

해결 하고자하는 과제

[0012] 본 발명은 상기와 같은 종래 기술의 제반 문제점을 해소하기 위하여 안출한 것으로, 신호기 차단 제어부와 신호차단 컨트롤러로 이루어진 방호부가 구비됨을 제1목적으로 한 것이고, 제2목적은 상기한 기술적 구성에 의해 철도 선로변 설비의 유지/보수를 위해 작업하는 인원들에 대해 열차 운행관제 시스템이 작업 계획에 따라 자동으로 해당 구간으로의 열차 진입을 제한하는 것이고, 만일 열차의 진입이 발생되는 경우에는 자동으로 현장 작업자들에게 열차의 진입을 알려서 열차 사고를 미연에 방지할 수 있도록 한 것이며, 제3목적은 상기한 기술적 작용에 의해 본 발명은 제품의 품질과 신뢰성을 대폭 향상시켜 작업자로 하여금 좋은 이미지를 심어줄 수 있도록 한 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호시스템 및 그 운용방법을 제공한다.

과제 해결수단

[0013] 이러한 목적 달성을 위하여 본 발명은 철도 선로변 작업자를 보호하는 시스템에 있어서, 열차 운행 관제 시스템과 연동되며, 철도 현장 설비 관련 작업자들에 대하여 해당 작업구간으로의 열차 진입을 우선 차단하여 현장 작업자의 작업 안전도를 높일 수 있는 방호부가 구비됨을 특징으로 하는 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호시스템을 제공한다.

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[0014] 또한 본 발명은 철도 선로변 작업자를 보호하는 운용방법에 있어서, 해당 구간으로 진입하도록 허용하는 출발진로의 출발신호기를 연동장치의 신호기 제어 출력 전압이 방호부의 신호차단 컨트롤러 및 신호기 차단 제어부를 제어하여 신호기를 GREEN→RED로 강제 전환함으로써 해당 열차가 출발할 수 없도록 함은 물론 열차 운전자와 선로변 작업자에게 모두 주위정보를 무선으로 알린 후 수동으로 열차를 출발시키도록 하여 선로변 작업자에 대한 인명 피해를 방지하도록 함을 특징으로 하는 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호 운용방법을 제공한다.

효 과

[0015] 상기에서 상세히 살펴본 바와 같이 본 발명은 신호기 차단 제어부와 신호차단 컨트롤러로 이루어진 방호부가 구비되도록 한 것이다.

[0016] 본 발명은 상기한 기술적 구성에 의해 철도 선로변 설비의 유지/보수를 위해 작업하는 인원들에 대해 열차 운행 관제 시스템이 작업 계획에 따라 자동으로 해당 구간으로의 열차 진입을 제한하는 것이고, 만일 열차의 진입이 발생되는 경우에는 자동으로 현장 작업자들에게 열차의 진입을 알려서 열차 사고를 미연에 방지할 수 있도록 한 것이다.

[0017] 본 발명은 상기한 기술적 작용에 의해 제품의 품질과 신뢰성을 대폭 향상시켜 작업자로 하여금 좋은 이미지를 심어줄 수 있도록 한 매우 유용한 발명인 것이다.

[0018] 이하에서는 이러한 효과 달성을 위한 본 발명의 바람직한 실시 예를 첨부된 도면에 따라 상세히 설명하면 다음과 같다.

발명의 실시를 위한 구체적인 내용

[0019] 본 발명에 적용된 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호시스템 및 그 운용방법은 도 4 내지 도 10 에 도시된 바와 같이 구성되는 것이다.

[0020] 하기에서 본 발명을 설명함에 있어, 관련된 공지 기능 또는 구성에 대한 구체적인 설명이 본 발명의 요지를 불필요하게 흐릴 수 있다고 판단되는 경우에는 그 상세한 설명은 생략할 것이다.

[0021] 그리고 후술되는 용어들은 본 발명에서의 기능을 고려하여 설정된 용어들로서 이는 생산자의 의도 또는 관례에 따라 달라질 수 있으므로 그 정의는 본 명세서 전반에 걸친 내용을 토대로 내려져야 할 것이다.

[0022] 먼저, 본 발명은 철도 선로변 작업자를 보호하는 시스템에 있어서, 열차 운행 관제 시스템(TMS: Traffic Management System)과 연동되며, 철도 현장 설비 관련 작업자들에 대하여 해당 작업구간으로의 열차 진입을 우선 차단하여 현장 작업자의 작업 안전도를 높일 수 있는 방호부(1)가 구비되어 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호시스템이 이루어지게 된다.

[0023] 상기한 방호부(1)의 기술적 구성을 도 8 을 보면서 보다 상세히 설명하면 다음과 같다.

[0024] 즉, 열차 운행 관제 시스템에 적용된 연동장치(10)와 계전기(40)의 사이에 구비되며, 연동장치(10)에서 출력된 전압이 신호설비의 입력에 해당되는 계전기(40)를 거쳐 다시 연동장치(10)의 입력부로 들어오는 방법을 이용하되 상기 계전기(40)의 출력 전압에 따라서 연동장치(10)는 해당 설비의 상태를 판단하게 되고 이로 인해 신호기를 온/오프시키는 신호차단 컨트롤러(30)가 구비된다.

[0025] 그리고 상기 신호차단 컨트롤러(30)와 연결되며, 연동장치(10)로 입력되는 계전기(40) 입력 부분을 조작함은 물론 연동장치(10)에서 출력된 신호기 제어를 무효시킬 수 있게 입력정보 변경을 콘트롤하는 신호기 차단 제어부(20)가 구비되어 구성된다.

[0026] 상기한 기술적 구성은 도 6, 7로부터 부연 설명할 수 있는 것으로, 도 6 은 신호기가 RED인 상태의 도면이고, 도 7 은 신호기가 GREEN인 상태의 도면을 나타낸 것으로, 상기 도 6 에서 P1은 공통출력전압(common)의 값과 동일하므로 연동장치(10)의 상태값은 OFF이며, 이와 반대로 도 7 에서 P1은 공통출력전압(common)의 값과 다르게 되므로 연동장치(10)의 상태값은 ON으로 되며, 이와 같은 입력상태를 사용하는 연동장치(10)에서 P1의 입력정보

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변경은 상기 도 8 과 같이 수행하게 되며, 결과적으로 상기 연동장치(10)의 신호기 제어 출력 전압이 방호부(1)의 출력 전압의 판단에 따라 신호기의 상태를 RED로 설정하게 되는 것이다.

[0027] 한편 본 발명은 상기의 구성부를 적용함에 있어 다양하게 변형될 수 있고 여러 가지 형태를 취할 수 있다.

[0028] 그리고 본 발명은 상기의 상세한 설명에서 언급되는 특별한 형태로 한정되는 것이 아닌 것으로 이해되어야 하며, 오히려 첨부된 청구범위에 의해 정의되는 본 발명의 정신과 범위 내에 있는 모든 변형물과 균등물 및 대체물을 포함하는 것으로 이해되어야 한다.

[0029] 상기와 같이 구성된 본 발명 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호시스템 및 그 운용방법의 작용효과를 설명하면 다음과 같다.

[0030] 우선, 본 발명은 철도 선로변 작업자들의 작업에 대해 시스템이 해당 구간으로 진입하는 열차에 대해 진로제어를 할 수 없도록 함으로써 작업 구간으로 열차가 진입하는 것을 막음으로써 선로변 작업자의 안전을 도모할 수 있다. 즉, 해당 작업구간에 진입하기 위해 역에서 출발하는 열차의 출발 진로가 해당 구간으로 진입하도록 설정되고, 해당 구간에 대해 시스템에서 작업 보호가 이루어지고 있다면, 방호부(1)가 해당 구간으로 진입하도록 허용하는 출발진로의 출발신호기를 GREEN→RED로 강제로 전환함으로써 해당 열차가 출발할 수 없도록 하며, 필요한 경우 열차 운전자와 선로변 작업자에게 모두 주의정보를 무선 혹은 기타 방법으로 알린 후에 수동으로 열차를 출발시키도록 함으로써 선로변 작업자에 대한 인명 피해를 방지할 수 있도록 한 것이다.

[0031] 이를 위해 본 발명은 철도 선로변 작업자를 보호하는 운용방법에 있어서, 해당 구간으로 진입하도록 허용하는 출발진로의 출발신호기를 연동장치(10)의 신호기 제어 출력 전압이 방호부(1)의 신호차단 컨트롤러(30) 및 신호기 차단 제어부(20)를 제어하여 신호기를 GREEN→RED로 강제 전환함으로써 해당 열차가 출발할 수 없도록 함은 물론 열차 운전자와 선로변 작업자에게 모두 주위정보를 무선으로 알린 후 수동으로 열차를 출발시키도록 하여 선로변 작업자에 대한 인명 피해를 방지하게 된다.

[0032] 본 발명의 상기 방호부(1)의 운용방법을 보다 상세히 설명하면 다음과 같다.

[0033] 즉, 도 5 에 도시된 바와 같이 현장 작업계획을 신호기 차단 제어부(20)에 등록하는 단계를 거친다.

[0034] 이후 현장 작업자가 신호기 차단 제어부(20)에 지정된 위치 및 시간에 대해 승인을 요청하는 단계를 거친다.

[0035] 이어서 신호기 차단 제어부(20)가 관제사의 설정에 따라 자동 또는 수동으로 현장 작업에 대한 승인을 하는 단계를 거친다.

[0036] 그리고 열차가 지정시간 동안에 작업 현장으로 진입하고자 할 경우 신호차단 컨트롤러(30)는 계전기(40)가 출력 전압에 따라서 연동장치(10)의 해당 설비를 제어하게 되어 열차가 해당 작업 구간으로 출발할 수 없도록 출발 신호기를 강제로 RED 상태로 설정하는 단계를 거친다.

[0037] 마지막으로 현장 작업자는 작업이 완료되면 지정된 위치 및 시간에 대해 작업완료를 방호부(1)에 요청하는 단계를 거쳐 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호 운용방법을 수행하게 된다.

[0038] 본 발명은 상기 작업완료를 방호부(1)에 요청하는 단계 이후 방호부(1)는 관제사의 설정에 따라 자동 또는 수동으로 현장 작업에 대한 작업 완료를 승인하는 단계를 거치게 된다.

[0039] 또한 본 발명에 적용된 상기 방호부(1)와 선로변 작업자는 상호 인터페이스로 무선 소통하고, 상기 방호부(1)의 작업 계획 등록은 역 관제사에 의해 수동으로 이루어지되, 역 관제사는 선로변 작업자의 작업계획에 대하여 선로변 작업자의 요청이 있는 경우 방호부(1)가 계획된 작업계획과 일치하는 경우에는 자동 또는 수동으로 방호부(1)가 승인할 수 있도록 설정하게 되며 만일 방호부(1)에 등록된 작업계획과 일치하지 않는 작업 승인이 요청되면 관제사는 방호부(1)에 등록된 작업계획을 변경하여 수동으로 승인하게 된다.

[0040] 또한 본 발명에 적용된 상기 방호부(1)는 동일한 구간의 복수 작업 계획을 위해 각 작업별로 고유한 ID를 부여하게 된다.

[0041] 이때 상기 방호부(1)는 선로변 작업이 승인되면 이 승인된 정보는 ID가 부여되며, 작업 완료시 선로변 작업자는 작업 ID와 작업에 대한 정보를 이용하여 작업 완료 요청을 수행하게 된다.

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[0042] 그리고 상기 방호부(1)는 각 구간에 대하여 복수의 작업 ID를 등록할 수 있도록 하며, 해당 구간의 전체 작업 ID에 대해 작업 승인이 안되어 있는 경우에만 해당 구간에 열차를 진입할 수 있도록 하게 된다.

[0043] 상기 본 발명의 실시예를 도 9 와 도 10 을 보면서 설명하면 다음과 같다.

[0044] 먼저, 도 9 는 방호부(1)의 보호처리 흐름도로, 기본 작업계획을 등록하고, 선로변 작업자가 작업 승인을 요청(이때 작업구간과 작업시작 그리고 종료시간)하게 된다.

[0045] 이후 등록된 계획과 동일한가의 여부에 따라 'YES'이면 자동승인할 것이가를 묻고 여기서도 'YES'이면 처리 마침으로 종료된다.

[0046] 그러나 상기 등록된 계획과 동일한가와 자동승인 여부에서 'NO'일 경우에는 관제사가 승인할 것인가를 묻게 되는데, 여기서 'NO'일 경우에는 처리마침으로 종료하게 되나, 'YES'일 경우에는 작업계획 수정등록과 요청된 작업구간 보호시작 단계를 거쳐 최종 처리마침으로 종료된다.

[0047] 또한 도 10 은 방호부(1)의 해제 흐름도로, 선로변 작업자의 작업 완료정보는 방호부(1)에 전송되어 방호부(1)에서 해당 구간에 대한 방호정보와 동일한 경우 해당 구간에 대한 방호를 해제하게 된다.

[0048] 즉, 구간 A 보호중 선로변 작업자가 작업 완료를 요청(이때 작업구간과 작업 ID)하게 된다.

[0049] 이후 보호중인 작업 ID와 동일여부에 따라 'YES'일 경우 작업구간 A 보호해제를 거쳐 처리마침으로 종료된다.

[0050] 그러나 'NO'일 경우에는 관제사에게 작업완료 요청 메시지 표시를 한 후 처리마침으로 종료하게 된다.

[0051] 본 발명은 상기한 작동에 의해 작업구간으로 진입하는 열차의 출발을 자동으로 방호하도록 하게 된다.

산업이용 가능성

[0052] 본 발명 열차 운행 관제 시스템을 이용한 철도 선로변 작업자 보호시스템 및 그 운용방법의 기술적 사상은 실제로 동일결과를 반복 실시 가능한 것으로, 특히 이와 같은 본원발명을 실시함으로써 기술발전을 촉진하여 산업발전에 이바지할 수 있어 보호할 가치가 충분히 있다.

도면의 간단한 설명

[0053] 도 1 은 종래 일반적으로 이루어지고 있는 선로변 작업자에 대한 안전 조치

[0054] 를 취하는 모습을 도시한 도면.

[0055] 도 2 는 종래 열차 안전운행을 위한 설비의 조건을 도시한 도면.

[0056] 도 3 은 종래 신호기 차단 제어부가 없는 경우의 상황을 도시한 도면.

[0057] 도 4 는 본 발명 신호기 차단 제어부가 동작하여 작업구간으로 열차진입을

[0058] 막는 상황을 도시한 도면.

[0059] 도 5 는 본 발명 신호기 차단 제어부의 사용 사례를 도시한 도면.

[0060] 도 6 은 본 발명을 설명하기에 앞서 신호기가 RED인 상태의 도면.

[0061] 도 7 은 본 발명을 설명하기에 앞서 신호기가 GREEN인 상태의 도면.

[0062] 도 8 은 본 발명에 적용된 열차 운행 관제 시스템을 이용한 철도 선로변 작

[0063] 업자 보호시스템의 구성도.

[0064] 도 9 는 본 발명 신호기 차단 제어부의 보호처리 흐름도.

[0065] 도 10 은 본 발명 신호기 차단 제어부의 해제처리 흐름도.

[0066] <도면의 주요 부분에 대한 부호의 설명>

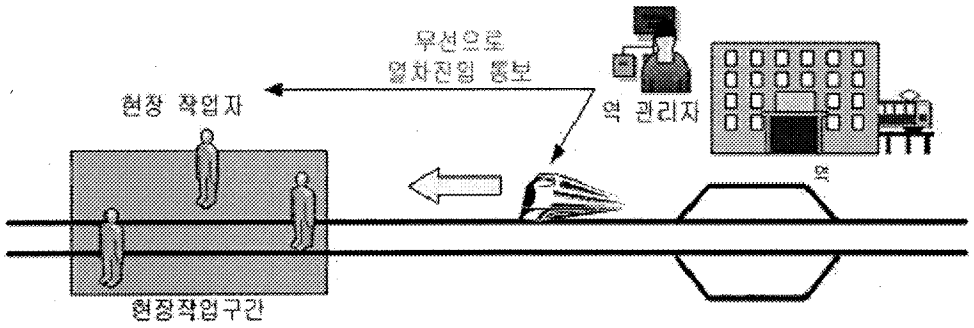
[0067] 10: 연동장치 20: 신호기 차단 제어부

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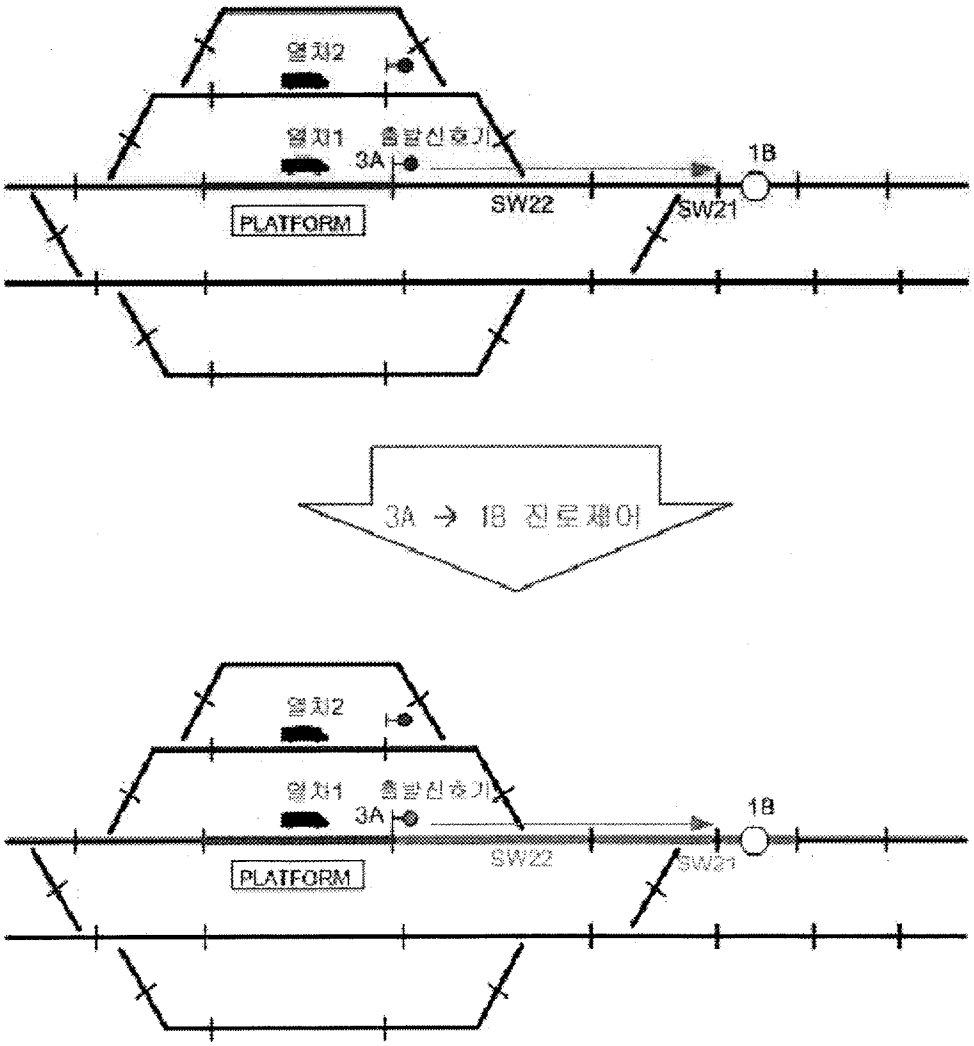
[0068] 30: 신호차단 컨트롤러 40: 계전기

도면

도면1

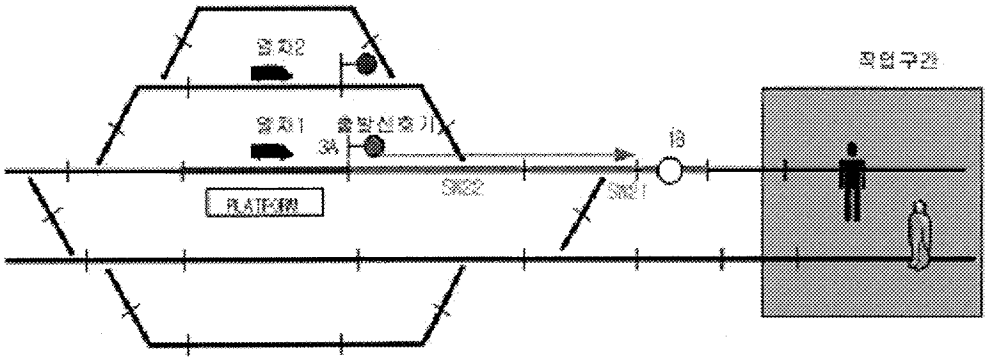


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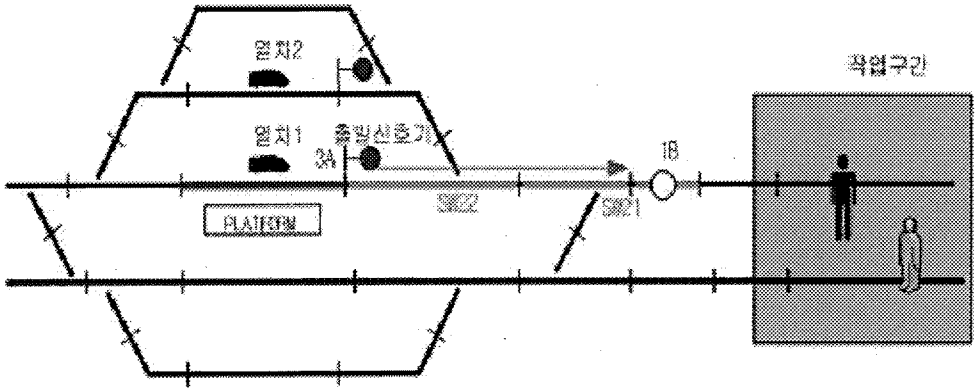


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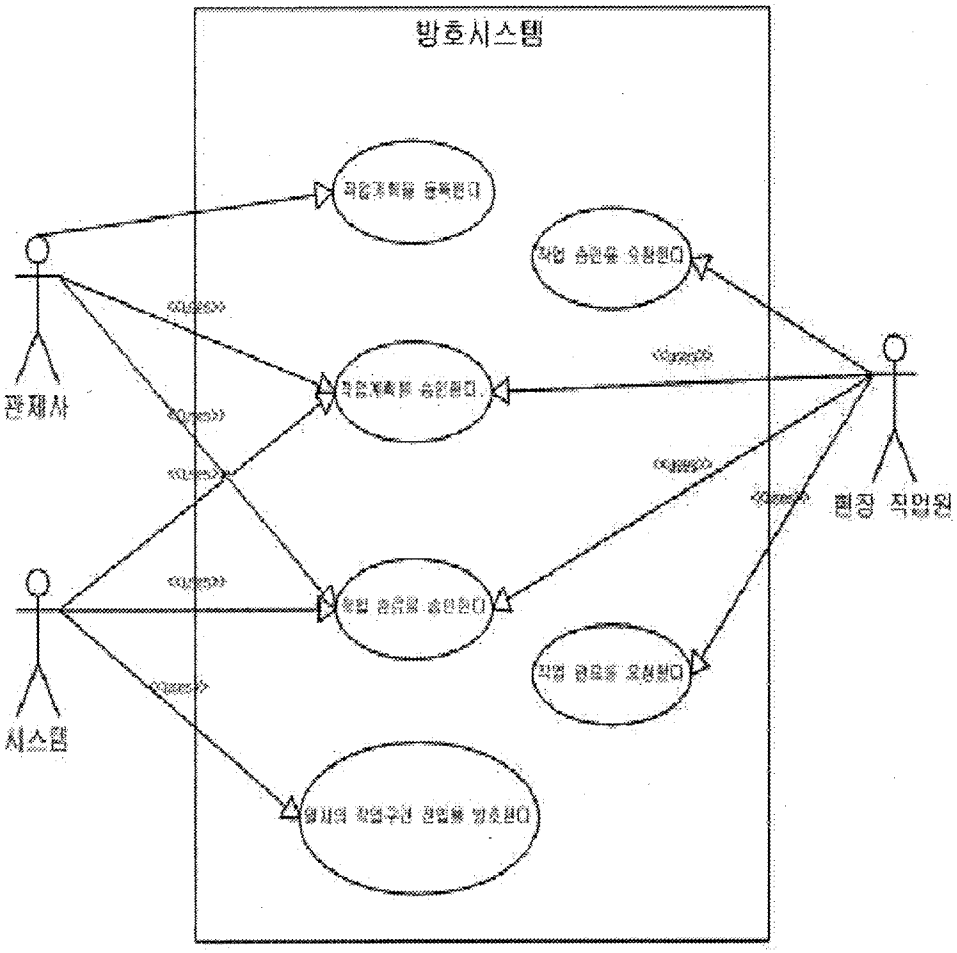


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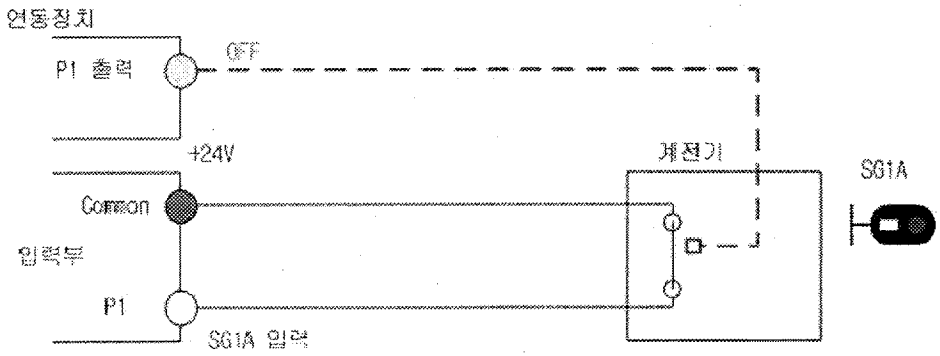


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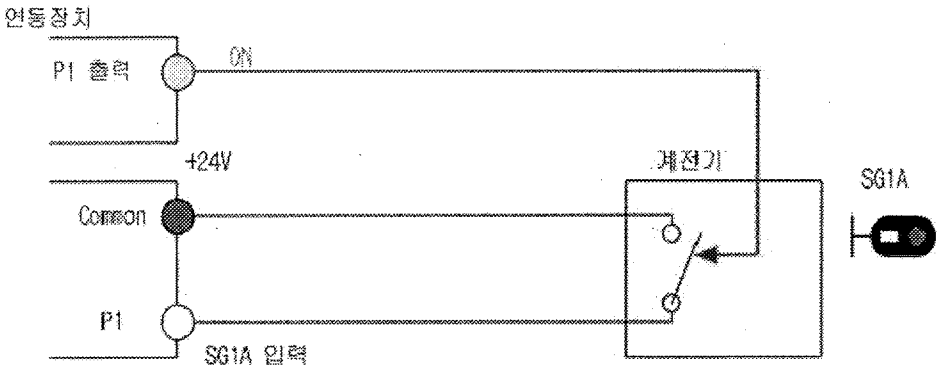


도면6



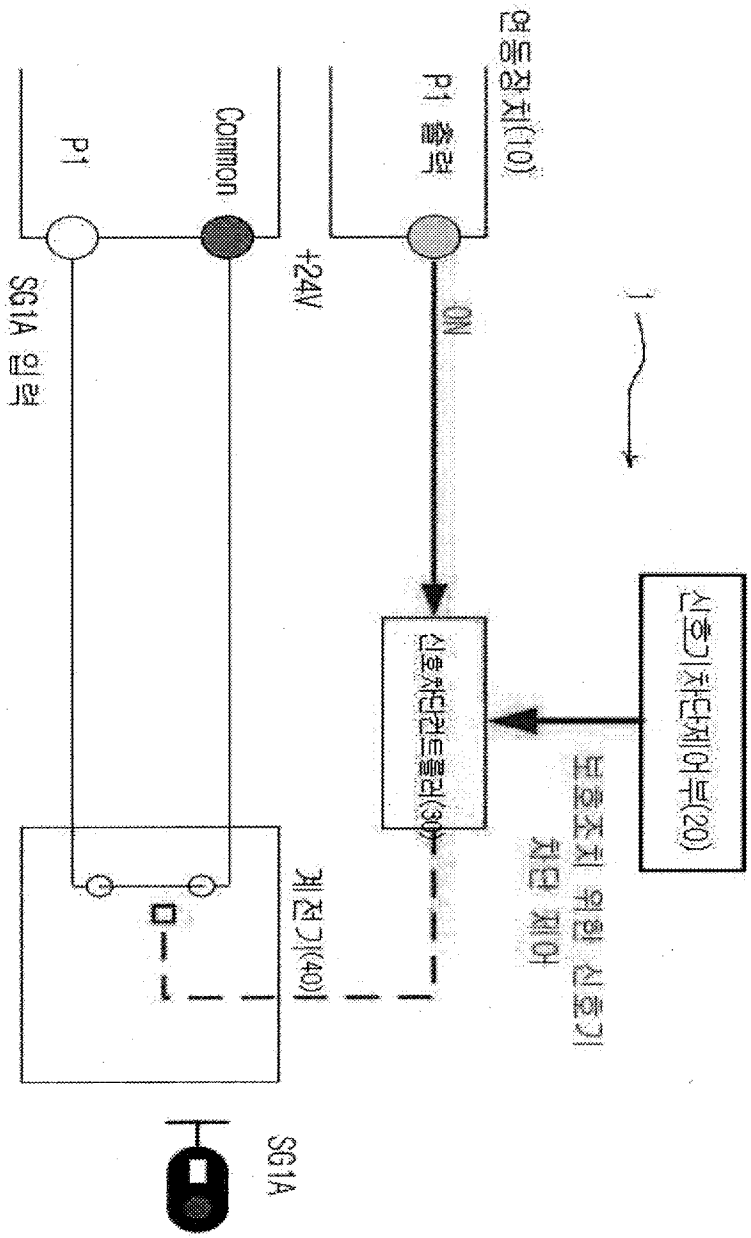
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도면7



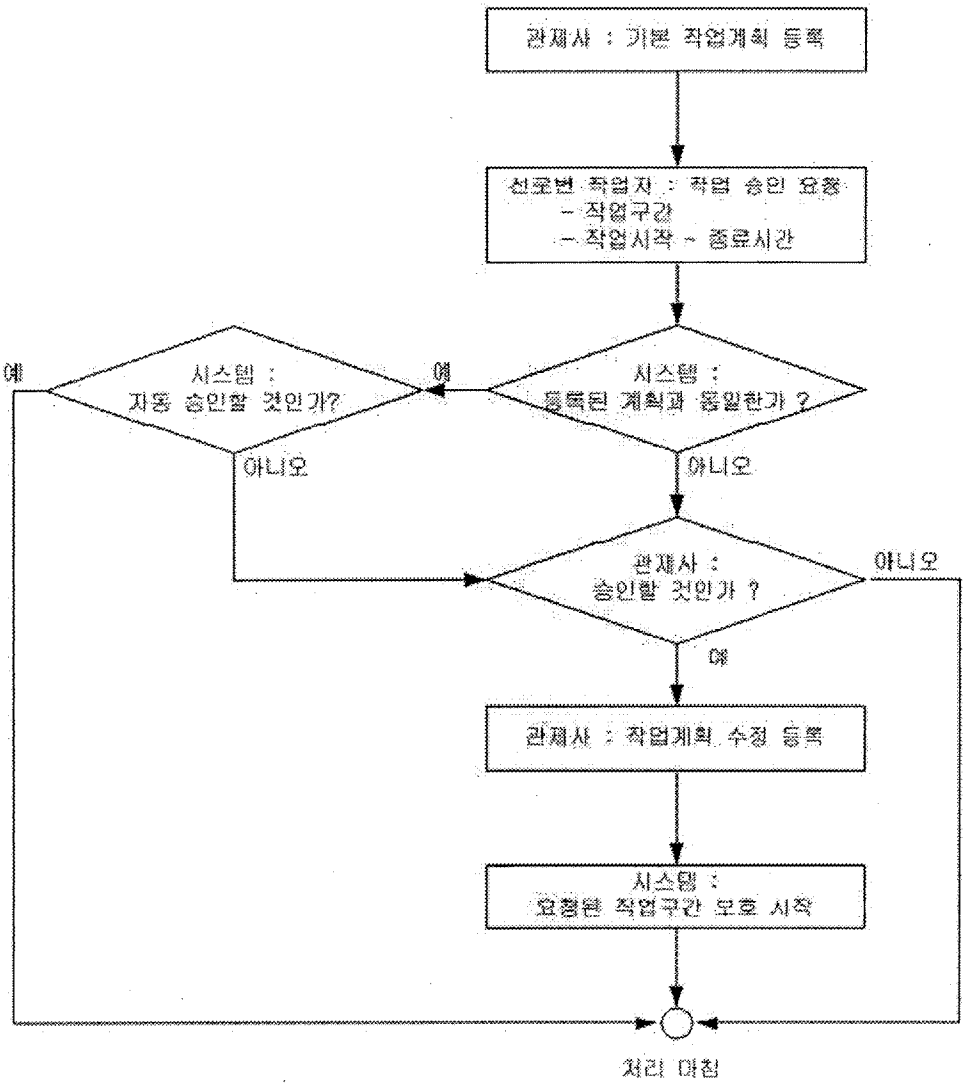
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도면8



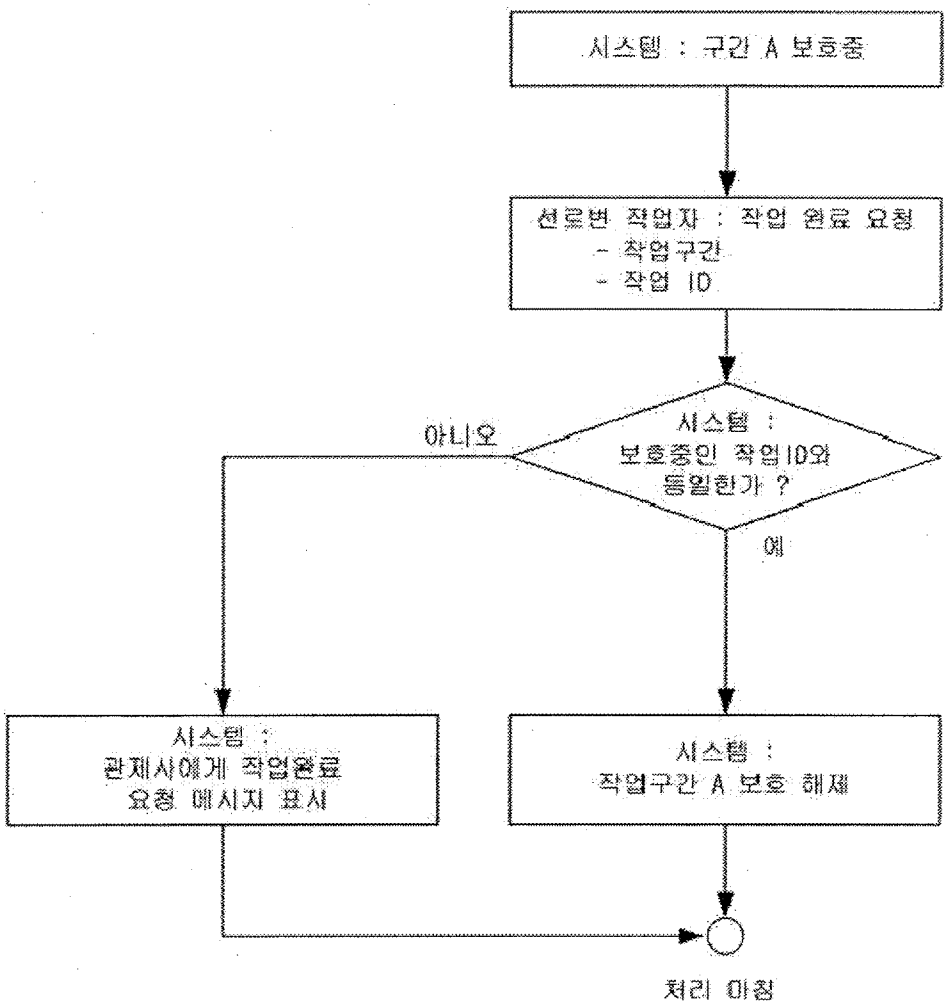
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도면9



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도면10



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* Literature quoted by the examiner
(73) Patentee
DAEA TI Co., Ltd.
6th Floor, Misung Building, 115-7, Nonhyeon-dong,
Gangnam-gu, Seoul, Republic of Korea
(72) Inventor:
Seung Tae Ha
Unit 604, Building 2101, Dajeonghan Maeul, Sang 3-dong,
Wonmi-gu, Bucheon-si, Gyeonggi-do, Republic of Korea
(74) Attorney
Seong Pyo Hong

Total number of claims: 7 claims in total

Examiner: Choon Geun Cho

(54) A railroad line worker protection system using the rail traffic management system and operating method thereof

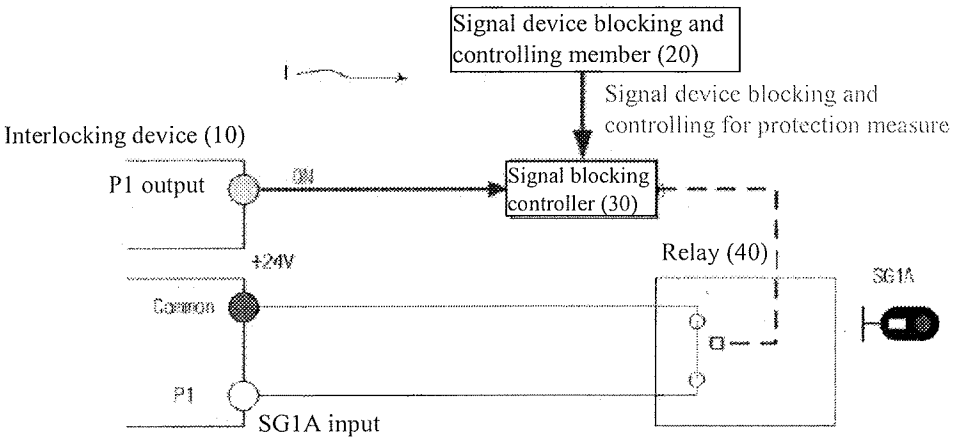
(57) Abstract

The present invention relates to a railroad trackside worker protection system using the rail traffic management system and operating method thereof.

The present invention is linked with a rail traffic management system for this and is equipped with a protection member (1), which can enhance the on-site workers' working safety by blocking the entry of a train into the pertinent working section for the workers related to the railroad on-site facilities, in its configuration.

In the present invention configured as described above, the rail traffic management system automatically restricts the entry of a train into the pertinent section according to the work plan for the personnel working for the maintenance or repair of the railroad trackside facilities, and if the entry of a train takes place, it automatically alerts the on-site workers to the entry of the train to prevent a train accident in advance. The quality and reliability of the product have been enhanced significantly due to this and thus, it imparts a good image to the workers.

Main Drawing



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Scope of Patent Claims

Claim 1
Deleted

Claim 2
A railroad trackside worker protection system using a rail traffic management system which is linked with the rail traffic management system and is equipped with a protection member that can enhance the on-site workers' work safety by blocking the entry of a train into the pertinent working section for the workers working in relation to the railroad field facilities, wherein the said protection member (1) is comprised of: a signal blocking controller (30) which is located between an interlocking device (10) and a relay (40) that have been applied to the rail traffic management system, uses a method in which a voltage coming out of the interlocking device enters into the input section of the interlocking device again by way of the relay that amounts to the input of the signal equipment, and turns on or off the signal device as the interlocking device determines the status of the pertinent equipment depending on the output voltage of the said relay; and a signal device blocking and controlling member (20) which is connected with the said signal blocking controller, controls the relay input part which is entered into the interlocking device and controls the change in input information so that the signal device control output from the interlocking device can be nullified.

Claim 3
An operating method to protect the workers working at the railroad trackside using a rail traffic management system, wherein a pertinent train is made unable to start by switching the start signal device of the start route from Green to Red as the signal device controlling output voltage of the interlocking device controls the signal blocking controller (30) and the signal device blocking and controlling member (20) of the protection member (1) and the train is allowed to start manually after alerting the train drivers and the trackside workers to all cautionary information by wireless to ensure that any casualties to the trackside workers can be prevented.

Claim 4
The operating method to protect the workers working at the railroad trackside using a rail traffic management system of Claim 3, wherein the operating method of said protection member (1) is comprised of: a step of registering the field working plan into the signal device blocking and controlling member (20); a step at which a field worker asks for an approval for the designated location and time to the signal device blocking and controlling member (20); a step at which the signal device blocking and controlling member (20) approves a field work automatically or manually according to a controller's setup; a step at which the signal blocking controller (30) sets the start signal device to RED status by force to ensure that a train can't start heading into the pertinent working section as the relay gets to control the pertinent equipment of the interlocking device depending on the output voltage when the train is about to enter into the work site during the designated time; and a step at which the field worker requests the completion of work to the protection member (1) with regard to the designated location and time when the work has been completed.

Claim 5
The operating method to protect the workers working at the railroad trackside using a rail traffic management system of Claim 4, wherein the operating method further includes a step at which the protection member (1) approves the completion of work with regard to the field work automatically or manually depending on the controller's setup after the said step of requesting the completion of work to the protection member (1).

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Claim 6
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Claim 7
The operating method to protect the workers working at the railroad trackside using a rail traffic management system of Claim 4, wherein said protection member (1) assigns a unique ID by work for multiple working plans for the same section.

Claim 8
The operating method to protect the workers working at the railroad trackside using a rail traffic management system of Claim 7, wherein if a trackside work is approved, this approval information is assigned with ID in said protection member (1) , and when the work has been completed, the trackside worker submits a request for work completion using the work ID and the information about the work.

Claim 9
The operating method to protect the workers working at the railroad trackside using a rail traffic management system of Claim 7, wherein said protection member (1) allows multiple work IDs to be registered for each section and a train is allowed to enter into the pertinent section only when work approval hasn't been provided for all work IDs.

Specifications

Detailed Explanation of the Invention

Technical Area

[0001] The present invention relates to the railroad trackside worker protection system using a rail traffic management system and operating method thereof, and more specifically, the rail traffic management system automatically restricts the entry of a train into the pertinent section according to the work plan for the personnel working for the maintenance or repair of the railroad trackside facilities, and if the entry of a train takes place, it automatically alerts the on-site workers to the entry of the train to prevent a train accident in advance. The quality and reliability of the product have been enhanced significantly due to this and thus, it imparts a good image to the workers.

Background Technology

[0002] As we know, a train is moving as its wheels roll on railways (tracks). Among them, the train is an object that can move but the track is a facility fixed to ensure that it doesn't move from its position, and various safety facilities in addition to the track are used for the safe driving of a train.

[0003] In order to check the safety of the installed facilities described above and maintain them, field workers have to go to the location of the pertinent facilities and check whether or not they are safe by the naked eye and a required maintenance work has to be conducted. In this case, the safety of the field maintenance personnel is at issue.

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[0004] The safety of the field maintenance crew described above is a critical issue directly connected with the human casualties of a train. If a train is running at high speed while maintenance crew are working on the railway without knowing that a train is approaching and the maintenance crew don't have any space to evacuate to or time to evacuate, the collision of the train with the maintenance crew will become inevitably and this just leads to human casualties.

[0005] Even though the field maintenance crew described above carry out their work after reporting the work to the station which has control over the pertinent section wireless in advance in order to perform the work on the site, the possibility of the occurrence of such an accident comes into being if a train is sent to the pertinent working section as a mistake of the controller who is in charge of the control of train traffic and the train operator doesn't know that the work is performed on the pertinent section in advance.

[0006] The existing Traffic Management System (TMS) installed at railroad stations doesn't have any facility in the system which protects the working crew who work on the railroad on which the train rides and various facilities.

[0007] In other words, as illustrated in FIG. 1, the field workers near from the railway stop working or evacuate from the site as they get to know about the approach of a train when they hear the information about an approaching train from a station worker through radio or the horn generated by the train approaching the working section.

[0008] Therefore, the rail traffic management system needs a protection equipment which can automatically protect the workers working along the trackside, but there is no such technology in the prior art.

[0009] On the one hand, FIG. 2 shows the requirements of the conventional facilities for the safe operation of train, wherein a train control system or interlocking device console requests the route setting corresponding to the progress route of 3A → 1B to the interlocking device to ensure that the train 1 starts from 3A signal device and travels safety to 1B, the interlocking device locks the track switch machines SW22 and SW21 in the forward direction after verifying that there is no train on the track form 3A signal device to 1B point and the track switch machines are not locked, and 3A signal device is changed from RED to GREEN to indicate that the train can start. In this case, the train operator starts the train after confirming that the 3A signal device has been turned to GREEN by the naked eye. If the 3A signal device is maintained in RED, the train operator can't start the train without a separate order from the controller.

[0010] Therefore, because of the conventional technology described above doesn't have a technical configuration ensuring that the start of a train entering into the working section is automatically prevented as shown in FIG. 3, the operator moves forward only with the sight of GREEN signal and thus, an safety accident can't be prevented in advance causing a big trouble.

[0011] Especially, a lot of works are being performed along the trackside currently but since the system doesn't automatically protect the workers working along the trackside, there is a high probability of the occurrence of casualties posing a serious risk.

Contents of the Invention

Issue to Be Resolved

[0012] The present invention has been thought out to resolve various problems of the prior art described above. Its first objective is to be equipped with the protection member comprised of the signal device blocking and controlling member and the signal blocking controller and its second objective is to make the rail traffic management system to restrict the entry of a train into the pertinent section automatically according to the working plan to protect the working crew working for the maintenance and repair of the railroad trackside facilities through the technical configuration described above, and to automatically inform the on-site workers of the entry of a train to prevent any train accident in advance if the entry of a train comes about anyway, and the third objective of the present invention is to dramatically enhance the quality and reliability of the product through the technical mechanism described above and allow the workers to have confidence in it, thus providing a railroad trackside worker protection system using a rail traffic management system and operating method thereof.

Means to Resolve the Issue

[0013] In order to achieve these objectives, the present invention provides a railroad trackside worker protection system using a rail traffic management system, wherein the railroad trackside worker protection system is linked with a rail traffic management system and is equipped with a protection member which can enhance the working safety of the on-site workers by blocking the entry of a train into the pertinent working section where the workers are working on the railroad site facilities.

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[0014] In addition, the present invention provides an operating method to protect the workers working at the railroad trackside using a rail traffic management system, wherein a pertinent train is made unable to start by switching the start signal device of the start route from Green to Red as the signal device controlling output voltage of the interlocking device controls the signal blocking controller and the signal device blocking and controlling member of the protection member and the train is allowed to start manually after alerting the train drivers and the trackside workers to all cautionary information by wireless to ensure that any casualties to the trackside workers can be prevented.

Effects

[0015] As has been examined in detail above, the present invention is equipped with a protection member comprised of the signal device blocking and controlling member and the signal blocking controller.

[0016] In the present invention configured as described above, the rail traffic management system automatically restricts the entry of a train into the pertinent section according to the work plan for the personnel working for the maintenance or repair of the railroad trackside facilities, and if the entry of a train takes place, it automatically alerts the on-site workers to the entry of the train to prevent a train accident in advance.

[0017] The quality and reliability of the product have been enhanced significantly by the technical function of the present invention described above and thus, it imparts a good image to the workers so this is a very useful invention.

[0018] The preferred embodiments of the present invention to achieve these effects are explained in detail referring to the attached drawings as follows:

Concrete Contents for the Implementation of the Invention

[0019] The railroad trackside worker protection system using a rail traffic management system applied to the present invention and operating method thereof are configured as illustrated in FIGs. 4 to 10.

[0020] In explaining the present invention below, when it is deemed a detailed explanation on any related and disclosed function or configuration can cloud the main point of the present invention unnecessarily, such a detailed explanation will be omitted.

[0021] And the terms described later are the terms established in consideration of the function in the present invention and since they can vary depending on a manufacturer's intention or practice, those definitions shall be made on the basis of the content of the entire specifications.

[0022] First, since the railroad trackside worker protection system of the present invention is equipped with a protection member (1) which is linked with a rail traffic management system (TMS) and can enhance the field workers' working safety by blocking the entry of a train into the pertinent working section for the workers related to the railroad field facilities, a railroad trackside worker protection system using a rail traffic management system is embodied.

[0023] The technical configuration of said protection member (1) can be explained in detail referring to FIG. 8 as follows:

[0024] In other words, it is equipped with a signal blocking controller (30) which is located between a interlocking device (10) and a relay (40) that have been applied to the rail traffic management system, uses a method in which a voltage coming out of the interlocking device (10) enters into the input section of the interlocking device (10) again by way of the relay (40) that amounts to the input of the signal equipment, and turns on or off the signal device as the interlocking device (10) determines the status of the pertinent equipment depending on the output voltage of the said relay (40).

[0025] And it is equipped with a signal device blocking and controlling member (20) which is connected with the said signal blocking controller (30), controls the relay (40) input part which is entered into the interlocking device (10) and controls the change in input information so that the signal device control output from the interlocking device (10) can be nullified in its configuration.

[0026] The technical configuration described above can be explained additionally using FIGs. 6 and 7. FIG. 6 illustrates the signal device in the state of RED, whereas FIG. 7 illustrates the signal device in the state of GREEN. In the FIG. 6, the status value of the interlocking device (10) is OFF since P1 is the same with the common output voltage (common), whereas in the FIG. 7, the status value of the interlocking device (10) is ON since P1 is different from the common output voltage (common), and the change of the input information of P1 is performed in the interlocking device (10) using this input status as shown in the FIG. 8. As a result, the signal device control output voltage of the interlocking device (10) set the status of the signal device to REC according to the Judgement of the output voltage of the protection member (1).

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[0027] On the one hand, the present invention can be modified in many different ways and be embodied in many different forms in the application of said configuration.

[0028] Further, it has to be understood that the present invention is not restricted to a particular form mentioned in the detailed explanation described above, but rather, it has to be understood that it includes all modifications, equivalents and substitutes within the spirit and scope of the present invention defined by the attached Scope of Claims.

[0029] The action and effects of the railroad trackside worker protection system using a rail traffic management system and operating method thereof of the present invention configured as described above can be explained as follows:

[0030] First, the present invention can promote the trackside workers' safety by making it impossible for the system to control the route of a train entering into the pertinent section with regard to the railroad trackside workers' work and thus, preventing the train from entering into the working section. In other words, if the start route of a train which starts from a station to enter into the pertinent working section is set up to allow it to enter into the pertinent section and the work protection for the pertinent section is in place in the system, a pertinent train is made unable to start as the protection member (1) switches the start signal device of the start route, which allows an entry into the pertinent section, from Green to Red, and if needed, it allows the train to be started manually after alerting the train drivers and the trackside workers to all cautionary information by wireless to ensure that any casualties to the trackside workers can be prevented.

[0031] For this, under the operating method of the present invention to protect the workers working at the railroad trackside, a pertinent train is made unable to start by switching the start signal device of the start route from Green to Red as the signal device controlling output voltage of the interlocking device (10) controls the signal blocking controller (30) and the signal device blocking and controlling member (20) of the protection member (1) and the train is allowed to start manually after alerting the train drivers and the trackside workers to all cautionary information by wireless to ensure that any casualties to the trackside workers can be prevented.

[0032] The operating method of said protection member (1) of the present invention can be explained in more detail as follows:

[0033] In other words, as illustrated in FIG. 5, it goes through a step of registering the field working plan into the signal device blocking and controlling member (20).

[0034] Thereafter, it goes through a step at which a field worker asks for an approval for the designated location and time to the signal device blocking and controlling member (20).

[0035] Subsequently, it goes through a step at which the signal device blocking and controlling member (20) approves a field work automatically or manually according to a controller's setup.

[0036] Further, it goes through a step at which the signal blocking controller (30) sets the start signal device to RED status by force to ensure that a train can't start heading into the pertinent working section as the relay (40) gets to control the pertinent equipment of the interlocking device (10) depending on the output voltage when the train is about to enter into the work site during the designated time.

[0037] Lastly, it goes through a step at which the field worker requests the completion of work to the protection member (1) with regard to the designated location and time when the work has been completed, by which the operating method to protect the workers working at the railroad trackside using a rail traffic management system is carried out.

[0038] The present invention go through a step at which the protection member (1) approves the completion of work with regard to the field work automatically or manually depending on the controller's setup after the said step of requesting the completion of work to the protection member (1).

[0039] In addition, the protection member (1) applied to the present invention and the trackside workers communicate with each other through interface by wireless, the working plan registration of the protection member (1) is conducted manually by a station controller but when there is a request from the trackside worker with regard to the working plan, the station controller sets up the protection member (1) to automatically or manually approve it when it agrees with the working plan registered in the protection member (1) but if an approval for work which doesn't agree with the working plan registered in the protection member (1) is requested, the controller will modify the working plan registered in the protection member (1) and approve the request manually.

[0040] In addition, the protection member (1) applied to the present invention assigns a unique ID by work for multiple working plans for the same section.

[0041] At this time, if a trackside work is approved, this approval information is assigned with ID in said protection member (1) , and when the work has been completed, the trackside worker submits a request for work completion using the work ID and the information about the work.

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[0042] Further, the protection member (1) allows multiple work IDs to be registered for each section and a train is allowed to enter into the pertinent section only when work approval hasn't been provided for all work IDs.

[0043] The embodiment of the present invention described above is explained referring to FIG. 9 and FIG. 10 as follows:

[0044] First, FIG. 9 is the protection processing flowchart of the protection member (1), wherein a basic working plan is registered and a trackside worker requests an approval for work (at this time, working section and working time and end time).

[0045] Thereafter, depending on whether or not it is the same with the registered plan, if it is 'YES,' it will be asked whether it will be approved automatically and if it is 'YES' here too, it will end with the completion of processing.

[0046] However, when the answer is 'NO' in whether it is the same with the registered plan or whether it will be approved automatically, it will be asked whether the controller will approve it, and if it is 'NO' here, it will end with the completion of processing, but if it is 'YES,' it will end with the final completion of processing after going through the registration of modified working section and the requested working section protection start step.

[0047] In addition, FIG. 10 is a cancellation flowchart of the protection member (1), wherein the trackside worker's work completion information is sent to the protection member (1) and when it is the same with the protection information for the pertinent section in the protection member (1), the protection for the pertinent section will be cancelled.

[0048] In other words, while Section A is under protection, the trackside worker requests the completion of work (at this time, working section and work ID).

[0049] Thereafter, depending on whether or not it is the same with the work ID under protection, if it is 'YES,' it will end with the completion of processing after going through the cancellation of the protection of working section A.

[0050] However, if it is 'NO,' it will end with the completion of processing after displaying the request for the completion of work to the controller.

[0051] The present invention automatically prevents the start of a train entering into the working section by the operation described above.

Feasibility of Industrial Application

[0052] The technical idea of the railroad trackside worker protection system using a rail traffic management system and operating method thereof of the present invention can be implemented repeatedly with the result in reality, and especially, since the development of technology is promoted by implement of the invention of this application, it can contribute to the industrial development and thus, it is sufficiently worthy of being protected.

Concise Explanation of the Drawings

[0053] FIG. 1 is a drawing illustrating the safety measure taken for the trackside workers which is performed generally
[0054] in the prior art.

[0055] FIG. 2 is a drawing illustrating the conditions of the conventional facilities for the safe operation of train.

[0056] FIG. 3 is a drawing illustrating the situation when there is no signal device blocking and controlling member in the conventional system.

[0057] FIG. 4 is a drawing illustrating a situation in which the entry of a train into the working section is prevented by the
[0058] operation of the signal device blocking and controlling member of the present invention.

[0059] FIG. 5 is a drawing illustrating the examples using the signal device blocking and controlling member of the present invention.

[0060] FIG. 6 is a drawing showing the status in which the signal device is RED prior to the explanation of the present invention.

[0061] FIG. 7 is a drawing showing the status in which the signal device is GREEN prior to the explanation of the present invention.

[0062] FIG. 8 is a block diagram of the railroad trackside worker protection system using a rail traffic management
[0063] system which has been applied to the present invention.

[0064] FIG. 9 is the protection processing flowchart of the signal device blocking and controlling member of the present invention.

[0065] FIG. 10 is the cancellation processing flowchart of the signal device blocking and controlling member of the present invention.

[0066] <Explanation on the numbers marked on the major parts of the drawings>

[0067] 10: Interlocking device 20: Signal device blocking and controlling member

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[0068] 30: Signal blocking controller 40: Relay

Drawings

FIG. 1

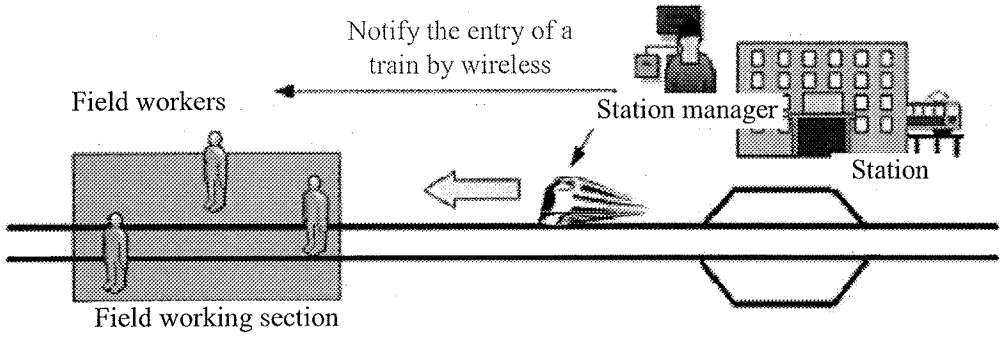
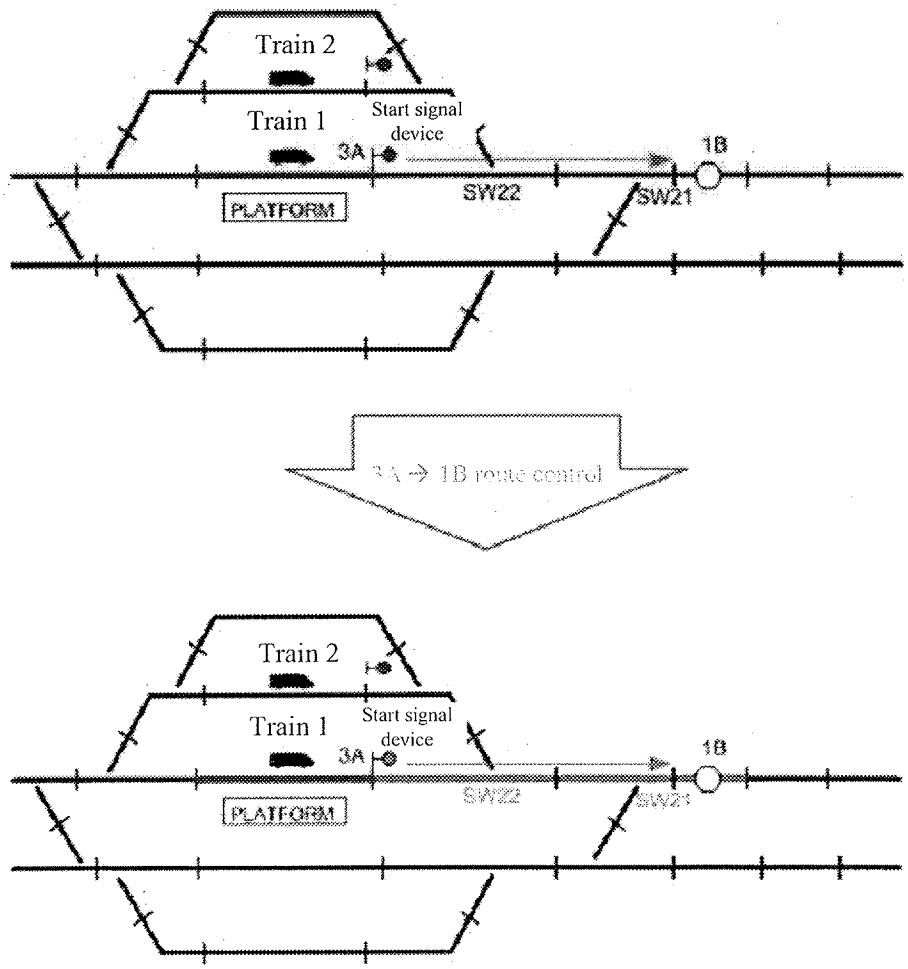


FIG. 2



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FIG. 3

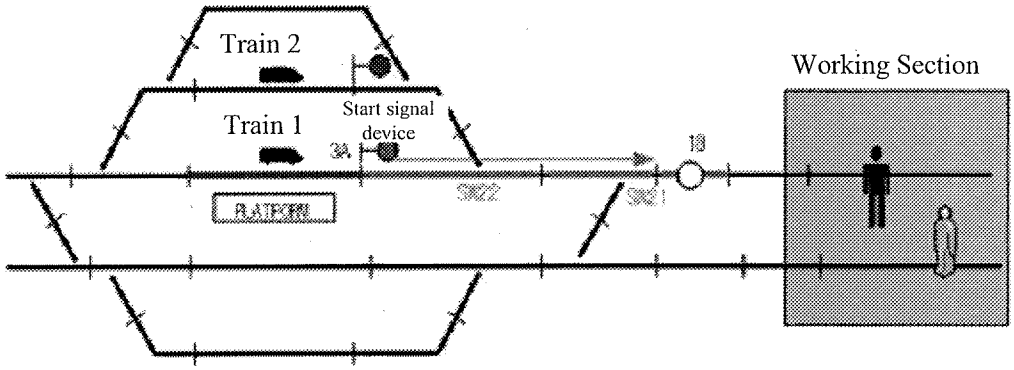
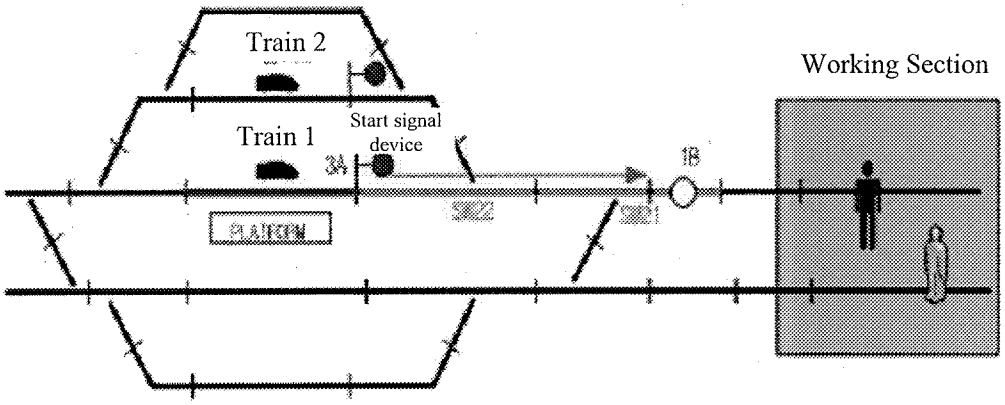


FIG. 4



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FIG. 5

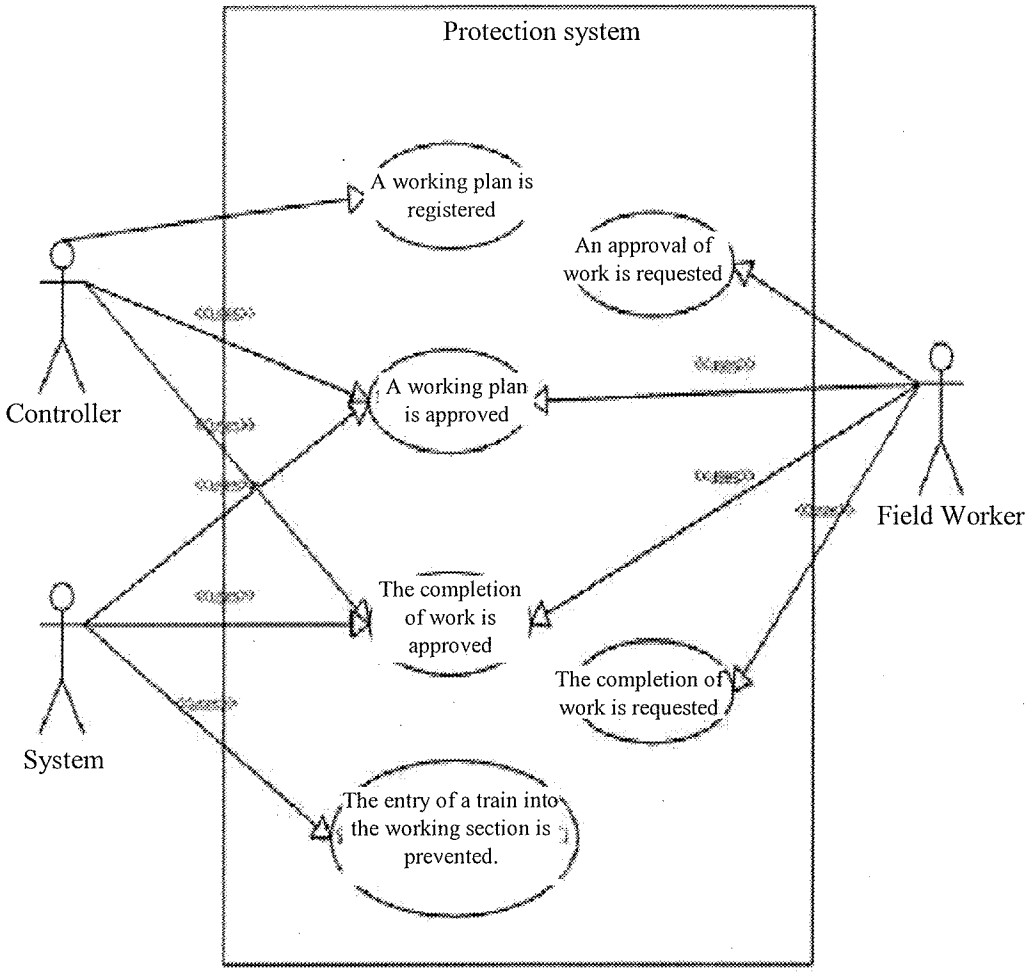
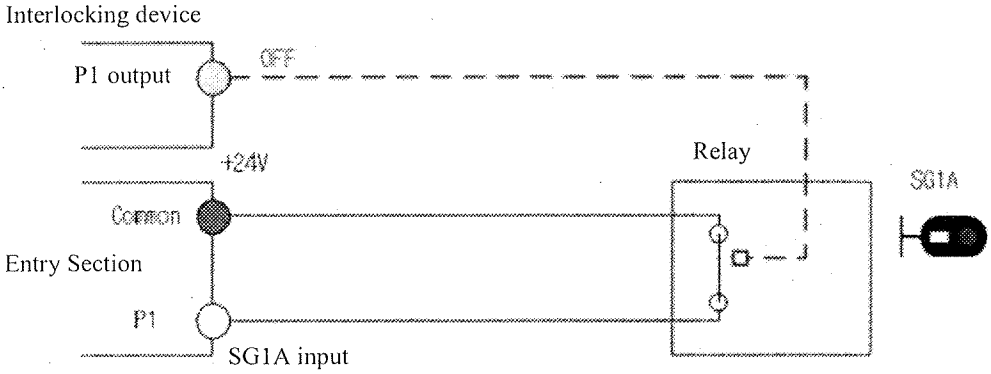
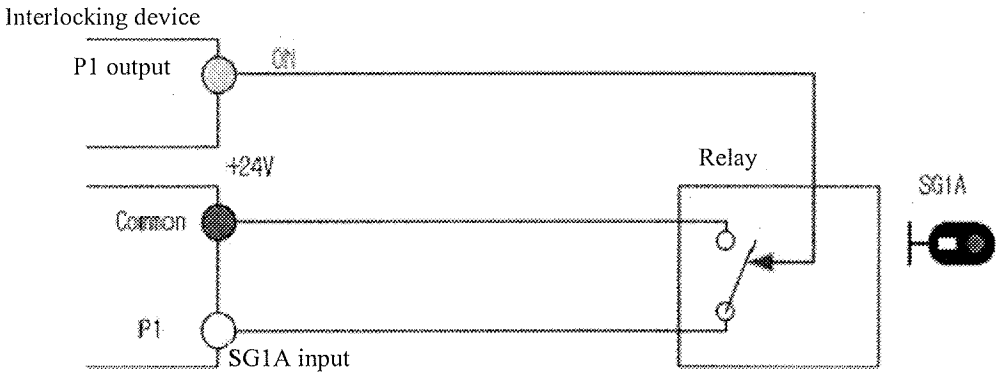


FIG. 6

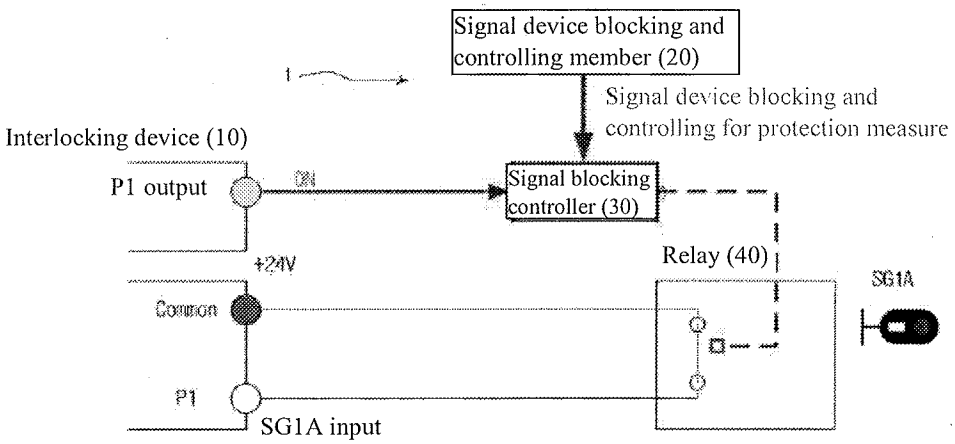


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FIG. 7

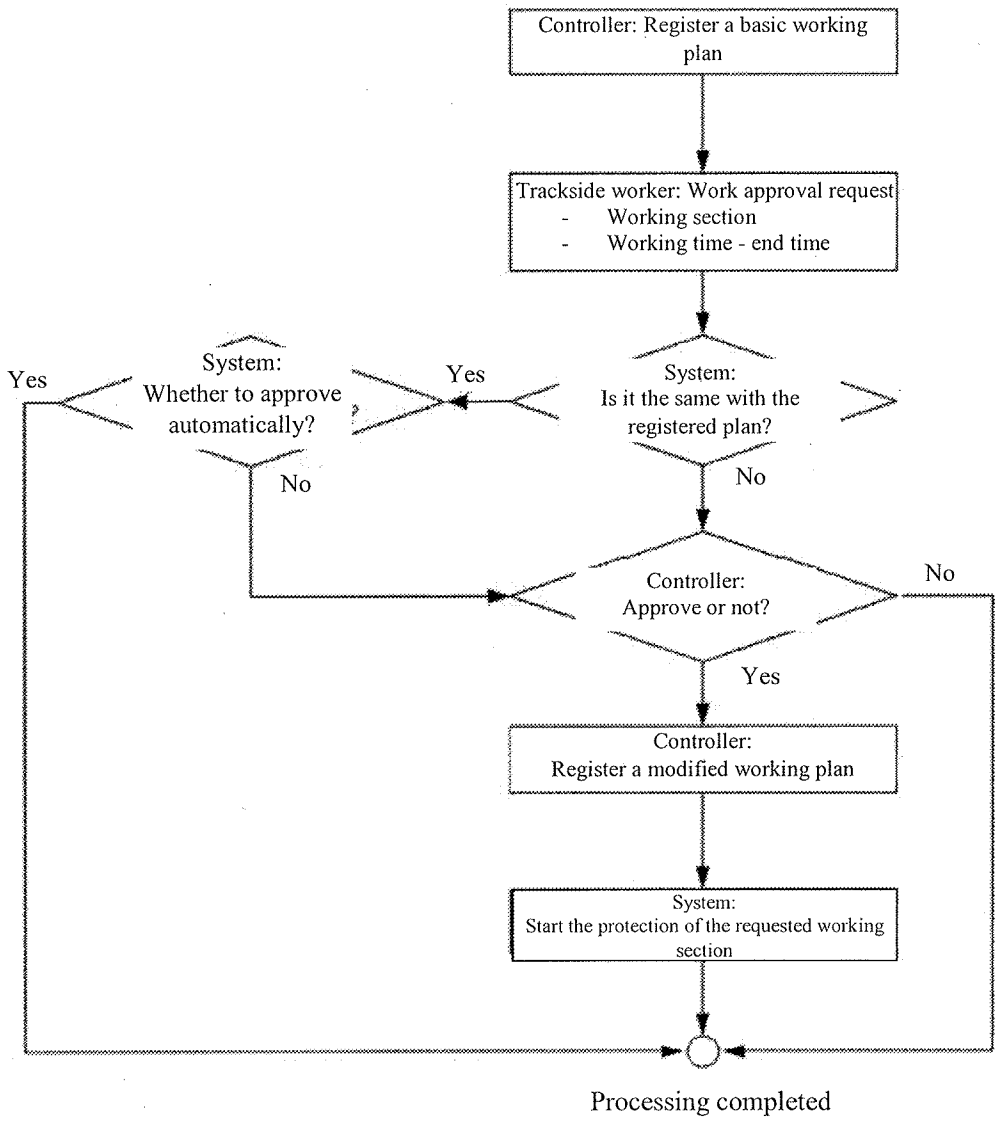


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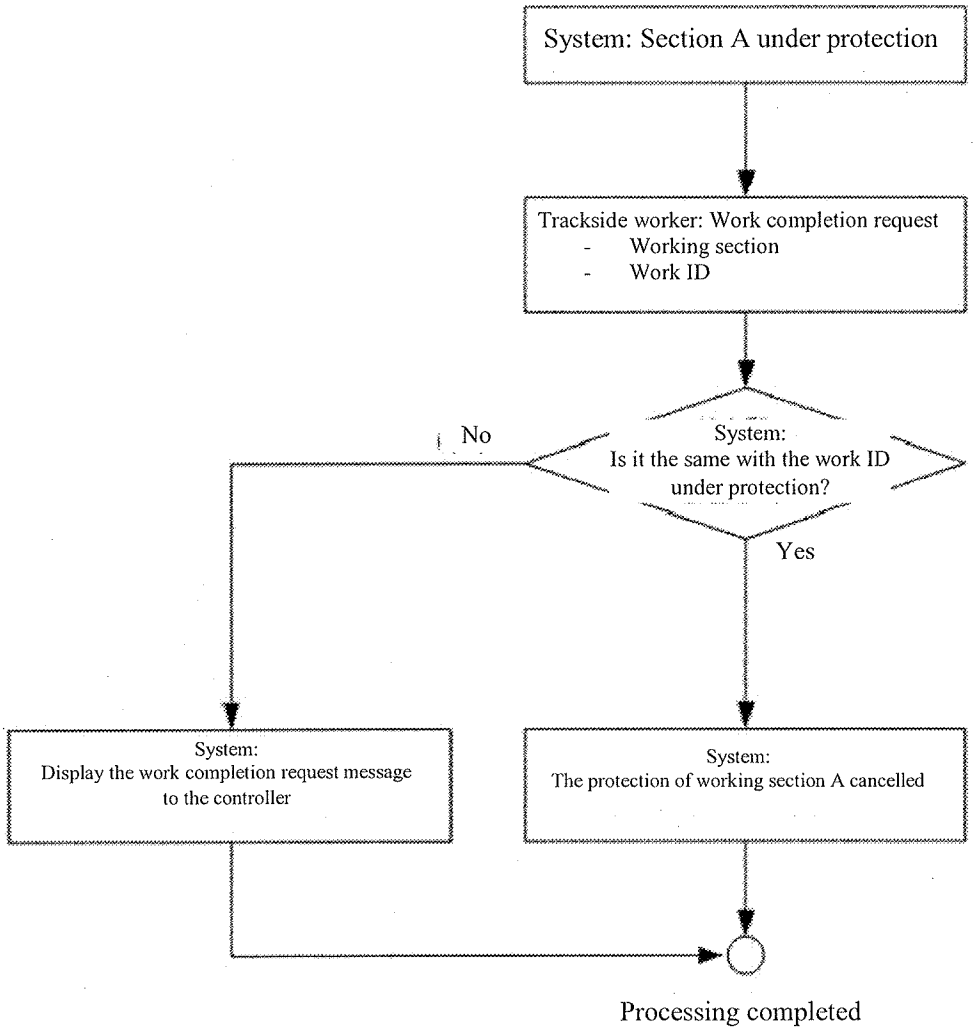
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FIG. 9



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FIG. 1c



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(71) Applicant: Kawasaki Jukogyo Kabushiki Kaisha
1-1 Higashikawasaki-cho 3-chome
Chuo-ku Kobe-shi Hyogo-ken(JP)

(72) Inventor: Miki, Hiromu
4-8, Takaoka-1-chome
Ohkubocho, Akashi-shi(JP)

(72) Inventor: Tomizawa, Yukio
425-22, Wada, Inamicho
Kako-gun, Hyogo-ken(JP)

(74) Representative: Strehl, Peter et al,
Dipl.-Ing. P. Strehl Dr. U. Schübel-Hopf Dr. R. Schulz
Patentanwälte Widenmayerstrasse 17 Postfach 22 03 45
D-8000 München 22(DE)

(54) Method and apparatus for administration and control of train service.

(57) Transmitter and receiver units (28, ..., 31, 32 ..., 35) each connected to corresponding one of a plurality of sections (37 ..., 42; 43 ..., 48) of an information transmission line (36), information transmission units (24, 25; 26, 27), control-processing unit (22; 23) and a single administration-processing unit (21) are arranged to form a hierarchy structure. The administration-processing unit (21) monitors the operation of the whole system and supplies to the control-processing units (22; 23) information relating to a train service schedule of a group of trains, a modified train service schedule to meet a change in demand, etc., and the control-processing units (22; 23) performs the traffic control of each train.

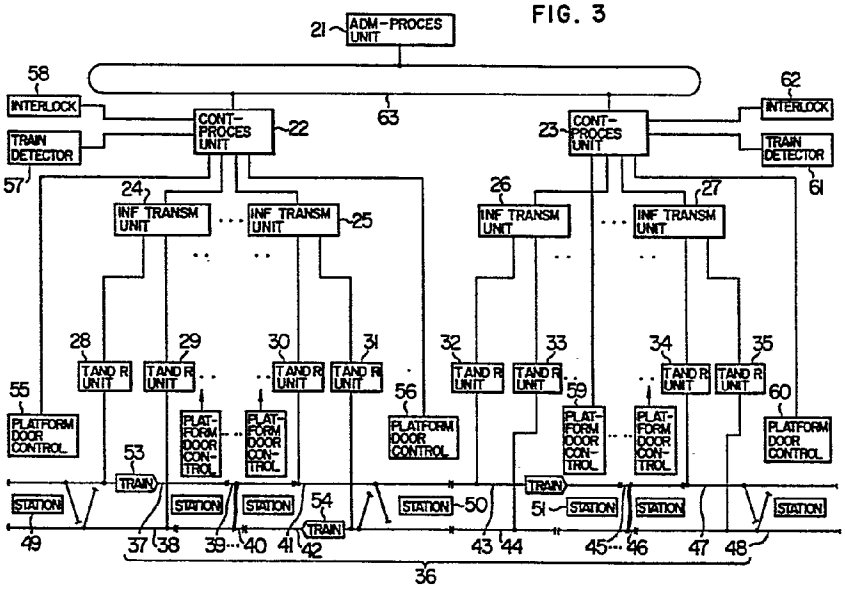
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FIG. 3



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METHOD AND APPARATUS FOR ADMINISTRATION AND CONTROL OF TRAIN SERVICE

This invention relates to a method and apparatus for administration and control of train service.

Prior art train service administration and control systems which can attain unmanned train operation are broadly classified into a so-called centralized control type and a so-called decentralized control type. The prior art system of the centralized control type is shown in FIG. 1. Referring to FIG. 1, an information transmission line 6 extending along the entire length of the track (not shown) laid for running of trains 7A to 7X (of which only two, 7A and 7X, are shown) is divided nto a plurality of sections 6A, 6B, 6C, 6D, ..., 6K, 6L, 6M and 6N (some of which are not shown). Transmitter and receiver units 5A, 5B, ..., 5M and 5N are respectively connected to the individual sections 6A, 6B, .., 6M and 6N of the information transmission line 6. (The transmitter and receiver units 5C to 5L corresponding to the sections 6C to 6L respectively are not shown to avoid confusion of illustration.) A single or a plurality of information transmission units 4 are connected to all of the transmitter and receiver units 5A, 5B, ..., 5M and 5N to transmit and receive information required for the control of the operation of the trains 7A to 7X existing within the extent of the sections 6A to 6N of the information transmission line 6. (In FIG. 1,

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a single information transmission unit 4 is shown.) Connected to the information transmission unit 4 is a train service administration and control unit 1 to exchanging information with the information transmission unit 4. Connected to the train service administration and control unit 1 are platform door control units 10A to 10Z controlling opening and closure of doors disposed at the platform of stations 8A to 8Z. Connected also to the train service administration and control unit 1 are a train detection unit 11 and an interlocking operation unit 12. Both of the train service administration and control unit 1 and the information transmission unit 4 are collectively installed in a central control center. The train service administration and control unit 1 functions to prepare the train service schedule, administrate the group of the trains and control the operation of the individual trains.

According to such a train service administration and control system of the centralized control type, the structure of its control system can be simplified, and all of necessary information can be collected in the train service administration and control unit 1. Therefore, this sytem has such an advantage that the operators can acquire all the information of the whole system and can readily intervene or interrupt in the control as required. This sytem has such another advantage that the installation of the important parts of the system in the central control center facilitates maintenance of those

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parts. However, the prior art system of the centralized control type has such a disadvantage that, in the event of occurrence of an accident, the load attributable to the accident is added to the normal load of the train service administration and control unit 1, and the response speed for processing is inevitably reduced due to the concentration of the loads to be processed. Further, the prior art system of the centralized control type has such another disadvantage that the expansion of the system to deal with an extension of the train track is difficult since the load to be processed by the unit 1 is generally proportional to the length of the track or the frequency of train service.

The prior art train service administration and control system of the decentralized control type is shown in FIG. 2. In FIG. 2, the same reference numerals are used to designate the same or equivalent parts appearing in FIG. 1. In the system of the distributed control type , station control units 9A to 9Z are disposed for the individual stations 8A to 8Z respectively. All of these station control units 9A to 9Z are connected to the train service administration and control unit 1. Connected to the station control units 9A to 9Z are the platform door control units 10A to 10Z, interlocking operation units 12A to 12Z and station information transmission lines 13A to 13Z respectively. Information of a train or trains stopped at the station or stations and information of the individual stations are exchanged between the train

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service administration and control unit 1 and the station control units 9A to 9Z. The train service administration and control 1 monitors generally the status of the individual trains 7A to 7X and applies to the station control units 9A to 9Z, the train control information for controlling the trains according to a predermined schedule of train service. The station control units 9A to 9Z control the operation of the trains 7A to 7X according to a predetermined sequence and timing. While the trains 7A to 7X are running, the train service administration and control unit 1 monitors the status of the trains on the basis of information applied through the information transmission unit 4 and transmits the control command through the information transmission unit 4.

The system of the decentralized control type has such an advantage that the load processed by the train service administration and control 1 can be distributed to improve the response speed for processing. However, due to the fact that the component units of the system are widely distributed, the maintenance of the distributed units is not easy, and the necessity for providing two systems of the train information transmission line 6 and station information transmission lines 13, leads to an increase in the cost. Further, when any one of the station control units 9A to 9Z is disabled, the function of the disabled one of the station control units 9A to 9Z cannot be substituted by the train service administration and control unit 1 disposed in the central control

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center and since the trouble cannot be dealt with by intervention from the central control center, an operator must be dispatched to the associated stations 8A to 8Z for which the station control units 9A to 9Z are provided respectively. The prior art system of the distributed control type is therefore defective in that the unmanning of the stations cannot be realized in such an event.

With a view to solve the technical problems encountered by the prior art systems described above, it is a primary object of the present invention to provide a method and apparatus for administration and control of train service, which increases the response speed for processing, facilitates an expansion of the system to deal with an extension of the train track and yet permits easy maintenance of the system.

The present invention provides a method and apparatus for train service administration and control including means for exchanging information including status information indicative of the operating status of each of a plurality of trains running on the track and command information controlling the operation of the train, through an information transmission line divided into a plurality of sections of a predetermined length extending along the entire length of the track thereby controlling the train operation according to a train service schedule, the apparatus comprising a plurality of transmitter and receiver units connected individually to the sections of the information transmission line,

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at least one information transmission unit installed in a central control center to be connected to at least one of the transmitter and receiver units, at least one control-processing unit installed in the central control center to be connected to the information transmission unit, and a single administration and control unit installed in the central control center to be connected to the control-processing unit, all of the units being disposed in a hierarchy in the above order, so that the distribution of processing functions to the administration-processing unit and control-processing unit can improve the response speed of these processing units.

The present invention differs from the prior art system of the centralized control type in that the train service administration-processing unit is divided into a single administration-processing unit and a plurality of control-processing units constituting a hierarchy structure, and the tasks of the processing for administration and the processing for control are respectively allocated to respective stages of the hierarchy thereby improving the response speed for processing. The present invention differs also from the prior art system of the distributed control type in that all of information are collected in a central control center for conveniences of the operators, and simplification of the structure of the system and improvement in the maintenance are further achieved.

Preferred embodiments of the present invention

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will now be described in detail with reference to the drawings.

FIGs. 1 and 2 are block diagrams illustrating the prior art train service administration and control systems.

FIG. 3 is a block diagram of a preferred embodiment of the present invention.

FIG. 4 is a block diagram showing the detailed structure of the control-processing unit 22 shown in FIG. 3.

FIG. 5 is a block diagram of another preferred embodiment of the present invention.

Referring to FIG. 3 which is a block diagram of a preferred embodiment of the present invention, the train service administration and control system according to the present invention comprises an administration-processing unit 21, a plurality of or, for example, two control-processing units 22 and 23, a plurality of information transmission units 24, ..., 25 and 26, ..., 27 (some of which are not shown), and a plurality of transmitter and receiver units 28, 29, ..., 30, 31, 32, 33, ..., 34 and 35 (some of which are not shown). The administration-processing unit 21 and the control-processing units 22, 23; the control-processing units 22, 23 and the information transmission units 24 to 27; and the information transmission units 24 to 27 and the transmitter and receiver units 28 to 35 are disposed in a hierarchy as shown.

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An information transmission line 36 extends along the entire length of the track laid for running of trains (of which only two, 53 and 54, are shown). This information transmission line 36 is divided into a plurality of sections 37, 38, 39, ..., 40, 41, 42, 43, 44, 45, ..., 46, 47 and 48 (some of which are not shown in FIG. 3). The sections 37 to 42 of the information transmission line 36 are those disposed along a section of track which was constructed in the first stage of the tranck construction work, while the sections 43 to 48 of the information transmission line 36 are those disposed along an extended track section which was constructed in the second stage of the track construction work carried out to extend the track. Stations 49, ..., 50 are those provided in the first stage of the track construction work, while stations 51, ..., 52 are those provided in the second stage of the track construction work. The transmitter and receiver units 28 to 35 are disposed in a relation individually corresponding to the sections 37 to 48 respectively of the information transmission line 36. (The transmitter and receiver units corresponding to the sections 39, ..., 40 and 45, ..., 46 of the information transmission line 36 are not shown.) These transmitter and receiver units 28 to 35 are installed in the individual stations nearest thereto or two or more of them are collectively installed in each of the key stations of a plurality of stations.

The transmitter and receiver units 28 to 35

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are divided into a plurality of groups (some of which are not shown), and the information transmission units 24 to 27 are disposed in a relation corresponding individually to the groups of the transmitter and receiver units 28 to 35. In FIG. 3, the transmitter and receiver units 28 and 29 are connected to the information transmission unit 24, and the transmitter and receiver units 30 and 31 are connected to the information transmission unit 25. The transmitter and receiver units 32 and 33 are connected to the information transmission unit 26, and the transmitter and receiver units 34 and 35 are connected to the information transmission unit 27.

The information transmission units 24 to 27 are divided into a plurality of groups, for example, two groups as shown, and the control-processing units 22 and 23, which may be composed of computers, are disposed in a relation individually corresponding to the groups of the information transmission units 24 to 27. The information transmission units 24 to 25 are connected to the control-processing unit 22, and the information transmission units 26 to 27 are connected to the control-processing unit 23.

Connected also to the control-processing unit 22 are platform door control units 55 to 56 controlling the opening and closure of doors disposed at the platform of the stations in relation to the opening and closure of the doors of the trains 53 to 54 running along the corresponding sections of the track, a train detection

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unit 57 detecting the position of the trains 53 to 54, and an interlocking operation unit 58 controlling the route of advancing movement of the trains 53 to 54 and indicating the advancing route status. Connected also to the control-processing unit 23 are platform door control units 59 to 60 similar to the platform door control units 55 to 56, a train detection unit 61 similar to the train detection unit 57, and an interlocking operation unit 62 similar to interlocking operation unit 58.

The control-processing units 22 and 23 are connected to each other and to an administration-processing unit 21, which may be also composed of a computer, through an exclusive circuit 63 which is in the form of , for example, an optical fiber cable or a coaxial cable. The administration-processing unit 21, control-processing unit 22 and information transmission units 24 to 25 are collectively installed in a central control center. The control-processing unit 23 and information transmission units 26 to 27 are collectively installed in a sub-control center. The central control center and sub-control center may be located in the same place or separate places.

The administration-processing unit 21, which is of the high echelon in the hierarchy arrangement, exchanges information with the control-processing units 22 and 23 of the lower echelon through the exclusive circuit 63, to carry out processing for the purpose of administration. The administration-processing unit 21

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supplied to the control-processing units 22 and 23 the information including the train service schedule prepared for the group of the trains 53 to 54, modified schedule required to deal with, for example, a change of the transportation demand and occurrence of an accident, and intervening or interrupt information for inhibiting departure of or emergency stopping of a train or trains. The administration-processing unit 21 functions also to monitor the status of the train service administration and control system.

The control-processing unit 22 receives train status information from the sections 37 to 42 of the information transmission line 36 through the transmitter and receiver units 28 to 31 and information transmission units 24 to 25. The control-processing unit 22 receives also platform door status information from the platform door control units 55 to 56, trains position information from the train detection unit 57 and train advancing route status information from the interlocking operation unit 58. In response to the train service schedule information and interrupt information supplied from the administration-processing unit 21, the control-processing unit 22 generates train control command information, platform door control command information and route setting command information with appropriate timing on the basis of the train status information, platform door status information, train position information and train advancing route status information applied thereto.

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FIG. 4 is a block diagram showing the detailed structure of the control-processing unit 22 shown in FIG. 3. Referring to FIG. 4, the control-processing unit 22 includes a timer 70, a plurality of memory parts 71, 72, 73, 74, 75 and 76, a plurality of selector parts 77, 78 and 79, a plurality of output parts 80, 81 and 82, and a plurality of checking parts 83, 84 and 85.

The timer 70 performs time keeping operation. The first memory part 71 stores the train operation schedule information supplied from the administration-processing unit 21. The second memory part 72 stores the interrupt information supplied from the administration-processing unit 21. The third memory part 73 stores the train position information supplied from the train detection unit 57. The fourth memory part 74 stores the train status information supplied from the information transmission units 24 to 25. The fifth memory part 75 stores the platform door status information supplied from the platform door control units 55 to 56. The sixth memory part 76 stores the train advancing route status information supplied from the interlocking operation unit 58.

The selector 77, 78 and 79 are actuated in response to the application of the train position information together with the time information and select a train control command, a platform door control command and a route setting command respectively depending on the train service schedule. The first output part 80 supplies the selected train control command information to the

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information transmission units 24 to 25. The second output part 81 supplies the selected platform door control command information to the platform door control units 55 to 56. The third output part 82 supplies the selected route setting command information to the interlocking operation unit 58.

The first checking part 83 compares the train control command information supplied from the first output part 80 to the information transmission units 24 to 25, with the train status information supplied to the first memory part 74 from the information transmission units 24 to 25, and if there is a non-coincidence therebetween, informs the administration-processing unit 21 of the presence of non-coincidence or trouble. The second checking part 84 compares the platform door control command information supplied from the second output part 81 to the platform door control units 55 to 56, with the platform door status information supplied to the fifth memory part 75 from the platform door control units 55 to 56, and, if there is a non-coincidence therebetween, informs the administration-processing unit 21 of the presence of non-coincidence or trouble. The third checking part 85 compares the route setting command information supplied from the third output part 82 to the interlocking operation unit 58, with the train advancing route status information supplied to the sixth memory part 76 from the interlocking operation unit 58, and, if there is a non-coincidence therebetween, informs the administration-processing unit 21 of the presence of non-coincidence

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or trouble.

When such a non-coincidence is found as a result of the check for comparison between the train status information and the train control command information, between the platform door status information and the platform door control command information and/or between the train advancing route status information and the route setting command information, the control-processing unit 22 supplies a non-coincidence information output indicative of the presence of the non-coincidence or trouble to the administration-processing unit 21. Also the control-processing unit 22 supplies the train status information, platform door status information and train advancing route status information to the administration-processing unit 21.

The administration-processing unit 21 supplies the train service schedule information to the control-processing unit 22 and, when so required, supplies also manual interrupt information by the operator for train departure inhibition, emergency train stopping, door opening-closure, etc. with appropriate timing. On the basis of the train service schedule information and interrupt information and in response to the train position information applied together with the time information as trigger the control-processing unit 22 selects and stores the required train control command information, platform door control information and route setting command information in the respective selectors, and send these command information at appropriate timing. When a

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predetermined period of time has elapsed or when any one of the statuses changes after sending of the command information from the control-processing unit 22, the specific status information and command information are checked to be compared with each other. When the result of the comparison check proves that there is a non-coincidence therebetween, the administration-processing unit 21 at the highest echelen is informed of the presence of non-coincidence or trouble.

The other control-processing unit 23 has a structure similar to that of the control-processing unit 22 and executes functions similar to those of the control-processing unit 22. Further, the second stage of the track construction work can be started at any desired time after the first stage of the track construction work was completed, and it can be made while the trains are running on the first stage track, and the second control-processing unit 23 can be very easily connected to the administration-processing unit 21 by connecting the exclusive circuit 63.

The information transmission units 24 to 27 transmit the command information to the trains 53 to 54 through the transmitter and receiver units 28 to 35 and the sections 37 to 48 of the information transmisstion line 36 according to a predetermined information transmission sequence. Further, the information transmission units 24 to 27 scan the status information of each of the trains 53 to 54 at intervals of a

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predetermined period of time for detecting any change in the status of each train. When the result of scanning proves that a change has occurred in the status of any one of the trains, the corresponding one of the information transmission units 24 to 27 trainsmits the status information of the specific train to the associated one of the control-processing units 22 and 23 at the higher echelon.

The administration-processing unit 21 monitors the status of the train service administration and control system on the basis of the train status information, platform door status information and trouble information supplied from the control-processing units 22 and 23 and sends out interrupt information to the control-processing units 22 and 23. More precisely, the administration-processing unit 21 supplies to the control-processing units 22 and 23 the information including the train service schedule prepared for the train group, modified train service schedule required to deal with, for example, a change of the transportation demand and occurrence of an accident, and interrupt information for inhibiting departure of or emergency stopping of the train or trains, open-close control of the platform door or doors, etc. The administration-processing unit 21 functions also to offer various information indicative of the status of the system to the operators in the central control center, so that the operators monitoring the status of the system on the

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control panel can operate the control console as required to supply to the control-processing units 22 and 23 the interrupt information for inhibiting departure or emergency stopping of a train or trains, open-close control of the platform door or doors, etc.

FIG. 5 is a block diagram of another preferred embodiment of the present invention. In FIG. 5, the scan reference numerals are used to designate the same or equivalent parts appearing in FIG. 3. It is to be noted that, in order to provide redundancy, the administration-processing unit 21, control-processing units 22 and 23, information transmission units 24 to 27, and transmitter and receiver units 28 to 35 shown in FIG. 3 are replaced by a dual or duplex configuration of administration-processing units 21a and 21b, control processing units 22a, 22b and 23a, 23b, information transmission units 24a, 24b, ..., 25a, 25b and 26a, 26b, ..., 27a, 27b, and transmitter and receiver units 28a, 28b, 29a, 29b, ..., 30a, 30b, 31a, 31b and 32a, 32b, 33a, 33b, ..., 34a, 34b, 35a, 35b. It will be seen that the administration-processing units 21a and 21b; control-processing units 22a, 22b and 23a, 23b; information transmission units 24a, 24b, ..., 25a, 25b and 26a, 26b, ..., 27a, 27b; and transmitter and receiver units 28a, 28b, 29a, 29b, ..., 30a, 30b, 31a, 31b and 32a, 32b, 33a, 33b, ..., 34a, 34b, 35a, 35b are provided in dual or duplex to operate as a dual system or duplex system. Therefore, the system constructed in this way can

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operate with higher reliability. Although this redundant arrangement is applied to each of the administration-processing unit 21, control-processing units 22 and 23, information transmission units 24 to 27 and transmitter and receiver units 28 to 35 in FIG. 5, it may be applied to at least one of them.

It will be understood from the foregoing detailed description of the present invention that the distribution of processing functions to the processing units arranged in a hierarchy can increase the response speed for processing. Further, because of the arrangement in which the administration-processing unit, control-processing unit and information transmission units are collectively installed in the central control center to collect all of the information in the central control center, the operators in the central control center can readily intervene in the processing by the administration-processing unit or control-processing unit in the event of an emergency so that unmanning of the trains and stations can be achieved. Further, the system according to the present invention requires only a single information requires only a single information transmission line compared with the prior art system of the distributed control type. Therefore, the number of required units can be decreased and the system construction can be simplified, thereby to make easy the maintenance. Furthermore, because of the fact that the processing functions are so distributed that the

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administration-processing unit participates in the processing for preparation of the train service schedule and the control-processing unit participates in the processing for train service control, an expansion of the sytem to deal with an extension of the track can be easily done compared with that in the prior art system of the centralized control type.

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CLAIMS

1. A train service administration and control system including means for exchanging information including status information indicative of the operating status of a plurality of trains (53, ..., 54) running on the track, and command information controlling the operation of the train through an information transmission line (36) divided into a plurality of sections (37, 38, ..., 41, 42) of a predetermined length extending along the entire length of the track thereby controlling the train operation according to a train service schedule, characterized in that

a plurality of transmitter and receiver units (28, 29, ..., 30, 31) connected individually to said sections of said information transmission line, at least one information transmission unit (24, ..., 25) to be connected to at least one of said transmitter and receiver units, at least one control-processing unit (22) to be connected to said information transmission unit, and a single administration-processing unit (21) to be connected to said at least one control-processing unit, are connected to form a hierachy structure in this order with said administration-processing unit at the top echelon.

2. A train service administration and control systm as claimed in claim 1, characterized in that said administration-processing unit (21) and said control-processing unit (22) are connected to each other by an exclusive circuit (63).

3. A train service administration and control

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system as claimed in claim 1 or 2, characterized in that at least one of said administration-processing unit (21), said control-processing unit (22), said information transmission unit (24, ..., 25) and the group of said plural transmitter and receive units (28, 29, ..., 30, 31) is further redundantly added to provide a multiplex system.

4. A train service administration and control systm, as claimed in claim 1, 2 or 3, characterized in that,

there are further provided a plurality of information transmission line sections (43, 44, ..., 47, 48) of a predetermined length extending along an extension of said track, a plurality of transmitter and receiver units (32, 33, ..., 34, 35) connected individually to said information transmission line sections, at least one information transmission unit (26, ..., 27) to be connected to at least one of said transmitter and receiver units, and at least one control-processing unit (23) to said information transmission unit, all of said units being disposed in a hierarchy in the above order, with said control-processing unit (23) being connected to said administration-processing unit (21) of the highest order in the hierarchy arrangement.

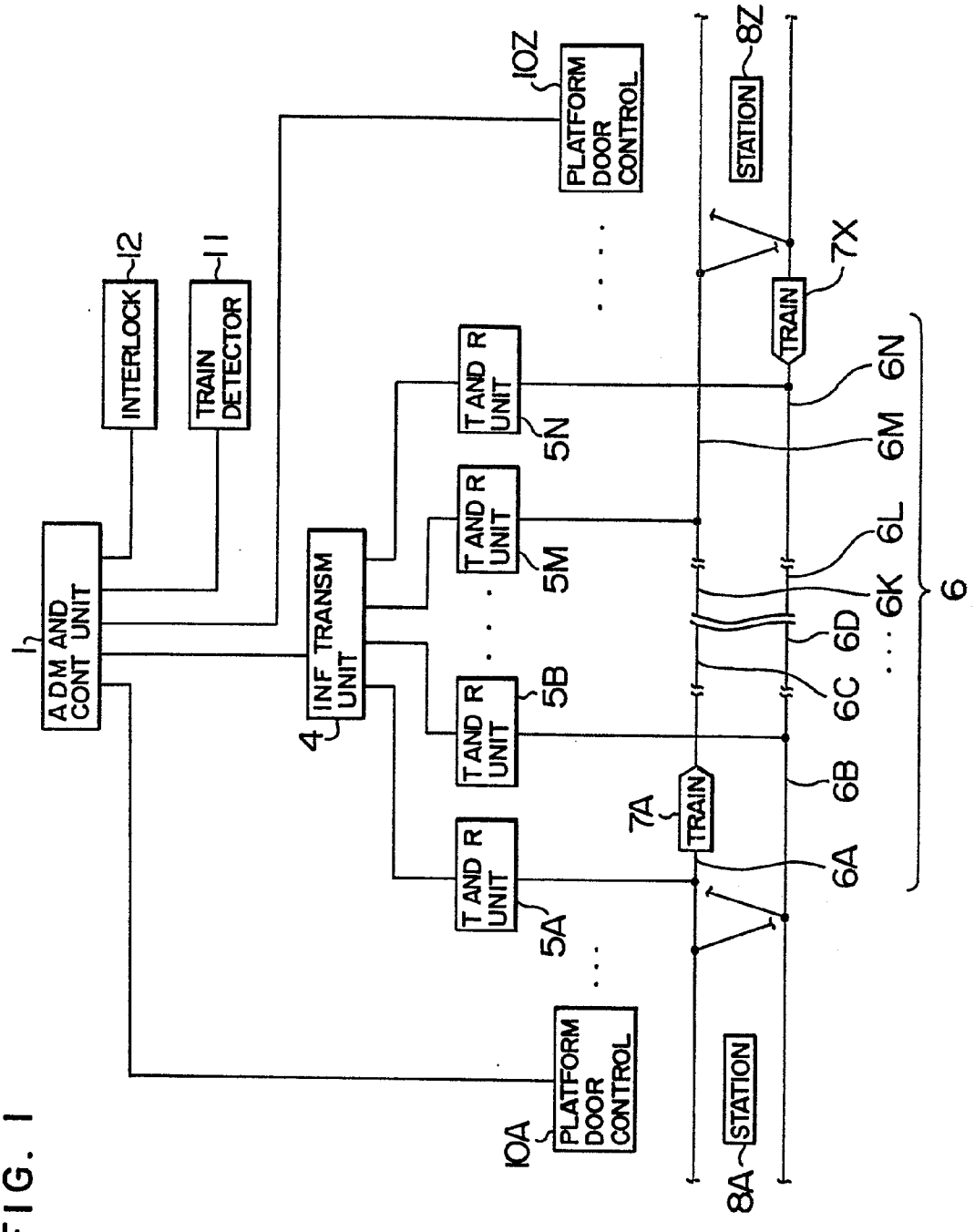
5. A method for train service administration and control by a train service administration and control system as claimed in claim 1, 2, 3 or 4, characterized in that at least one control-processing unit (22) is connected to a single administration-processing unit

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(21), train service schedule information from said administration-processing unit is supplied to said control-processing unit, and the service of trains (53, ..., 54) existing within the governing range of said control-processing unit is controlled by the function of said control-processing unit.

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FIG. 1



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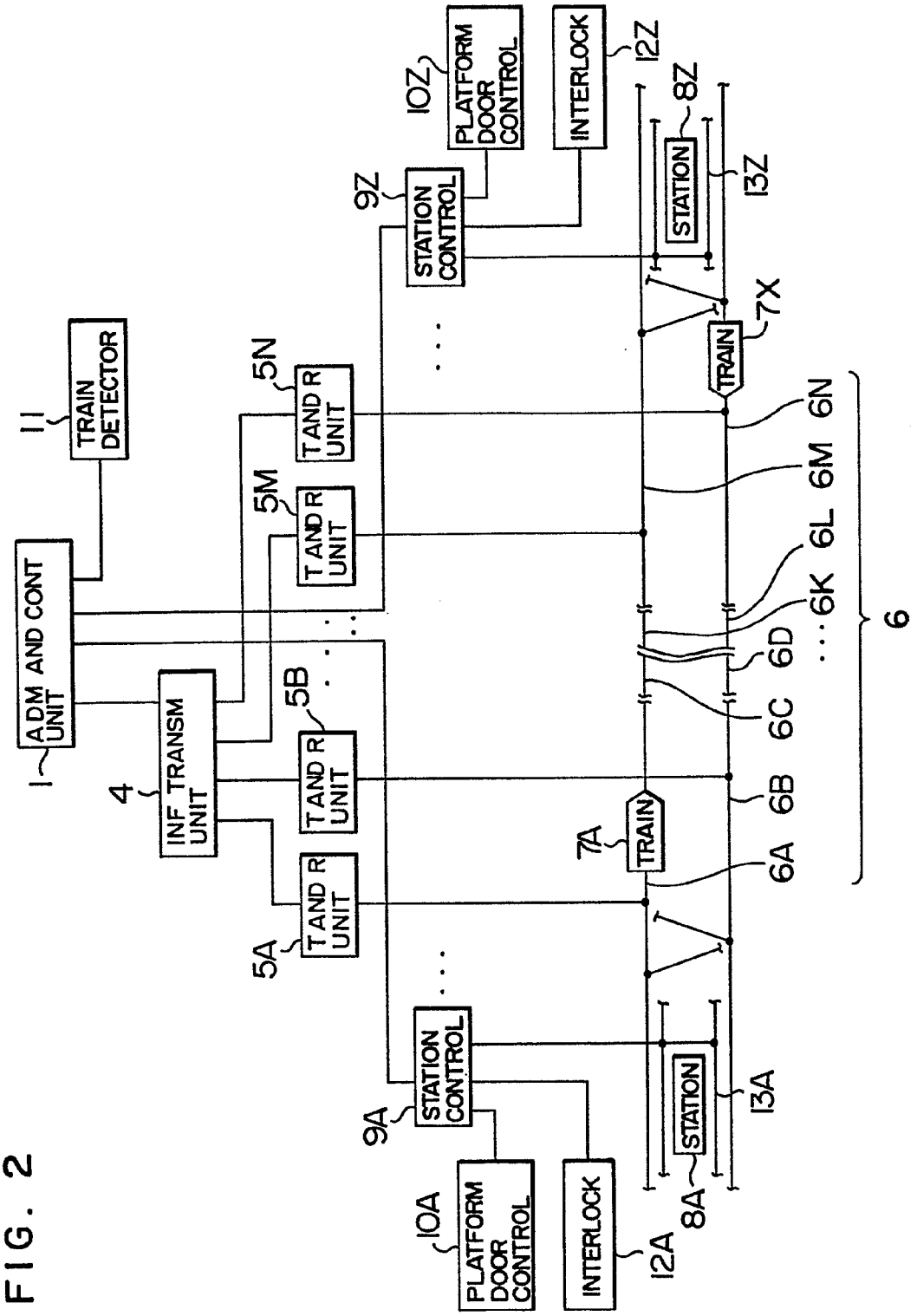
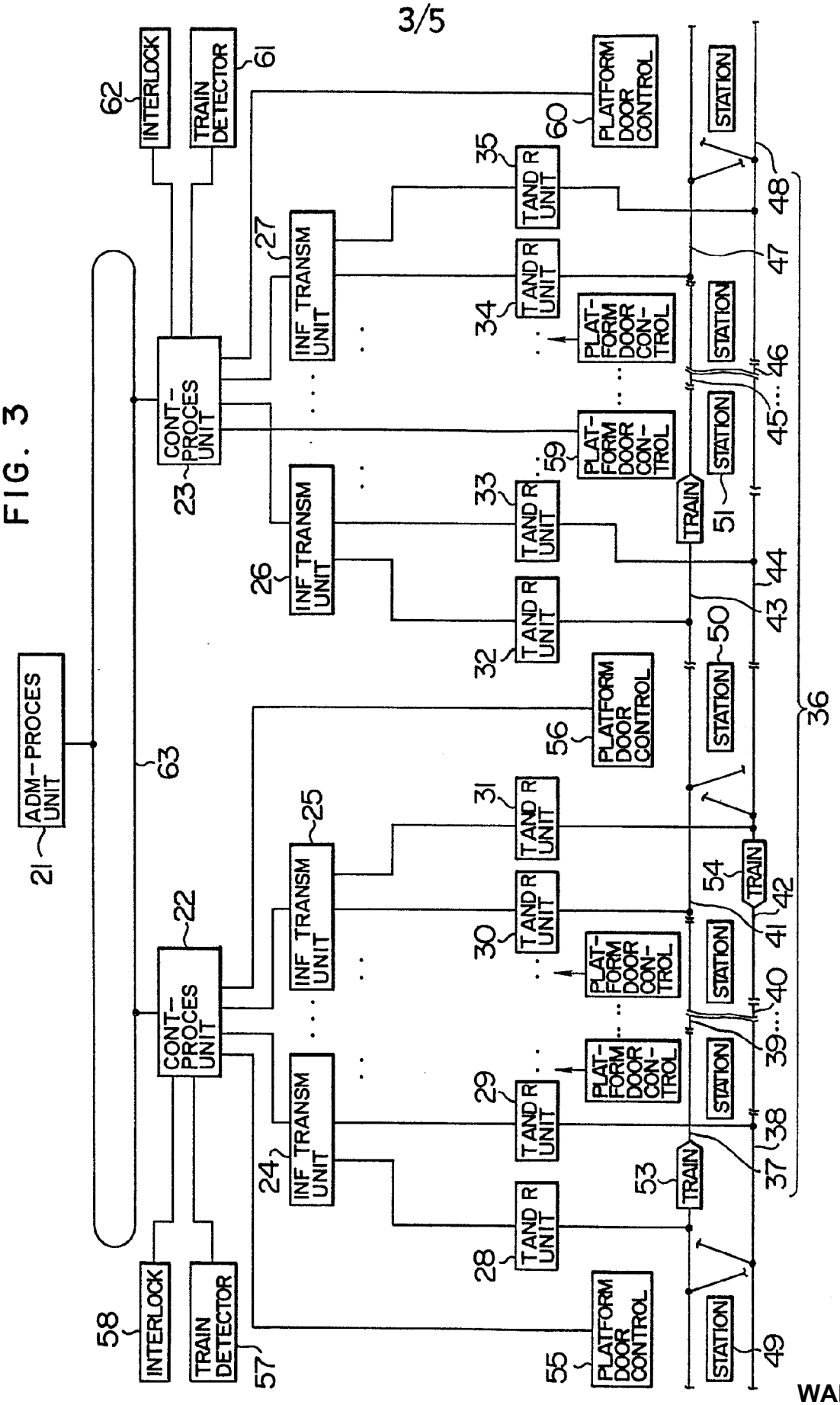


FIG. 2

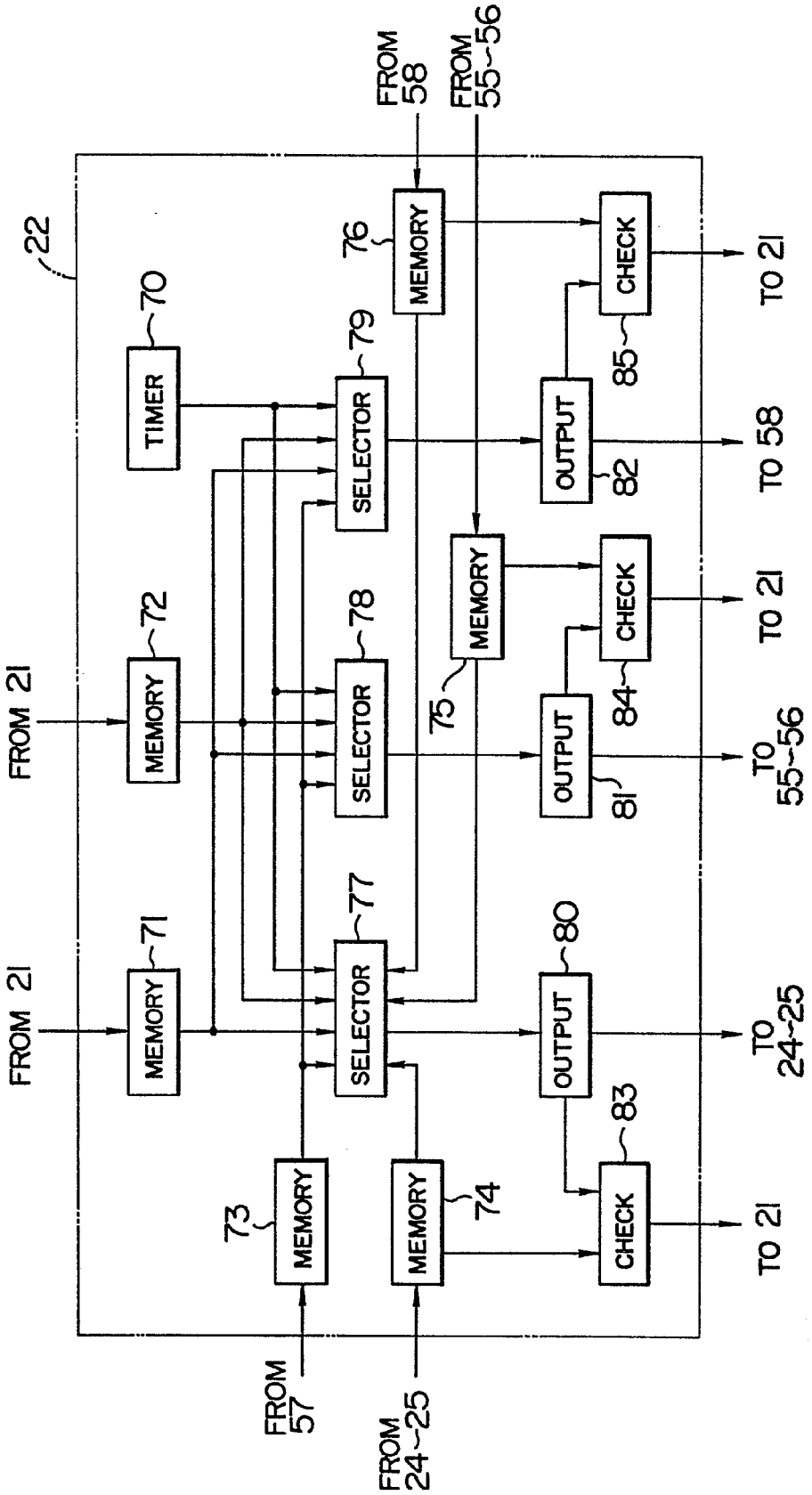
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FIG. 3



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FIG. 4



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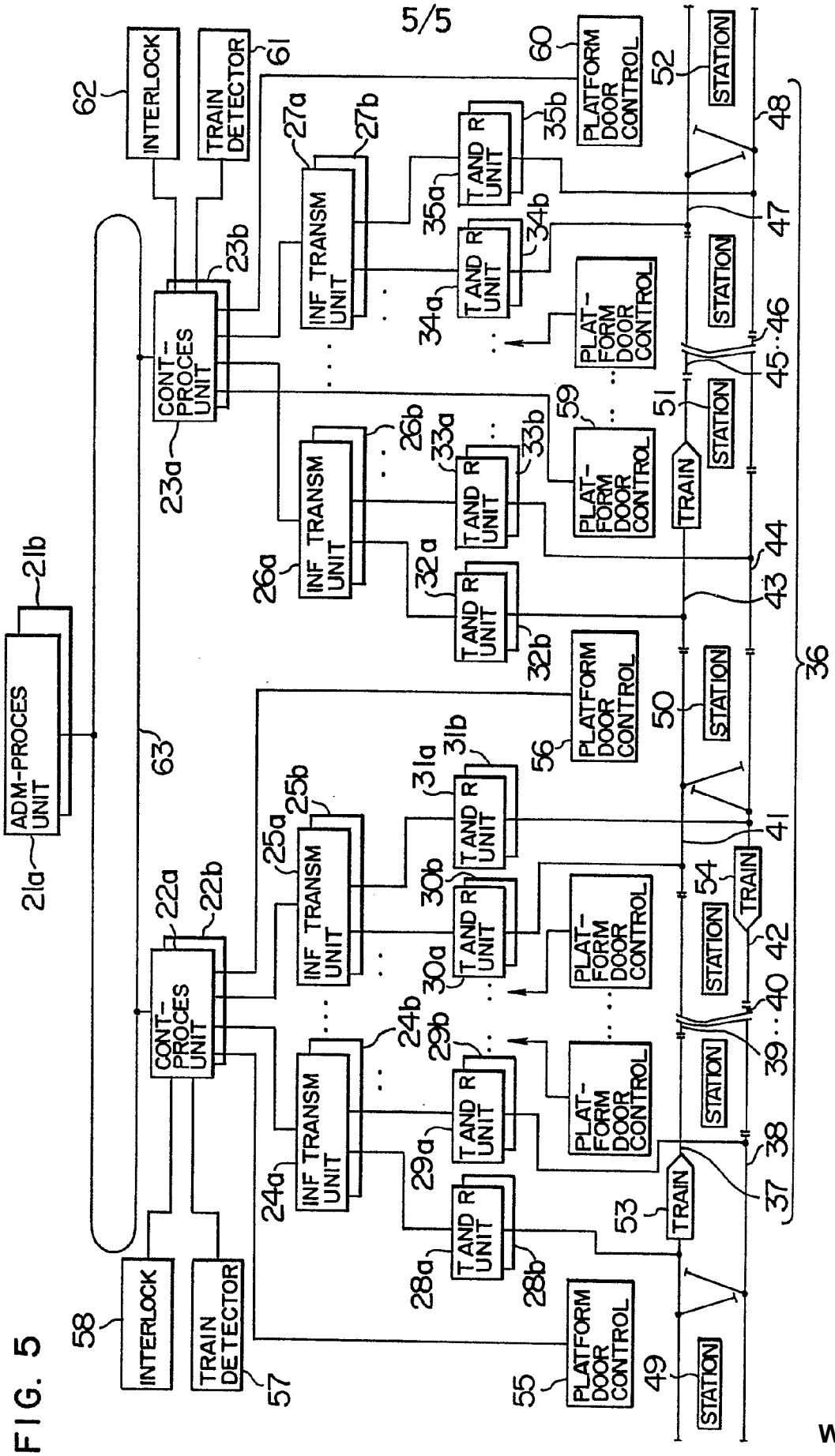
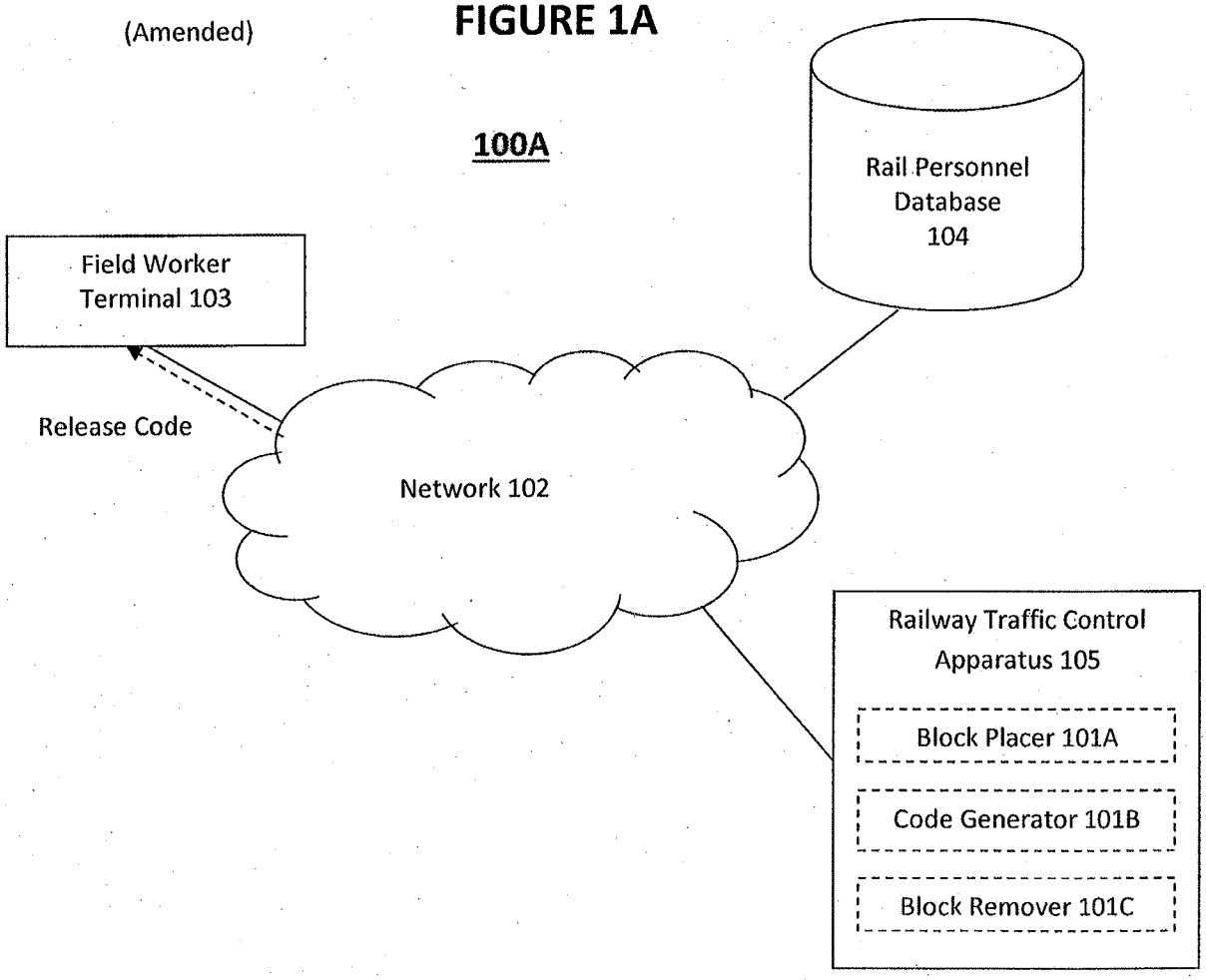


FIG. 5

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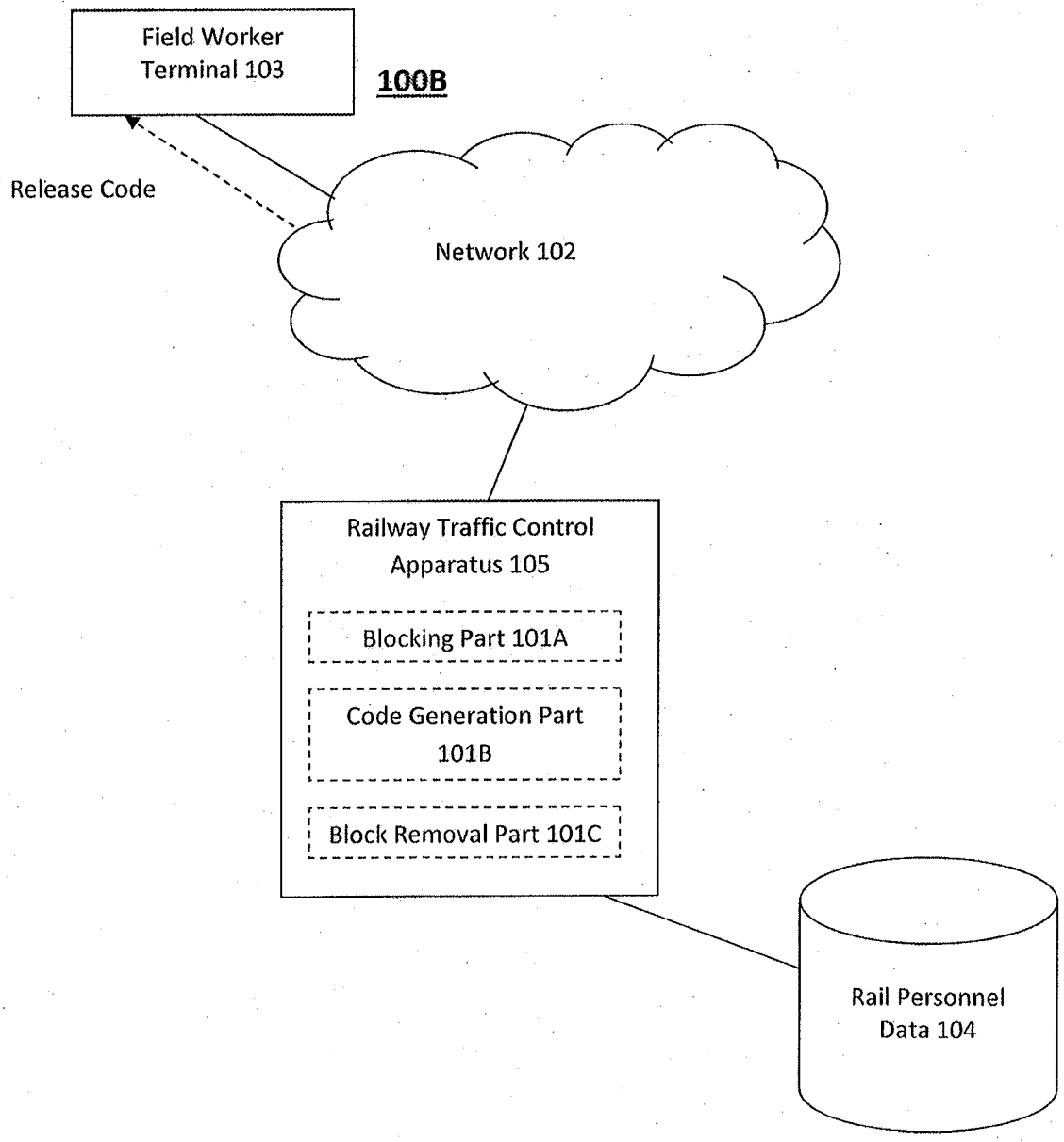
(Amended)

FIGURE 1A



(Amended)

FIGURE 1B



(Amended)

FIGURE 2

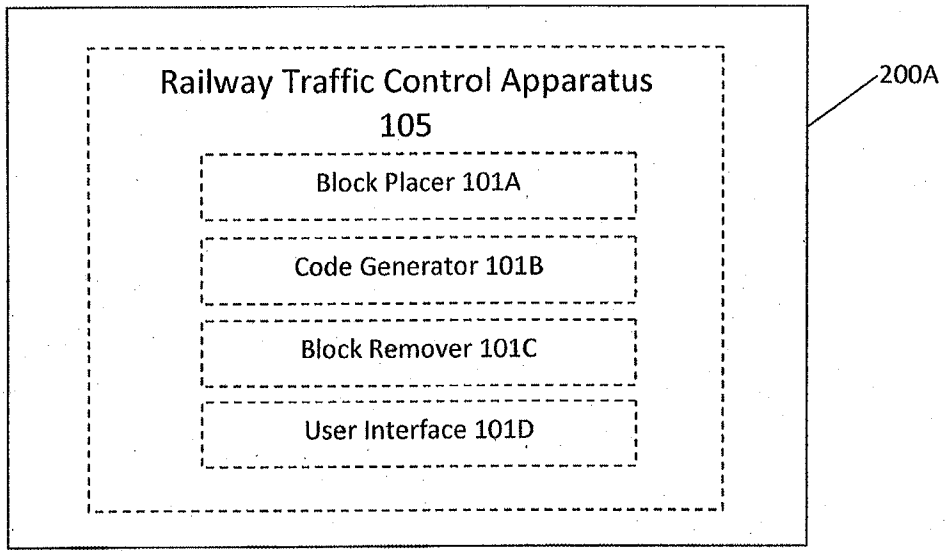
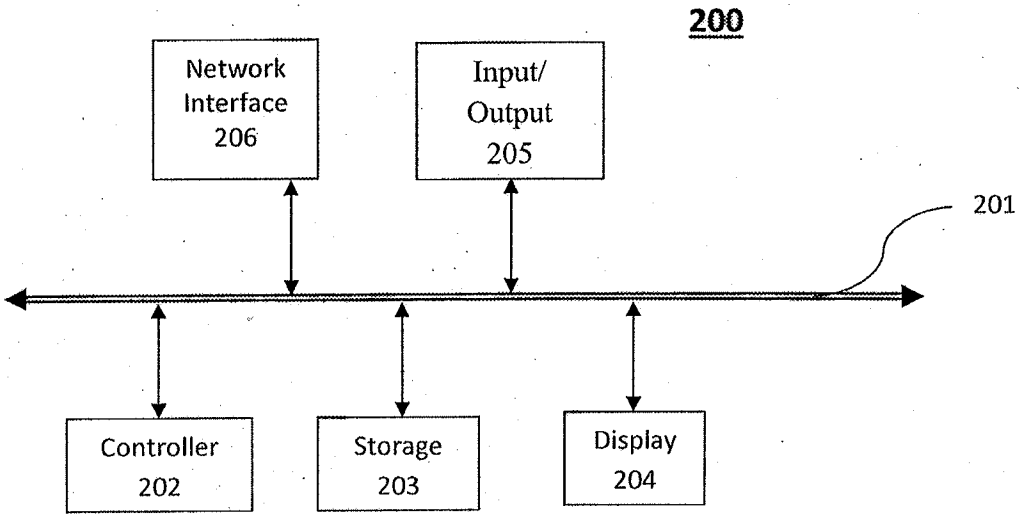
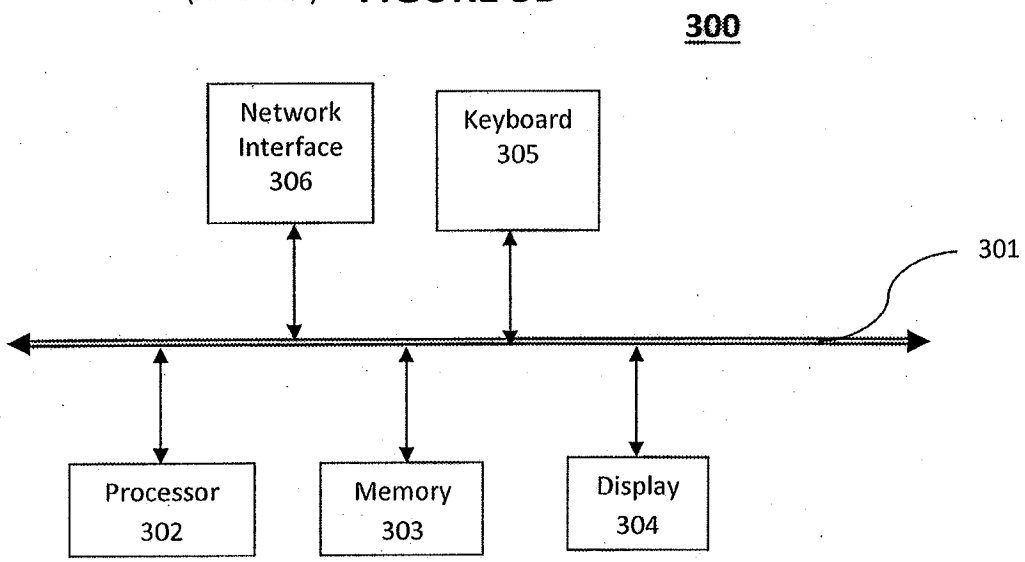


FIGURE 3A



(Amended) **FIGURE 3B**



(Amended) **FIGURE 5**

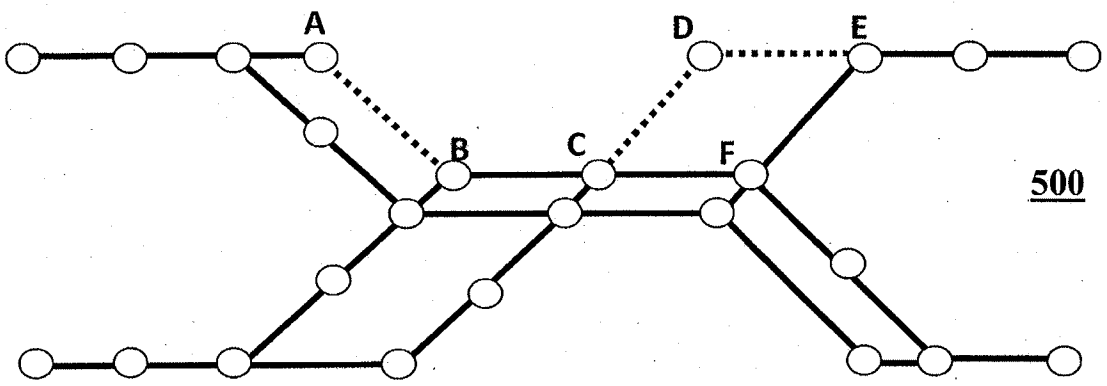
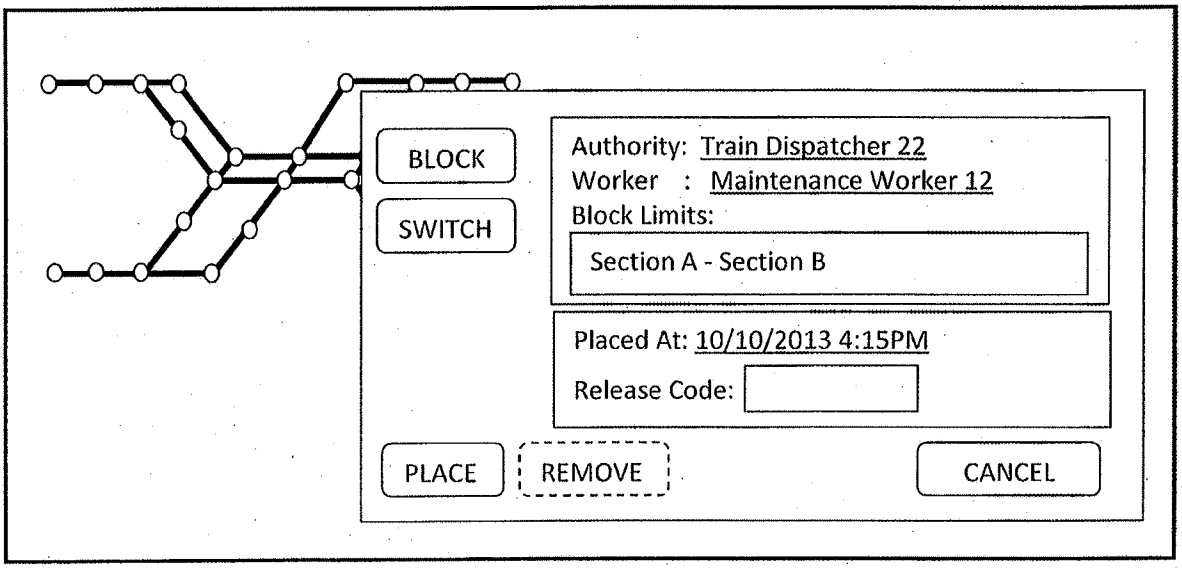


FIGURE 6



(Amended)

FIGURE 7

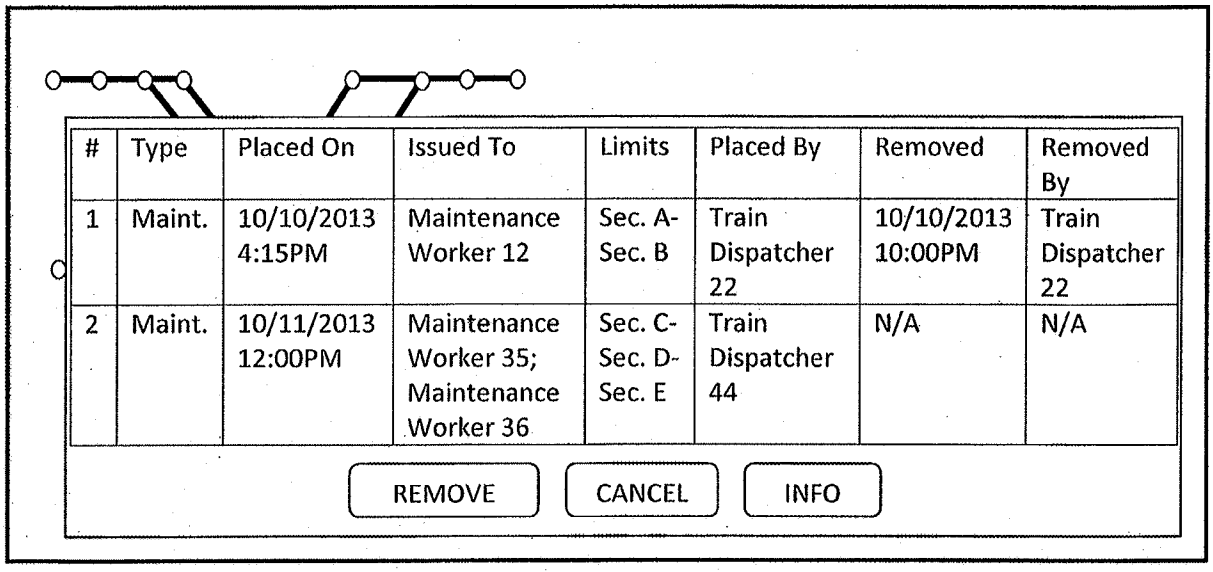
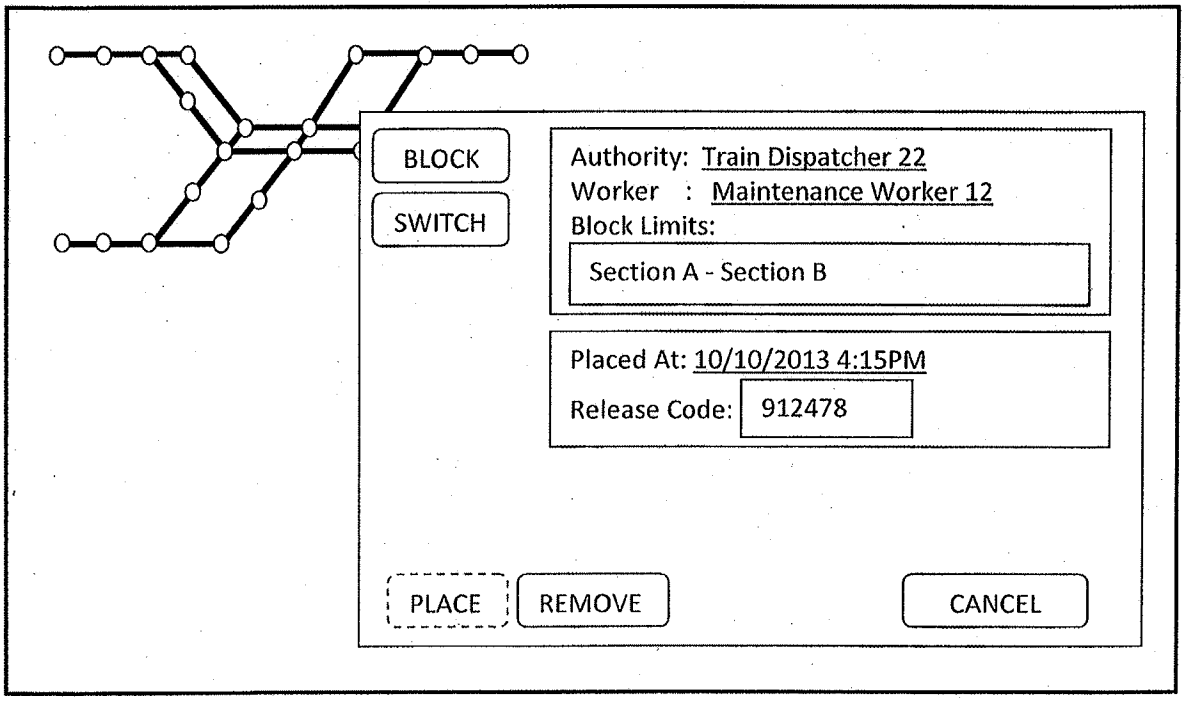
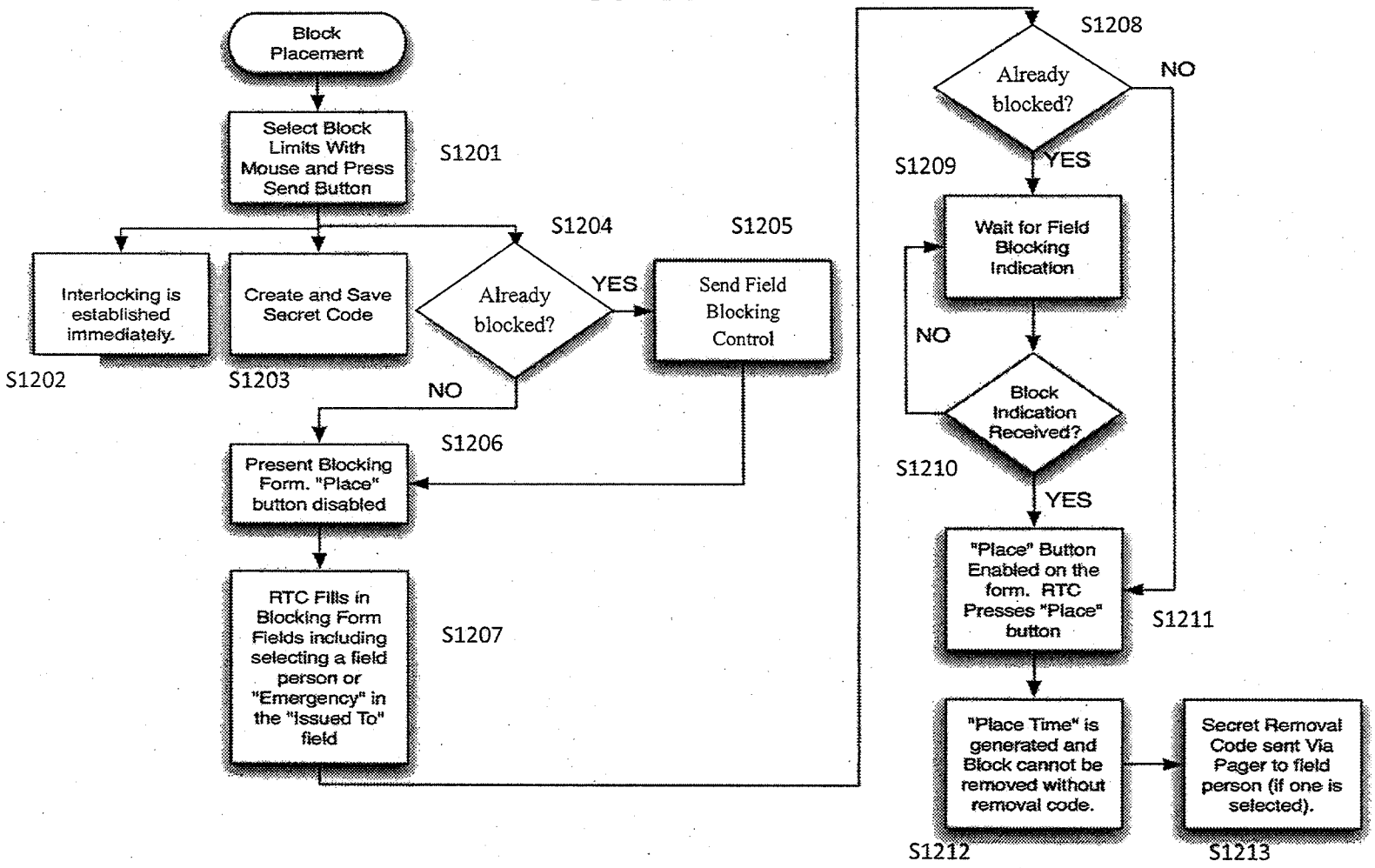


FIGURE 8



(Amended) **FIGURE 12**



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STATEMENT OF STATUS AND SUPPORT FOR ALL CHANGES TO CLAIMS

The subject reissue application is a Continuation of Reissue Application No. 15/928,955 filed March 22, 2018, for reissue of U.S. Patent No. 9,403,545, granted on August 2, 2016. U.S. Patent No. 9,403,545 was granted with claims 1-19. By the present Amendment, patent claims 1-19 have been canceled (since they were already reconsidered in Reissue Application No. 15/928,955), and new claims 20-39 have been added. Accordingly, claims 20-39 are presented for examination in the present reissue application.

Applicants respectfully submit that no new matter is presented by this Amendment, and that new claims 20-39 added hereby are supported by the disclosure in the original patent and are patentable.

Pursuant to 37 C.F.R. § 1.173(c), an explanation of support, which can be found (without limitation) in the drawings and specification (column:line) of U.S. Patent No. 9,403,545, for new claims 20-39 is set forth in the following table.

claims	support in patent disclosure
20. A railway control apparatus comprising:	
a processor for controlling a plurality of track sections in a railway network, wherein each track section is associated with a corresponding interlock; and	5:29-46; 7:10-20; Fig. 5.
a memory device storing one or more programs of executable instructions, wherein execution of the one or more programs causes the processor to:	303; 5:21-28.
receive a selection of at least one track section amongst the plurality of track sections;	Figs. 6 and 12; 9:8-11.
transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the selected track section;	9:11-16.
generate a secret code associated with the at least one selected track section; and	9:16-18.
transmit the secret code to a remote user terminal.	9:52-54.

21. The railway control apparatus of claim 20, wherein execution of the one or more programs causes the processor to store the secret code in the memory device.	6:33-44; 9:16-18.
22. The railway control apparatus of claim 21, wherein execution of the one or more programs causes the processor to:	6:33-44.
receive a second secret code;	10:6.
determine that the second secret code and the secret code stored in the memory device are the same; and	10:7-9.
responsive to determining that the second secret code and the secret code stored in the memory device are the same, release the block on the at least one selected track section.	7:6-9.
23. The railway control apparatus of claim 22, wherein the second secret code is received in the form of a voice message.	3:22-24; 8:53.
24. The railway control apparatus of claim 23, wherein execution of the one or more programs causes the processor to extract the second secret code from the voice message.	3:22-24.
25. The railway control apparatus of claim 21, wherein execution of the one or more programs causes the processor to:	6:33-44.
receive a second secret code;	10:6.
determine that the second secret code and the secret code stored in the memory device are not the same; and	Fig. 13, S1309, "NO; 10:9-11.
responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the at least one selected track section.	Fig. 13; 10-51-55.
26. The railway control apparatus of claim 20, wherein the secret code is transmitted to the remote user terminal by text message, email, or voice message.	8:50-53.

27. The railway control apparatus of claim 20, wherein the remote user terminal is a mobile phone, a smartphone, a tablet computer, a pager, or a personal digital assistant.	10:53-57.
28. The railway control apparatus of claim 20, wherein execution of the one or more programs causes the processor to:	6:33-44. Fig. 12.
responsive to receiving the selection of one or more track sections, determine that the at least one selected track section has an existing block;	9:9-21.
receive a signal from the corresponding interlock of the at least one selected track section that a new block can be established; and	9:38-43.
responsive to receiving the signal that a new block can be established, permit the block to be placed on the at least one selected track section.	9:43-44
29. The railway control apparatus of claim 20, further comprising: a network interface, wherein execution of the one or more programs causes the processor to transmit the secret code to the remote user terminal via the network interface.	6:41-44; 11:14-17.
30. The railway control apparatus of claim 20, wherein the secret code is transmitted only to the remote user terminal.	6:61-67.
31. The railway control apparatus of claim 20, wherein the secret code is generated by a random or pseudorandom process.	5:47-49
32. The railway control apparatus of claim 20, further comprising:	
a rail personnel database comprising information related to a plurality of rail personnel;	104
wherein execution of the one or more programs causes the processor to:	
retrieve specific personnel data from the rail personnel database; and	6:48-56.

determine an electronic address of the remote user terminal to which the secret code is to be transmitted.	12:46-50.
33. A method comprising:	
receiving, by a processor, a selection of at least one track section in a centrally controlled railway network, wherein each track section corresponds to an interlock;	Figs. 6 and 12; 9:8-11.
transmitting, by the processor, a block signal to the corresponding interlock of the at least one selected track section to place a block on the at least one selected track section;	9:11-16.
generating, by the processor, a secret code associated with the at least one selected track section;	9:16-18.
transmitting, by the processor, the secret code to a remote user terminal.	9:52-54.
34. The method of claim 33, further comprising: storing the secret code in a memory device.	6:33-44; 9:16-18.
35. The method of claim 33, further comprising:	6:33-44.
receiving, by the processor, a second secret code;	10:6.
determining, by the processor, that the second secret code and the secret code stored in the memory device are the same; and	10:7-9.
responsive to determining that the second secret code and the secret code stored in the memory device are the same, releasing, by the processor, the block on the at least one selected track section.	7:6-9.
36. The method of claim 35, wherein the second secret code is received in the form of a voice message, and further comprising:	3:22-24; 8:53.
extracting, by the processor, the second secret code from the voice message.	3:22-24.
37. The method of claim 33, further comprising:	
receiving, by the processor, a second secret code;	10:6.
determining, by the processor, that the second secret code and the secret code stored in the memory device are not the same; and	Fig. 13, S1309, "NO; 10:9-11.

responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the at least one selected track section.	Fig. 13; 10-51-55.
38. The method of claim 33, wherein the processor transmits the secret code to only the remote user terminal.	6:61-67.
39. The method of claim 32, further comprising:	
retrieving, by the processor, specific personnel data from a rail personnel database; and	6:48-56.
determining, by the processor, an electronic address of the remote user terminal to which the secret code is to be transmitted.	12:46-50.

The Patent Office is hereby authorized to charge to Deposit Account No. 03-3125 any additional fees that are required in connection with this amendment and/or the reissue application concurrently submitted herewith.

Respectfully submitted,

Paul Teng, Reg. No. 40,837
Attorney for Applicant
COOPER & DUNHAM LLP
30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross PIRTLE
Filer:	Paul Teng/Esther Weiner
Attorney Docket Number:	7552/85663-Reissue-A

Filed as Large Entity

Filing Fees for Reissue (Utility)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY REISSUE BASIC	1014	1	300	300
REISSUE OR REISSUE DESIGN CPA SEARCH FEE	1114	1	660	660
REISSUE OR REISSUE DESIGN CPA EXAM. FEE	1314	1	2200	2200
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**3160**

Electronic Acknowledgement Receipt

EFS ID:	37981378
Application Number:	16709126
International Application Number:	
Confirmation Number:	1509
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross PIRTLE
Customer Number:	23432
Filer:	Paul Teng/Esther Weiner
Filer Authorized By:	Paul Teng
Attorney Docket Number:	7552/85663-Reissue-A
Receipt Date:	10-DEC-2019
Filing Date:	
Time Stamp:	15:10:54
Application Type:	Reissue (Utility)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$3160
RAM confirmation Number	E2019B0F11477966
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Reissue Application	ApplicationTransmittal_85663-Reissue-A.pdf	79341 af804ede45c2ca2360ce2667a7be90fd33082f11	no	1
Warnings:					
Information:					
2	Transmittal Letter	FeeTransmittal_85663-Reissue-A.pdf	78598 569672eebffe0fb8273edebd163e240171111914	no	1
Warnings:					
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3		Specification_85663-Reissue-A.pdf	805047 f96dfd0e503a212d0313f655a17447030376b26d	yes	7

Multipart Description/PDF files in .zip description

Document Description	Start	End
Claims	6	7
Specification	1	5

Warnings:					
Information:					
4	Drawings-only black and white line drawings	Drawings_85663-Reissue-A.pdf	201754 50cb5680254620c6e909596de8206d16676a08cc	no	11
Warnings:					
Information:					
5	Oath or Declaration filed	Declaration_85663-Reissue-A.pdf	132732 fcf118e651204881e0fb379cb9dde8aa0bee1f56	no	2
Warnings:					
Information:					

WABTEC EX1002

6	Application Data Sheet	ApplicationDataSheet_85663-Reissue-A.pdf	1256006 5b8212d1e4c2941aca6f05acf56072db972602bc	no	8
Warnings:					
Information:					
7	Consent of Assignee accompanying the declaration	ConsentOfAssignee_85663-Reissue-A.pdf	99438 df8e38954aa5e1ce0cf29596820fcc1f2924dedb	no	1
Warnings:					
Information:					
8	Assignee showing of ownership per 37 CFR 3.73	3-73Statement_85663-Reissue-A.pdf	123224 e65b0174df68cf416d6bbb43083299febeeb91c4	no	2
Warnings:					
Information:					
9	Abstract	Abstract_85663-Reissue-A.pdf	39193 34878b000b9ab1591f72b4acd38796fe7797091f	no	1
Warnings:					
Information:					
10	Information Disclosure Statement (IDS) Form (SB08)	InformationDisclosureStatement-1449_85663-Reissue-A.pdf	324106 09aeaf5a402fd44be73610cdafd31916d943db93	no	5
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
11	Foreign Reference	B1-WO2004-042663A1.pdf	3034222 0790d2182b6976a0686c37c640f9c0d6cf1aeaa0	no	70
Warnings:					
Information:					
12	Foreign Reference	B2-EP1308366B1andTranslation.pdf	1499631 cd7892d8271a0273729c74f6be9804233162c8f4	no	20
Warnings:					
Information:					

13	Foreign Reference	B3-KR10-1008160B1andTranslation.pdf	1528171 1e81201079cfaee094b886962e8730887d736b02	no	28
Warnings:					
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14	Foreign Reference	B4-EP0108363A2.pdf	1079733 1904e832c5ee4417263ecbaefb61549e8c0f78ce	no	29
Warnings:					
Information:					
15	Non Patent Literature	C1-Calvert1999.pdf	725624 6643aadac00da04f8b154fdccfe4016a86913acf	no	4
Warnings:					
Information:					
16	Non Patent Literature	C2-Bryan2006.pdf	943511 89443e316629a530729cfe9da812df78314e2dd6	no	5
Warnings:					
Information:					
17	Non Patent Literature	C3-McInnes2010.pdf	282378 325c3bd44c0a7b259911a6a8c507e585e1511f49	no	6
Warnings:					
Information:					
18	Non Patent Literature	C4-JaiC_S2010.pdf	98267 c1bc707d94d5c99ad51b44b54ef2463f6c255056	no	2
Warnings:					
Information:					
19	Non Patent Literature	C5-FatalAccidents2012.pdf	191844 8f214abbc9a97ea4f3785e25942442d01bbd68a4	no	5
Warnings:					
Information:					

20	Non Patent Literature	C6-IntroFAMES2012.pdf	425391 eb95111c938c11fe419dc7683af3b654ef3c5830	no	9
Warnings:					
Information:					
21	Non Patent Literature	C7-Jonz2013.pdf	787335 3790c0659c7d68f3b44add7413149102749 8df30	no	7
Warnings:					
Information:					
22	Non Patent Literature	C8-Aaron2013.pdf	297185 ae06832c4820b31f7880d5ffe9dfaecc06eb 30ff	no	2
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Information:					
23	Non Patent Literature	C9-Katahira1999.pdf	1219648 edbcfe4c4e282dfd595840a08e94cbd43a0 0b4f7	no	8
Warnings:					
Information:					
24	Non Patent Literature	C10-SCC.pdf	3301189 513573388ecb7cec77811e1b346c32010ce 13702	no	7
Warnings:					
Information:					
25	Non Patent Literature	C11-HowComputersWork1999.pdf	307914 4b91ba1e620f19739fb80914c7731ee0ca13 340a	no	4
Warnings:					
Information:					
26		PreliminaryAmendment_85663-Reissue-A.pdf	1001522 a04f3edc618ff7605e706980a43f2b40e2ca8 fd3	yes	23
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	

	Drawings-only black and white line drawings		17		23
	Miscellaneous Incoming Letter		12		16
	Preliminary Amendment		1		11
Warnings:					
Information:					
27	Fee Worksheet (SB06)	fee-info.pdf	34970 6403306a33dd5c496e8550e56525b36f934c9ed8	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	19897974		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Dkt. 7552/85663-Reissue-A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Ross Pirtle

Reissue Appl'n No.: (contin. of 15/928,955) Filed: herewith

Original Patent No.: 9,403,545 Granted On: August 2, 2016

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

This correspondence is being transmitted by facsimile transmission and/or EFS-Web to the U.S. Patent and Trademark Office.

Esther Weiner 2019 December 10
Esther Weiner Date

30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT AND STATEMENT OF STATUS AND SUPPORT FOR ALL CHANGES TO CLAIMS, ACCOMPANYING APPLICATION SUBMITTED CONCURRENTLY HEREWITH FOR REISSUE OF PATENT NO. 9,403,545

Sir:

This Amendment is being submitted concurrently with an application (which is a Continuation of Reissue Application No. 15/928,955) for reissue of U.S. Patent No. 9,403,545, granted on August 2, 2016.

Amendments to the Specification begin on page 2 of this paper.

Amendment to the Abstract begins on page 6 of this paper.

Amendments to the Claims begin on page 7.

Amendments to the Drawings begin on page 11 of this paper. Replacement sheets of drawings for FIGS. 1A, 1B, 2, 3B, 5, 7 and 12 are submitted concurrently herewith.

Remarks begin on page 12 of this paper.

Amendments to the Specification

Please amend the Cross-Reference to Relation Applications section at column 1, lines 3-9, in the following manner:

> This Reissue application is a continuation of Reissue Application No. 15/928,955 filed March 22, 2018, for reissue of U.S. Patent No. 9,403,545 granted August 2, 2016, from Application No. 14/519,727 filed October 21, 2014 which claims the benefit of U.S. Provisional Application No. 61/893,547, filed Oct. 21, 2013 and entitled "SYSTEM, APPARATUS AND METHOD FOR RAILWAY TRAFFIC CONTROL".

Please amend the paragraph at column 2, line 63, through column 3, line 2, in the following manner:

> In another aspect, the adaptation may include a RTC user interface to permit a user (e.g., railway traffic controller (RTC) or train dispatcher) to specify a track section(s) to be blocked, specify an instruction to the centralized railway control system to block the railway traffic to the specified track section(s), and specify identifying information of the railway field worker performing (or to be performing) work in the specified track section(s).

Please amend the paragraph at column 4, lines 35-44, in the following manner:

> The drawings show examples of implementations of the subject matter of this patent disclosure in several computing environments. However, it should be understood that the subject matter of this disclosure can be utilized by any computing device including but not limited to PDAs (personal digital assistants), cell phones, personal, notebook and workstation computers, kiosks, other information terminals, [WIC (or another)] pager, etc. In addition, the subject matter of this disclosure might be provided as services in a modular fashion by other devices connected by a communication network.

Please amend the paragraph at column 5, lines 21-28, in the following manner:

FIG. 2 shows a [terminal **100A**] computer **200A** which is configured (such as via one or more programs of instructions executable by a processor) to be [of a computer or another electronic device) with] a railway traffic blocking apparatus [**101** to include] **105** including a block placer **101A**, a code generator **101B**, a block remover **101C** and a user interface **101D**. The [terminal 100A] computer **200A** can be any electronic device including a processor, storage and display, such as shown by way of examples in FIGS. 3A and 3B.

Please amend the paragraph at column 5, lines 61-65, in the following manner:

The user interface 101D is configured preferably for the ease of use for the railway traffic controller (RTC). As shown by way of examples in FIGS. 6-9 and 11, the user interface 101D displays information and tools needed to enable/disable blocks on rail sections.

Please amend the paragraph at column 6, lines 26-32, in the following manner:

The network interface 206 provides a connection (for example, by way of an Ethernet connection or other network connection which supports any desired network protocol such as, but not limited to TCP/IP, IPX (Internetwork Packet Exchange), IPX/SPX (Internetwork Packet Exchange/Sequenced Packet Exchange), or NetBEUI (NetBIOS Extended User Interface)) to a network (e.g., network 102) to enable the terminal device to communicate with another device through the network.

Please amend the paragraphs at column 6, line 61 through column 7, line 20, in the following manner:

The release code is then sent to the terminal [102] 103. This terminal [102] 103 is

the contact associated with the designated worker, and the electronic address of this terminal is found within the personnel data received from the rail personnel contact data 104. By this system, only the railway traffic control apparatus 105 and terminal [102] 103 receive the release code generated by the railway traffic control apparatus 105.

Additionally, FIG. 4 shows the communication between the terminal [102] 103 and the railway traffic control apparatus 105 in the event that a block on a certain track is to be lifted. In order for a block on a certain track to be lifted, the release code has to be input into the railway traffic control apparatus. The terminal [102] 103 sends the release code to the railway traffic control apparatus 105. The release code is then input into the block remover 101C. After which, the block is removed and traffic to that section of rail is then allowed.

FIG. 5 illustrates an example of a railway network 500. Labeled are interlocks A-F which control sections of railway of the railway network 500. For example, the rail traffic controller (RTC) might choose to block the section of rail corresponding to the track between interlock A and interlock B. This way, train traffic between those two interlocks in prohibited. The railway network is present on screen of the railway traffic control terminal 105 at all times for the convenience of the rail traffic controller. By being on screen at all times, the rail traffic controller knows the status of certain sections of rail in real time.

Please amend the paragraph at column 7, lines 28-37, in the following manner:

FIG. 6 is an exemplary illustration of the user interface of the railway traffic control terminal 105. The railway traffic controller (RTC) may place blocks on any section of traffic using this user interface. In this exemplary embodiment, the train traffic controller inputs authority, worker and block limits. This information corresponds to the train traffic controller username, maintenance worker designated to work on the specific blocked track and the sections of track being blocked, respectively. In addition, the railway traffic control terminal 105 then timestamps the order once the block is placed.

Please amend the paragraph at column 9, lines 8-18, in the following manner:

Next, the method of placing a block on a track section will be described with reference to **FIG. 12**. In S1201, the rail traffic controller selects the sections to be blocked using the railway traffic control terminal 105. Once the block limits are designated and sent, the railway traffic control terminal 105 [established office] establishes interlocking immediately in S1202. That is, the railway traffic control terminal 105 immediately sends a signal to the corresponding interlocks corresponding to the section of track designated to be blocked. Additionally, the railway traffic control terminal 105 generates and saves a random secret code in S1203.

Please amend the paragraph at column 9, lines 49-56, in the following manner:

Once the place button is selected, the railway traffic control terminal 105 generates a place time and enables safety measures so that the block cannot be removed without the input of the secret code generated (S1212). Finally, the railway traffic control terminal 105 sends the secret removal code to the corresponding one or more maintenance workers (S1213) if the railway traffic controller has selected maintenance workers for the given block.

Amendment to the Abstract

Please amend the abstract in the following manner:

Tools [(such as system, apparatus, methodology, etc.)] may be provided to control traffic over a railway track section, and more particularly, when a railway worker is working on or near the track section, a block is placed to prevent trains from traversing the track section. Further [. Move particularly, when traffic over the track section is to be blocked], a release code is generated and sent to [an electronic contact address of the railway worker. Traffic through the track section is blocked until the release code is entered in the system] a user terminal. The block is removed from the track section when the release code is received by the system.

Amendments to the Claims

Please cancel claims 1-19 and add new claims 20-39, as follows.

Claims 1-19 (canceled).

20. (New) A railway control apparatus comprising:

a processor for controlling a plurality of track sections in a railway network, wherein each track section is associated with a corresponding interlock; and

a memory device storing one or more programs of executable instructions, wherein execution of the one or more programs causes the processor to:

receive a selection of at least one track section amongst the plurality of track sections;

transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the selected track section;

generate a secret code associated with the at least one selected track section; and

transmit the secret code to a remote user terminal.

21. (New) The railway control apparatus of claim 20, wherein execution of the one or more programs causes the processor to store the secret code in the memory device.

22. (New) The railway control apparatus of claim 21, wherein execution of the one or more programs causes the processor to:

receive a second secret code;

determine that the second secret code and the secret code stored in the memory device are the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are the same, release the block on the at least one selected track section.

23. (New) The railway control apparatus of claim 22, wherein the second secret code is received in the form of a voice message.

24. (New) The railway control apparatus of claim 23, wherein execution of the one or more programs causes the processor to extract the second secret code from the voice message.

25. (New) The railway control apparatus of claim 21, wherein execution of the one or more programs causes the processor to:

receive a second secret code;

determine that the second secret code and the secret code stored in the memory device are not the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the at least one selected track section.

26. (New) The railway control apparatus of claim 20, wherein the secret code is transmitted to the remote user terminal by text message, email, or voice message.

27. (New) The railway control apparatus of claim 20, wherein the remote user terminal is a mobile phone, a smartphone, a tablet computer, a pager, or a personal digital assistant.

28. (New) The railway control apparatus of claim 20, wherein execution of the one or more programs causes the processor to:

responsive to receiving the selection of one or more track sections, determine that the at least one selected track section has an existing block;

receive a signal from the corresponding interlock of the at least one selected track section that a new block can be established; and

responsive to receiving the signal that a new block can be established, permit the block to be placed on the at least one selected track section.

29. (New) The railway control apparatus of claim 20, further comprising:

a network interface, wherein execution of the one or more programs causes the processor

to transmit the secret code to the remote user terminal via the network interface.

30. (New) The railway control apparatus of claim 20, wherein the secret code is transmitted only to the remote user terminal.

31. (New) The railway control apparatus of claim 20, wherein the secret code is generated by a random or pseudorandom process.

32. (New) The railway control apparatus of claim 20, further comprising:

a rail personnel database comprising information related to a plurality of rail personnel;

wherein execution of the one or more programs causes the processor to:

retrieve specific personnel data from the rail personnel database; and

determine an electronic address of the remote user terminal to which the secret code is to be transmitted.

33. (New) A method comprising:

receiving, by a processor, a selection of at least one track section in a centrally controlled railway network, wherein each track section corresponds to an interlock;

transmitting, by the processor, a block signal to the corresponding interlock of the selected one or more track sections to place a block on the selected one or more track sections;

generating, by the processor, a secret code associated with the selected one or more track sections;

transmitting, by the processor, the secret code to a remote user terminal.

34. (New) The method of claim 33, further comprising:

storing the secret code in a memory device.

35. (New) The method of claim 33, further comprising:

receiving, by the processor, a second secret code;

determining, by the processor, that the second secret code and the secret code stored in

the memory device are the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are the same, releasing, by the processor, the block on the selected one or more track sections.

36. (New) The method of claim 35, wherein the second secret code is received in the form of a voice message, and further comprising:

extracting, by the processor, the second secret code from the voice message.

37. (New) The method of claim 33, further comprising:

receiving, by the processor, a second secret code;

determining, by the processor, that the second secret code and the secret code stored in the memory device are not the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the selected one or more track sections.

38. (New) The method of claim 33, wherein the processor transmits the secret code to only the remote user terminal.

39. (New) The method of claim 32, further comprising:

retrieving, by the processor, specific personnel data from a rail personnel database; and

determining, by the processor, an electronic address of the remote user terminal to which the secret code is to be transmitted.

Amendments to the Drawings

The replacement sheets of drawings concurrently herewith include changes to, and replace, FIGS. 1A, 1B, 2, 3B, 5, 7 and 12 of the original sheets of drawings.

In replacement FIG. 1A, the label "Terminal 103" has been replaced by "Field Worker Terminal 103", the label "Rail Personnel 104" has been replaced by "Rail Personnel Database 104", the label "Code Generator" has been replaced by "Code Generator 101B".

In replacement FIG. 1B, the label "Terminal 103" has been replaced by "Field Worker Terminal 103", and the label "Rail Personnel Contact Data 104" has been replaced by "Rail Personnel Data 104".

In replacement FIG. 2, the label "100A" has been replaced by "200A", and the label "101" has been replaced by "105".

In replacement FIG. 3B, the label "307" has been replaced by "306".

In replacement FIG. 5, a label has been added for railway network 500.

In replacement FIG. 7, the label "Sec. C- Sec. D- Sec. F" has been replaced by "Sec. C- Sec. D- Sec. E".

In replacement FIG. 12, the label "Office Interlocking is established immediately" has been replaced by "Interlocking is established immediately", the label "Has Field Block Bits?" for each of S1204 and S1208 has been replaced by "Already blocked?", and the label "Send Field Blocking Cointrol" has been replaced by "Send Field Blocking Control".

Attachment: replacement sheets of drawings for FIGS. 1A, 1B, 2, 3B, 5, 7 and 12

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/709,126

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	2200
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	3160

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/709,126	12/10/2019	Ross Pirtle	7552/85663-Reissue-A

CONFIRMATION NO. 1509

23432
COOPER & DUNHAM, LLP
30 Rockefeller Plaza
20th Floor
NEW YORK, NY 10112

FORMALITIES LETTER

OC000000113272817

Date Mailed: 12/11/2019

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given **TWO MONTHS** from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- An abstract of the technical disclosure preferably not exceeding 150 words in length and commencing on a separate sheet in compliance with 37 CFR 1.72(b) is required. An abstract was not provided for this application.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

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Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ddfelix/

WABTEC EX1002

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/709,126	12/10/2019	3617	3160	7552/85663-Reissue-A	20	2

CONFIRMATION NO. 1509

FILING RECEIPT

23432
COOPER & DUNHAM, LLP
30 Rockefeller Plaza
20th Floor
NEW YORK, NY 10112

OC000000113272816

Date Mailed: 12/11/2019

Receipt is acknowledged of this reissue patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Ross Pirtle, Commack, NY;

Applicant(s)

RAILWARE, INC., Hauppauge, NY, Assignee (with 37 CFR 1.172 Interest);

Assignment For Published Patent Application

RAILWARE, INC., Hauppauge, NY

Power of Attorney: The patent practitioners associated with Customer Number 23432

Domestic Priority data as claimed by applicant

This application is a REI of 14/519,727 10/21/2014 PAT 9403545
and is a CON of 15/928,955 03/22/2018
which is a REI of 14/519,727 10/21/2014 PAT 9403545
which claims benefit of 61/893,547 10/21/2013

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

WABTEC EX1002

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

TOOLS FOR RAILWAY TRAFFIC CONTROL

Preliminary Class

246

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

WABTEC EX1002

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

Electronic Acknowledgement Receipt

EFS ID:	38028189
Application Number:	16709126
International Application Number:	
Confirmation Number:	1509
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross Pirtle
Customer Number:	23432
Filer:	Paul Teng/Esther Weiner
Filer Authorized By:	Paul Teng
Attorney Docket Number:	7552/85663-Reissue-A
Receipt Date:	13-DEC-2019
Filing Date:	10-DEC-2019
Time Stamp:	15:56:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	RespTo2019Dec11NoticeToFileCorrectedApplPapers_85663-Reissue-A.pdf	389248 cc3e38284d7ee4ac95c1bd04bdef1fe0f7cd87f2	no	14

Warnings:

WABTEC EX1002

Information:	
Total Files Size (in bytes):	389248

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Dkt. 7552/85663-Reissue-A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Ross PIRTLE

Reissue Application No.: 16/709,126

Filed: December 10, 2019

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

Confirmation No.: 1509

This correspondence is being transmitted by facsimile transmission and/or EFS-Web to the U.S. Patent and Trademark Office.

Esther Weiner 2019 December 13
Esther Weiner Date

30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO DECEMBER 11, 2019 NOTICE TO FILE CORRECTED APPLICATION PAPERS – Filing Date Granted

Sir:

This Response is submitted in response to the December 11, 2019 Notice To File Corrected Application Papers from the Patent Office. A copy of the December 11, 2019 Notice is attached hereto as **Exhibit A**.

The December 11, 2019 Notice indicates that an abstract was not provided with the application papers filed on December 10, 2019. We disagree. Attached hereto as **Exhibit B** is a copy of the Electronic Acknowledgement Receipt (EAR) dated December 10, 2019 indicating the application papers received by the USPTO, included an abstract identified on the EAR as Document

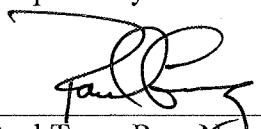
Number 9.

Another copy of the abstract submitted on December 10, 2019 is attached as **Exhibit C** hereto.

It is respectfully pointed out that such abstract was amended by the Preliminary Amendment filed with the application papers on December 10, 2019.

If a telephone interview could advance the prosecution of this application, the USPTO is respectfully requested to call the undersigned attorney.

Respectfully submitted,



Paul Teng, Reg. No. 40,837
Attorney for Applicant
COOPER & DUNHAM LLP
30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

EXHIBIT A

to

RESPONSE TO DECEMBER 11, 2019 NOTICE TO FILE CORRECTED APPLICATION PAPERS – Filing Date Granted

(Application No. 16/709,126)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/709,126	12/10/2019	Ross Pirtle	7552/85663-Reissue-A

CONFIRMATION NO. 1509

23432
COOPER & DUNHAM, LLP
30 Rockefeller Plaza
20th Floor
NEW YORK, NY 10112

FORMALITIES LETTER

OC000000113272817

Date Mailed: 12/11/2019

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given **TWO MONTHS** from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- An abstract of the technical disclosure preferably not exceeding 150 words in length and commencing on a separate sheet in compliance with 37 CFR 1.72(b) is required. An abstract was not provided for this application.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

WABTEC EX1002

/ddfelix/

WABTEC EX1002

EXHIBIT B

to

RESPONSE TO DECEMBER 11, 2019 NOTICE TO FILE CORRECTED APPLICATION PAPERS – Filing Date Granted

(U.S. Application No. 16/709,126)

Electronic Acknowledgement Receipt	
EFS ID:	37981378
Application Number:	16709126
International Application Number:	
Confirmation Number:	1509
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross PIRTLE
Customer Number:	23432
Filer:	Paul Teng/Esther Weiner
Filer Authorized By:	Paul Teng
Attorney Docket Number:	7552/85663-Reissue-A
Receipt Date:	10-DEC-2019
Filing Date:	
Time Stamp:	15:10:54
Application Type:	Reissue (Utility)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$3160
RAM confirmation Number	E2019B0F11477966
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Reissue Application	ApplicationTransmittal_85663-Reissue-A.pdf	79341 af804ede45c2ca2360ce2667a7be90fd33082f11	no	1
Warnings:					
Information:					
2	Transmittal Letter	FeeTransmittal_85663-Reissue-A.pdf	78598 569672eebffe0fb8273edebd163e240171111914	no	1
Warnings:					
Information:					
3		Specification_85663-Reissue-A.pdf	805047 f96dfd0e503a212d0313f655a17447030376b26d	yes	7

Multipart Description/PDF files in .zip description

Document Description	Start	End
Claims	6	7
Specification	1	5

Warnings:					
Information:					
4	Drawings-only black and white line drawings	Drawings_85663-Reissue-A.pdf	201754 50cb5680254620c6e909596de8206d16676a08cc	no	11
Warnings:					
Information:					
5	Oath or Declaration filed	Declaration_85663-Reissue-A.pdf	132732 fcf118e651204881e0fb379cb9dde8aa0bee1f56	no	2
Warnings:					
Information:					

6	Application Data Sheet	ApplicationDataSheet_85663-Reissue-A.pdf	1256006 5b8212d1e4c2941aca6f05acf56072db972602bc	no	8
Warnings:					
Information:					
7	Consent of Assignee accompanying the declaration	ConsentOfAssignee_85663-Reissue-A.pdf	99438 df8e38954aa5e1ce0cf29596820fcc1f2924dedb	no	1
Warnings:					
Information:					
8	Assignee showing of ownership per 37 CFR 3.73	3-73Statement_85663-Reissue-A.pdf	123224 e65b0174df68cf416d6bbb43083299febeeb91c4	no	2
Warnings:					
Information:					
9	Abstract	Abstract_85663-Reissue-A.pdf	39193 34878b000b9ab1591f72b4acd38796fe7797091f	no	1
Warnings:					
Information:					
10	Information Disclosure Statement (IDS) Form (SB08)	InformationDisclosureStatement-1449_85663-Reissue-A.pdf	324106 09aeaf5a402fd44be73610cdafd31916d943db93	no	5
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
11	Foreign Reference	B1-WO2004-042663A1.pdf	3034222 0790d2182b6976a0686c37c640f9c0d6cf1aeaa0	no	70
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12	Foreign Reference	B2-EP1308366B1andTranslation.pdf	1499631 cd7892d8271a0273729c74f6be9804233162c8f4	no	20
Warnings:					
Information:					

13	Foreign Reference	B3-KR10-1008160B1andTranslation.pdf	1528171 1e81201079cfaee094b886962e8730887d736b02	no	28
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Information:					
14	Foreign Reference	B4-EP0108363A2.pdf	1079733 1904e832c5ee4417263ecbaefb61549e8c0f78ce	no	29
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Information:					
15	Non Patent Literature	C1-Calvert1999.pdf	725624 6643aadac00da04f8b154fdccfe4016a86913acf	no	4
Warnings:					
Information:					
16	Non Patent Literature	C2-Bryan2006.pdf	943511 89443e316629a530729cfe9da812df78314e2dd6	no	5
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Information:					
17	Non Patent Literature	C3-McInnes2010.pdf	282378 325c3bd44c0a7b259911a6a8c507e585e1511f49	no	6
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18	Non Patent Literature	C4-JaiC_S2010.pdf	98267 c1bc707d94d5c99ad51b44b54ef2463f6c255056	no	2
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Information:					
19	Non Patent Literature	C5-FatalAccidents2012.pdf	191844 8f214abbc9a97ea4f3785e25942442d01bbd68a4	no	5
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Information:					

20	Non Patent Literature	C6-IntroFAMES2012.pdf	425391 eb95111c938c11fe419dc7683af3b654ef3c5830	no	9
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21	Non Patent Literature	C7-Jonz2013.pdf	787335 3790c0659c7d68f3b44add74131491027498df30	no	7
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22	Non Patent Literature	C8-Aaron2013.pdf	297185 ae06832c4820b31f7880d5ffe9dfaecc06eb30ff	no	2
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23	Non Patent Literature	C9-Katahira1999.pdf	1219648 edbcfe4c4e282dfd595840a08e94cbd43a00b4f7	no	8
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Information:					
24	Non Patent Literature	C10-SCC.pdf	3301189 513573388ecb7cec77811e1b346c32010ce13702	no	7
Warnings:					
Information:					
25	Non Patent Literature	C11-HowComputersWork1999.pdf	307914 4b91ba1e620f19739fb80914c7731ee0ca13340a	no	4
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26		PreliminaryAmendment_85663-Reissue-A.pdf	1001522 a04f3edc618ff7605e706980a43f2b40e2ca8fd3	yes	23
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	

	Drawings-only black and white line drawings		17		23
	Miscellaneous Incoming Letter		12		16
	Preliminary Amendment		1		11
Warnings:					
Information:					
27	Fee Worksheet (SB06)	fee-info.pdf	34970 6403306a33dd5c496e8550e56525b36f934c9ed8	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	19897974		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

EXHIBIT C

to

RESPONSE TO DECEMBER 11, 2019 NOTICE TO FILE CORRECTED APPLICATION PAPERS – Filing Date Granted

(U.S. Application No. 16/709,126)

ABSTRACT

Tools (such as system, apparatus, methodology, etc.) may be provided to control traffic over a railway track section, when a railway worker is working on or near the track section. Move particularly, when traffic over the track section is to be blocked, a release code is generated and sent to an electronic contact address of the railway worker. Traffic through the track section is blocked until the release code is entered in the system.

WABTEC EX1002

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/709,126

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	2200
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	3160

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/709,126	12/10/2019	3617	3160	7552/85663-Reissue-A	20	2

CONFIRMATION NO. 1509
UPDATED FILING RECEIPT

23432
COOPER & DUNHAM, LLP
30 Rockefeller Plaza
20th Floor
NEW YORK, NY 10112

OC000000113378437

Date Mailed: 12/18/2019

Receipt is acknowledged of this reissue patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Ross Pirtle, Commack, NY;

Applicant(s)

RAILWARE, INC., Hauppauge, NY, Assignee (with 37 CFR 1.172 Interest);

Assignment For Published Patent Application

RAILWARE, INC., Hauppauge, NY

Power of Attorney: The patent practitioners associated with Customer Number 23432

Domestic Priority data as claimed by applicant

This application is a REI of 14/519,727 10/21/2014 PAT 9403545
and is a CON of 15/928,955 03/22/2018
which is a REI of 14/519,727 10/21/2014 PAT 9403545
which claims benefit of 61/893,547 10/21/2013

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

WABTEC EX1002

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 12/16/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/709,126**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

TOOLS FOR RAILWAY TRAFFIC CONTROL

Preliminary Class

246

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

WABTEC EX1002

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/709,126

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	2200
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	3160

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/709,126	12/13/2019	Ross Pirtle	7552/85663-Reissue-A

CONFIRMATION NO. 1509

23432
COOPER & DUNHAM, LLP
30 Rockefeller Plaza
20th Floor
NEW YORK, NY 10112

WITHDRAWAL NOTICE

OC000000113912784

Date Mailed: 01/13/2020

Letter Regarding a New Notice and/or the Status of the Application

If a new notice or Filing Receipt is enclosed, applicant may disregard the previous notice mailed on 12/18/2019. The time period for reply runs from the mail date of the new notice. Within the time period for reply, applicant is required to file a reply in compliance with the requirements set forth in the new notice to avoid abandonment of the application.

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web. https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

If the reply is not filed electronically via EFS-Web, the reply must be accompanied by a copy of the new notice.

If the Office previously granted a petition to withdraw the holding of abandonment or a petition to revive under 37 CFR 1.137, the status of the application has been returned to pending status.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ddfelix/

WABTEC EX1002

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/709,126	12/13/2019	Ross Pirtle	7552/85663-Reissue-A

CONFIRMATION NO. 1509

23432
COOPER & DUNHAM, LLP
30 Rockefeller Plaza
20th Floor
NEW YORK, NY 10112

FORMALITIES LETTER

OC000000113913091

Date Mailed: 01/13/2020

NOTICE OF INCOMPLETE REPLY (REISSUE)

Filing Date Granted

The U.S. Patent and Trademark Office has received your reply on 12/13/2019 to the NOTICE TO FILE CORRECTED APPLICATION PAPERS (Notice) mailed 12/11/2019 and it has been entered into the application. The reply, however, is not a complete reply for the reason(s) listed below. A complete reply must be timely filed to prevent ABANDONMENT of the above-identified application. Replies should be mailed to: Mail Stop Missing Parts, Commissioner for Patents, P.O.Box 1450, Alexandria VA 22313-1450.

The period for reply continues to run from the date of the Notice mailed 12/11/2019. Applicant must submit all required items and pay any fees required below within two months from the date of the NOTICE TO FILE CORRECTED APPLICATION PAPERS to avoid abandonment. If the reply is submitted after two months from the date of the NOTICE TO FILE CORRECTED APPLICATION PAPERS, extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

Items Required to Avoid Abandonment:

The required items noted below SHOULD be filed along with any items required above.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- An abstract of the technical disclosure preferably not exceeding 150 words in length and commencing on a separate sheet in compliance with 37 CFR 1.72(b) is required. An abstract was not provided for this application.

WABTEC EX1002

Mail date of Notice: 12/11/2019

Last date that extension may be obtained: (Note: The petition and fee must be received by this date, or include a proper certificate of mailing under 37 CFR 1.8 with a date on or before this date, and extend the time to include this date.) 07/11/2020

Length of Extension of Time	Fee under 37 CFR 1.17(a) effective March 19, 2013		
(response due on or before)	Undiscounted	Small Entity	Micro Entity
One Month (03/11/2020)	$200	$100	$50
Two Months (04/11/2020)	$600	$300	$150
Three Months (05/11/2020)	$1400	$700	$350
Four Months (06/11/2020)	$2200	$1100	$550
Five Months (07/11/2020)	$3000	$1500	$750

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

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If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ddfelix/

WABTEC EX1002

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/709,126	12/13/2019	3993	3160	7552/85663-Reissue-A	20	2

CONFIRMATION NO. 1509
UPDATED FILING RECEIPT

23432
COOPER & DUNHAM, LLP
30 Rockefeller Plaza
20th Floor
NEW YORK, NY 10112

OC000000113913090

Date Mailed: 01/13/2020

Receipt is acknowledged of this reissue patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Ross Pirtle, Commack, NY;

Applicant(s)

RAILWARE, INC., Hauppauge, NY, Assignee (with 37 CFR 1.172 Interest);

Assignment For Published Patent Application

RAILWARE, INC., Hauppauge, NY

Power of Attorney: The patent practitioners associated with Customer Number 23432

Domestic Priority data as claimed by applicant

This application is a REI of 14/519,727 10/21/2014 PAT 9403545
and is a CON of 15/928,955 03/22/2018
which is a REI of 14/519,727 10/21/2014 PAT 9403545
which claims benefit of 61/893,547 10/21/2013

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

WABTEC EX1002

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 12/16/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/709,126**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

TOOLS FOR RAILWAY TRAFFIC CONTROL

Preliminary Class

246

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

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SelectUSA

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technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

WABTEC EX1002

Electronic Acknowledgement Receipt

EFS ID:	38434521
Application Number:	16709126
International Application Number:	
Confirmation Number:	1509
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross Pirtle
Customer Number:	23432
Filer:	Paul Teng/Esther Weiner
Filer Authorized By:	Paul Teng
Attorney Docket Number:	7552/85663-Reissue-A
Receipt Date:	29-JAN-2020
Filing Date:	13-DEC-2019
Time Stamp:	15:31:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	RespTo2020JanNoticeOfIncompleteReply_85663-Reissue-A.pdf	260477 2e95cd05522ef2b9ce23caac57eae926068d684e	no	7

Warnings:

WABTEC EX1002

Information:	
Total Files Size (in bytes):	260477

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Dkt. 7552/85663-Reissue-A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Ross PIRTLE

Reissue Application No.: 16/709,126

Filed: December 10, 2019

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

Confirmation No.: 1509

This correspondence is being transmitted by facsimile transmission and/or EFS-Web to the U.S. Patent and Trademark Office.

Esther Weiner 2020January29
Esther Weiner Date

30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO JANUARY 13, 2020 NOTICE OF INCOMPLETE REPLY (REISSUE)

Sir:

A January 13, 2020 Notice of Incomplete Reply (Reissue) from the USPTO (United States Patent and Trademark Office) indicated that the reply filed electronically by applicant on December 13, 2019 has been entered in the application, but is allegedly not a complete reply to the December 11, 2019 USPTO Notice To File Corrected Application Papers, for the reason that an abstract was purportedly not received.

However, in a telephone conference with Ms. Dauntria Felix, in the Patent Application Processing Office of the USPTO, Ms. Dauntria Felix acknowledged that a clean copy of the abstract was provided with applicant's December 13, 2019 reply and was entered by the USPTO in the Image

File Wrapper for the subject reissue application (no. 16/709,126 for reissue of U.S. Patent No. 9,403,545). Ms. Dauntria Felix stated that the January 13, 2020 USPTO Notice should be understood to mean that applicant needs to submit a copy of the cover page (containing patent abstract) of subject U.S. Patent No. 9,403,545.

Accordingly, a copy of the cover page of subject U.S. Patent No. 9,403,545 is submitted herewith as **Exhibit B** attached hereto, and a copy of the January 13, 2020 Notice is attached hereto as **Exhibit A**.

If any USPTO fees are required in connection with this Response, the USPTO is hereby authorized to charge such required fees to Deposit Account No. 03-3125.

Respectfully submitted,



Paul Teng, Reg. No. 40,837
Attorney for Applicant
COOPER & DUNHAM LLP
30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

EXHIBIT A

to

RESPONSE TO JANUARY 13, 2020 NOTICE OF INCOMPLETE REPLY (REISSUE)

(Reissue Application No. 16/709,126)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/709,126	12/13/2019	Ross Pirtle	7552/85663-Reissue-A

CONFIRMATION NO. 1509

23432
COOPER & DUNHAM, LLP
30 Rockefeller Plaza
20th Floor
NEW YORK, NY 10112

FORMALITIES LETTER



Date Mailed: 01/13/2020

NOTICE OF INCOMPLETE REPLY (REISSUE)

Filing Date Granted

The U.S. Patent and Trademark Office has received your reply on 12/13/2019 to the NOTICE TO FILE CORRECTED APPLICATION PAPERS (Notice) mailed 12/11/2019 and it has been entered into the application. The reply, however, is not a complete reply for the reason(s) listed below. A complete reply must be timely filed to prevent ABANDONMENT of the above-identified application. Replies should be mailed to: Mail Stop Missing Parts, Commissioner for Patents, P.O.Box 1450, Alexandria VA 22313-1450.

The period for reply continues to run from the date of the Notice mailed 12/11/2019. Applicant must submit all required items and pay any fees required below within two months from the date of the NOTICE TO FILE CORRECTED APPLICATION PAPERS to avoid abandonment. If the reply is submitted after two months from the date of the NOTICE TO FILE CORRECTED APPLICATION PAPERS, extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

Items Required to Avoid Abandonment:

The required items noted below SHOULD be filed along with any items required above.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- An abstract of the technical disclosure preferably not exceeding 150 words in length and commencing on a separate sheet in compliance with 37 CFR 1.72(b) is required. An abstract was not provided for this application.

WABTEC EX1002

Mail date of Notice: 12/11/2019

Last date that extension may be obtained: (Note: The petition and fee must be received by this date, or include a proper certificate of mailing under 37 CFR 1.8 with a date on or before this date, and extend the time to include this date.) 07/11/2020

Length of Extension of Time	Fee under 37 CFR 1.17(a) effective March 19, 2013		
(response due on or before)	Undiscounted	Small Entity	Micro Entity
One Month (03/11/2020)	$200	$100	$50
Two Months (04/11/2020)	$600	$300	$150
Three Months (05/11/2020)	$1400	$700	$350
Four Months (06/11/2020)	$2200	$1100	$550
Five Months (07/11/2020)	$3000	$1500	$750

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ddfelix/

WABTEC EX1002

EXHIBIT B

to

RESPONSE TO JANUARY 13, 2020 NOTICE OF INCOMPLETE REPLY (REISSUE)

(Reissue Application No. 16/709,126)

US009403545B2

(12) **United States Patent**
Pirtle

(10) **Patent No.: US 9,403,545 B2**
(45) **Date of Patent: Aug. 2, 2016**

(54) **TOOLS FOR RAILWAY TRAFFIC CONTROL**

(71) Applicant: **Ross Pirtle**, Commack, NY (US)

(72) Inventor: **Ross Pirtle**, Commack, NY (US)

(73) Assignee: **RAILWARE, INC.**, Hauppauge, NY (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 64 days.

(21) Appl. No.: **14/519,727**

(22) Filed: **Oct. 21, 2014**

(65) **Prior Publication Data**

US 2015/0108284 A1 Apr. 23, 2015

Related U.S. Application Data

(60) Provisional application No. 61/893,547, filed on Oct. 21, 2013.

(51) **Int. Cl.**
B61L 23/06 (2006.01)
B61L 27/00 (2006.01)

(52) **U.S. Cl.**
CPC ***B61L 23/06*** (2013.01); ***B61L 27/00*** (2013.01)

(58) **Field of Classification Search**
CPC B61L 23/06; B61L 23/16; B61L 27/00
USPC ..... 246/3, 4, 124, 122 R, 167 R
See application file for complete search history.

(56) **References Cited**

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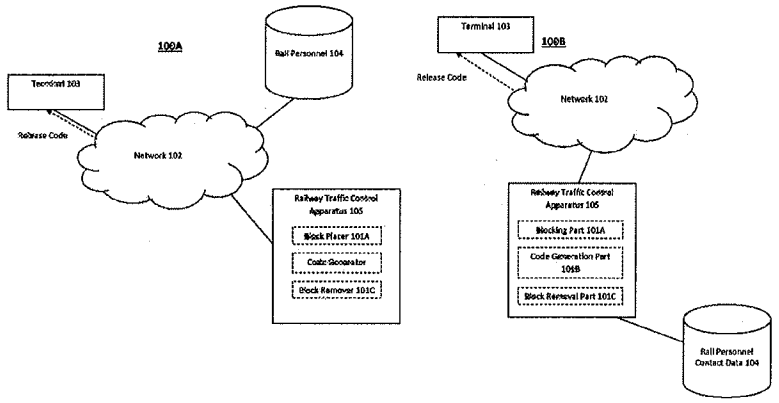
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Primary Examiner — Jason C Smith
(74) *Attorney, Agent, or Firm* — Cooper & Dunham LLP

(57) **ABSTRACT**

Tools (such as system, apparatus, methodology, etc.) may be provided to control traffic over a railway track section, when a railway worker is working on or near the track section. Move particularly, when traffic over the track section is to be blocked, a release code is generated and sent to an electronic contact address of the railway worker. Traffic through the track section is blocked until the release code is entered in the system.

19 Claims, 11 Drawing Sheets



WABTEC EX1002

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/709,126

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	2200
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	3160

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/709,126	12/13/2019	3993	3160	7552/85663-Reissue-A	20	2

CONFIRMATION NO. 1509
UPDATED FILING RECEIPT

23432
COOPER & DUNHAM, LLP
30 Rockefeller Plaza
20th Floor
NEW YORK, NY 10112

OC000000114457838

Date Mailed: 02/04/2020

Receipt is acknowledged of this reissue patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Ross Pirtle, Commack, NY;

Applicant(s)

RAILWARE, INC., Hauppauge, NY, Assignee (with 37 CFR 1.172 Interest);

Assignment For Published Patent Application

RAILWARE, INC., Hauppauge, NY

Power of Attorney: The patent practitioners associated with Customer Number 23432

Domestic Priority data as claimed by applicant

This application is a REI of 14/519,727 10/21/2014 PAT 9403545
and is a CON of 15/928,955 03/22/2018 PAT RE47835
which is a REI of 14/519,727 10/21/2014 PAT 9403545
which claims benefit of 61/893,547 10/21/2013

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

WABTEC EX1002

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 12/16/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/709,126**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

TOOLS FOR RAILWAY TRAFFIC CONTROL

Preliminary Class

246

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

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WABTEC EX1002

Dkt. 7552/85663-Reissue-A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Ross PIRTLE

Reissue Application No.: 16/709,126

Filed: December 10, 2019

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

Confirmation No.: 1509

This correspondence is being transmitted by facsimile transmission and/or EFS-Web to the U.S. Patent and Trademark Office.

Esther Weiner 2020 February 7
Esther Weiner Date

30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

Processing Division's Customer Correction Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CORRECTED FILING RECEIPT

Sir:

Attached hereto as **Exhibit A** is a copy of the updated Filing Receipt dated February 4, 2020 issued by the U.S. Patent and Trademark Office (USPTO) in connection with this patent application. The February 4, 2020 updated Receipt erroneously indicates the filing date as December 13, 2019.

It is respectfully requested that the updated Filing Receipt dated February 4, 2020 be corrected to reflect the correct filing date (that is, December 10, 2019) in connection with the above-identified application.

Attached hereto as **Exhibit B** is a copy of the Electronic Acknowledgement Receipt from the USPTO acknowledging receipt of the application papers, including specification, claims, abstract, drawings and payment of fees ($3,160), on December 10, 2019.

Applicant hereby requests the Patent Office to issue a corrected filing receipt to correct the aforementioned Patent Office mistake.

Respectfully submitted,

PAUL TENG, Reg. No. 40,837
Attorney for Applicant
COOPER & DUNHAM LLP
30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

EXHIBIT A

to

REQUEST FOR CORRECTED FILING RECEIPT

(Reissue Application No. 16/709,126)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/709,126	12/13/2019	3993	3160	7552/85663-Reissue-A	20	2

CONFIRMATION NO. 1509
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Date Mailed: 02/04/2020

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and is a CON of 15/928,955 03/22/2018 PAT RE47835
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which claims benefit of 61/893,547 10/21/2013

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Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

WABTEC EX1002

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Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

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countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

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NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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EXHIBIT B

to

REQUEST FOR CORRECTED FILING RECEIPT

(Reissue Application No. 16/709,126)

Electronic Acknowledgement Receipt

EFS ID:	37981378
Application Number:	16709126
International Application Number:	
Confirmation Number:	1509
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross PIRTLE
Customer Number:	23432
Filer:	Paul Teng/Esther Weiner
Filer Authorized By:	Paul Teng
Attorney Docket Number:	7552/85663-Reissue-A
Receipt Date:	10-DEC-2019
Filing Date:	
Time Stamp:	15:10:54
Application Type:	Reissue (Utility)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$3160
RAM confirmation Number	E2019B0F11477966
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Reissue Application	ApplicationTransmittal_85663-Reissue-A.pdf	79341 af804ede45c2ca2360ce2667a7be90fd33082f11	no	1
Warnings:					
Information:					
2	Transmittal Letter	FeeTransmittal_85663-Reissue-A.pdf	78598 569672eebffe0fb8273edebd163e240171111914	no	1
Warnings:					
Information:					
3		Specification_85663-Reissue-A.pdf	805047 f96dfd0e503a212d0313f655a17447030376b26d	yes	7

Multipart Description/PDF files in .zip description

Document Description	Start	End
Claims	6	7
Specification	1	5

Warnings:					
Information:					
4	Drawings-only black and white line drawings	Drawings_85663-Reissue-A.pdf	201754 50cb5680254620c6e909596de8206d16676a08cc	no	11
Warnings:					
Information:					
5	Oath or Declaration filed	Declaration_85663-Reissue-A.pdf	132732 fcf118e651204881e0fb379cb9dde8aa0bee1f56	no	2
Warnings:					
Information:					

6	Application Data Sheet	ApplicationDataSheet_85663-Reissue-A.pdf	1256006 5b8212d1e4c2941aca6f05acf56072db972602bc	no	8
Warnings:					
Information:					
7	Consent of Assignee accompanying the declaration	ConsentOfAssignee_85663-Reissue-A.pdf	99438 df8e38954aa5e1ce0cf29596820fcc1f2924dedb	no	1
Warnings:					
Information:					
8	Assignee showing of ownership per 37 CFR 3.73	3-73Statement_85663-Reissue-A.pdf	123224 e65b0174df68cf416d6bbb43083299febeeb91c4	no	2
Warnings:					
Information:					
9	Abstract	Abstract_85663-Reissue-A.pdf	39193 34878b000b9ab1591f72b4acd38796fe7797091f	no	1
Warnings:					
Information:					
10	Information Disclosure Statement (IDS) Form (SB08)	InformationDisclosureStatement-1449_85663-Reissue-A.pdf	324106 09aeaf5a402fd44be73610cdafd31916d943db93	no	5
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
11	Foreign Reference	B1-WO2004-042663A1.pdf	3034222 0790d2182b6976a0686c37c640f9c0d6cf1aeaa0	no	70
Warnings:					
Information:					
12	Foreign Reference	B2-EP1308366B1andTranslation.pdf	1499631 cd7892d8271a0273729c74f6be9804233162c8f4	no	20
Warnings:					
Information:					

13	Foreign Reference	B3-KR10-1008160B1andTranslation.pdf	1528171 1e81201079cfaee094b886962e8730887d736b02	no	28
Warnings:					
Information:					
14	Foreign Reference	B4-EP0108363A2.pdf	1079733 1904e832c5ee4417263ecbaefb61549e8c0f78ce	no	29
Warnings:					
Information:					
15	Non Patent Literature	C1-Calvert1999.pdf	725624 6643aadac00da04f8b154fdccfe4016a86913acf	no	4
Warnings:					
Information:					
16	Non Patent Literature	C2-Bryan2006.pdf	943511 89443e316629a530729cfe9da812df78314e2dd6	no	5
Warnings:					
Information:					
17	Non Patent Literature	C3-McInnes2010.pdf	282378 325c3bd44c0a7b259911a6a8c507e585e1511f49	no	6
Warnings:					
Information:					
18	Non Patent Literature	C4-JaiC_S2010.pdf	98267 c1bc707d94d5c99ad51b44b54ef2463f6c255056	no	2
Warnings:					
Information:					
19	Non Patent Literature	C5-FatalAccidents2012.pdf	191844 8f214abbc9a97ea4f3785e25942442d01bbd68a4	no	5
Warnings:					
Information:					

20	Non Patent Literature	C6-IntroFAMES2012.pdf	425391 eb95111c938c11fe419dc7683af3b654ef3c5830	no	9
Warnings:					
Information:					
21	Non Patent Literature	C7-Jonz2013.pdf	787335 3790c0659c7d68f3b44add7413149102749 8df30	no	7
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Information:					
22	Non Patent Literature	C8-Aaron2013.pdf	297185 ae06832c4820b31f7880d5ffe9dfaecc06eb 30ff	no	2
Warnings:					
Information:					
23	Non Patent Literature	C9-Katahira1999.pdf	1219648 edbcfe4c4e282dfd595840a08e94cbd43a0 0b4f7	no	8
Warnings:					
Information:					
24	Non Patent Literature	C10-SCC.pdf	3301189 513573388ecb7cec77811e1b346c32010ce 13702	no	7
Warnings:					
Information:					
25	Non Patent Literature	C11-HowComputersWork1999.pdf	307914 4b91ba1e620f19739fb80914c7731ee0ca13 340a	no	4
Warnings:					
Information:					
26		PreliminaryAmendment_85663-Reissue-A.pdf	1001522 a04f3edc618ff7605e706980a43f2b40e2ca8 fd3	yes	23
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	

	Drawings-only black and white line drawings		17		23
	Miscellaneous Incoming Letter		12		16
	Preliminary Amendment		1		11
Warnings:					
Information:					
27	Fee Worksheet (SB06)	fee-info.pdf	34970 6403306a33dd5c496e8550e56525b36f934c9ed8	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	19897974		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Electronic Acknowledgement Receipt

EFS ID:	38529460
Application Number:	16709126
International Application Number:	
Confirmation Number:	1509
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross Pirtle
Customer Number:	23432
Filer:	Paul Teng/Esther Weiner
Filer Authorized By:	Paul Teng
Attorney Docket Number:	7552/85663-Reissue-A
Receipt Date:	07-FEB-2020
Filing Date:	13-DEC-2019
Time Stamp:	16:23:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Corrected Filing Receipt	ReqCorrectedFilingReceipt_85663-Reissue-A.pdf	516946 e77eb36550386f2b38eee144aca2e564cc03a958	no	14

Warnings:

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Information:	
Total Files Size (in bytes):	516946

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/709,126	12/10/2019	3993	3160	7552/85663-Reissue-A	20	2

CONFIRMATION NO. 1509
CORRECTED FILING RECEIPT

23432
COOPER & DUNHAM, LLP
30 Rockefeller Plaza
20th Floor
NEW YORK, NY 10112

OC000000115106739

Date Mailed: 03/03/2020

Receipt is acknowledged of this reissue patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Ross Pirtle, Commack, NY;

Applicant(s)

RAILWARE, INC., Hauppauge, NY, Assignee (with 37 CFR 1.172 Interest);

Assignment For Published Patent Application

RAILWARE, INC., Hauppauge, NY

Power of Attorney: The patent practitioners associated with Customer Number 23432

Domestic Priority data as claimed by applicant

This application is a REI of 14/519,727 10/21/2014 PAT 9403545
and is a CON of 15/928,955 03/22/2018 PAT RE47835
which is a REI of 14/519,727 10/21/2014 PAT 9403545
which claims benefit of 61/893,547 10/21/2013

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 12/16/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/709,126**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

TOOLS FOR RAILWAY TRAFFIC CONTROL

Preliminary Class

246

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

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NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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PTO/AIA/14 (02-18)
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U.S. Patent and Trademark Office. U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16/709,126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Ross		Pirtle	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Commack	State/Province	NY	Country of Residence	US

Mailing Address of Inventor:

Address 1	c/o Railware, Inc.
Address 2	750 Veterans Memorial Hwy, Suite 200

City	Hauppauge	State/Province	NY
Postal Code	11788	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	23432		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL		
Attorney Docket Number	7552/85663-Reissue-A	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	11	Suggested Figure for Publication (if any)	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16/709,126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	23432		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	~~Pending~~ patented		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
16/709,126	reissue Continuation of	15928955	2018-03-22

Patent No. RE47,835 Issue Date: 2020-02-04

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85063-Reissue-A
	Application Number	16/709,126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15928955	reissued of	14519727	2014-10-21	9403545	2016-08-02

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
14519727	Claims benefit of provisional	61893547	2013-10-21

Prior Application Status	patented		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
16/709,126	reissued of	14519727	2014-10-21

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Patent No. 9,403,545

Issue Date: 2016-08-02

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove			
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[j] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16/709,126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

WABTEC EX1002

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85683-Reissue-A
	Application Number	16/709,126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

○ Assignee ○ Legal Representative under 35 U.S.C. 117 ○ Joint Inventor

○ Person to whom the inventor is obligated to assign. ○ Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Applicant:

Address 1			
Address 2			
City		**State/Province**	
Country[i]		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16/709,126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	RAILWARE, INC.

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	750 Veterans Memorial Hwy, Suite 200		
Address 2			
City	Hauppauge	**State/Province**	NY
Country	US	Postal Code	11788
Phone Number		Fax Number	
Email Address			

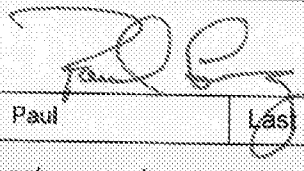
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature				Date (YYYY-MM-DD)	2020-05-07
First Name	Paul	Last Name	Teng	Registration Number	40837

Additional Signature may be generated within this form by selecting the Add button.

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PTO/AIA/14 (02-18)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16/709,126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Electronic Acknowledgement Receipt

EFS ID:	39384434
Application Number:	16709126
International Application Number:	
Confirmation Number:	1509
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross Pirtle
Customer Number:	23432
Filer:	Paul Teng
Filer Authorized By:	
Attorney Docket Number:	7552/85663-Reissue-A
Receipt Date:	07-MAY-2020
Filing Date:	10-DEC-2019
Time Stamp:	20:00:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Preliminary Amendment	2ndPreliminaryAmendment_85663-Reissue-A.pdf	405970 e5b1cec72cf235aed244cc2332c34e04de343738	no	3

Warnings:

WABTEC EX1002

Information:					
2	Application Data Sheet	SupplementalADS_85663-Reissue-A.pdf	2064339 98e66c0f8eef8fc7857ff0702c5a98559a29cf86	no	7
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
			Total Files Size (in bytes):	2470309	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Dkt. 7552/85663-Reissue-A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Ross Pirtle

Reissue Appl'n No.: 16/709,126 Original Patent No.: 9,403,545

Filed: December 10, 2019

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

Confirmation No.: 1509

This correspondence is being transmitted by facsimile transmission and/or EFS-Web to the U.S. Patent and Trademark Office.

May 7, 2020

Paul Teng Date

30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SECOND PRELIMINARY AMENDMENT

Sir:

This Preliminary Amendment is submitted in connection with the captioned continuation reissue application of Reissue Application No. 15/928,955 (now Reissued Patent No. RE47,835) for reissue of U.S. Patent No. 9,403,545 granted on August 2, 2016.

Amendments to the Specification begin on page 2 of this paper.

Remarks begin on page 3 of this paper.

Amendments to the Specification

Please amend the Cross-Reference to Relation Applications section at column 1, lines 3-9, in the following manner (with markings indicating changes relative to the patent for which reissue is sought):

CROSS-REFERENCE TO RELATED APPLICATIONS [APPLICATION]

[This application] Notice: The following multiple reissue applications have been filed for reissue of U.S. Patent No. 9,403,545:

(1) Reissue Application No. 15/928,955 filed on March 22, 2018 and reissued as U.S. Reissue Patent No. RE47,835;

(2) Reissue Application 16/709,126, filed on December 10, 2019, which is a reissue continuation of Reissue Application No. 15/928,955.

U.S. Patent No. 9,403,545 claims the benefit of U.S. Provisional Application No. 61/893,547, filed Oct. 21, 2013 and entitled "SYSTEM, APPARATUS AND METHOD FOR RAILWAY TRAFFIC CONTROL".

REMARKS

The specification is amended hereby to state more clearly, in the notice, which is required under 37 C.F.R. § 1.177(a), that multiple reissue applications have been filed for seeking reissue of U.S. Patent No. 9,403,545, that this continuation reissue application is a reissue continuation of Reissue Application No. 15/928,955 filed March 22, 2018 and reissued as U.S. Reissue Patent No. RE47,835.

A supplemental Application Data Sheet is also being submitted to make the corresponding clarification.

The Patent Office is hereby authorized to charge to Deposit Account No. 03-3125 any fees that are required in connection with this amendment.

Respectfully submitted,

Paul Teng, Reg. No. 40,837
Attorney for Applicant
COOPER & DUNHAM LLP
30 Rockefeller Plaza, 20th Floor
New York, New York 10112
Tel.: (212) 278-0400

UNITED STATES PATENT AND TRADEMARK OFFICE

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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/709,126	12/10/2019	Ross Pirtle	7552/85663-Reissue-A	1509

23432 7590 05/26/2021

COOPER & DUNHAM LLP
90 PARK AVENUE, 21 ST. FLOOR
NEW YORK, NY 10016

EXAMINER	
ENGLISH, PETER C	

ART UNIT	PAPER NUMBER
3993	

NOTIFICATION DATE	DELIVERY MODE
05/26/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DUSPTO@cooperdunham.com
patcomm-in-grp@cooperdunham.com
pdocketing@cooperdunham.com

WABTEC EX1002

Office Action Summary	Application No. 16/709,126	Applicant(s) Pirtle, Ross	
	Examiner Peter C English	Art Unit 3993	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 20-39 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 20-39 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☑ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 10 December 2019 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date 12/10/2019.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

WABTEC EX1002

DETAILED ACTION

Status of Submissions

1. This Office action is responsive to the preliminary amendments filed on December 10, 2019 and May 7, 2020, which have been entered.

2. The amendments filed on December 10, 2019 included proposed replacement drawing sheets, which have been approved for entry by the examiner.

Objections to Amendments – Formalities

3. The amendment filed on May 7, 2020 is objected to because:

At line 5 of the amended cross-reference to related applications, "(2) Reissue Application 16/709,126" should read "(2) This Reissue Application 16/709,126" for clarity.

Objections to Amendments – New Matter

4. The amendment filed on December 10, 2019 is objected to under 35 U.S.C. 132(a), which states that no amendment shall introduce new matter into the disclosure of the invention. The amendment is also objected to under 35 U.S.C. 251(a), which states that no new matter shall be introduced into the application for reissue. Specifically, the amendment introduces new matter for the following reasons:

5. There is no support in the original disclosure for "execution of the one ***or more programs*** causes the processor to: receive a selection of at least one track section amongst the plurality of track sections; transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the selected track section; generate a secret code associated with the at least one selected track section; and transmit the secret code to a remote user terminal" (claim 20, ll. 4-10; emphasis added).

The original disclosure:

- Broadly states that the terminal shown in Fig. 2 "is configured (such as via one or more programs of instructions executable by a processor of a computer or another electronic device) with...a block placer 101A, a code generator 101B, a block

remover 101C and a user interface 101D" (col. 5, ll. 21-26). However, the original disclosure does not provide any further explanation of how the "one or more programs" relate to the disclosed block placer 101A, code generator 101B, block remover 101C and user interface 101D.

- Describes the block placer 101A as "configured to stop traffic within a certain length of rail line" (col. 5, ll. 30-32). However, the original disclosure does not indicate that the specific functions of the block placer 101A are accomplished via the execution of "one or more programs" as required by claim 20.
- Includes Fig. 12, which is described as "a flow chart illustrating a block placement method" (col. 4, ll. 16-17), and which illustrates a sequence of specific steps that are executed by/via the block placer 101A, the code generator 101B and the user interface 101D. While the original disclosure does not explicitly state that Fig. 12 shows a computer program, it would be assumed by a person of ordinary skill in the art (POSITA) that the illustrated flow chart represents a computer program that is executed in order to carry out the disclosed functions of the block placer 101A, the code generator 101B, and the user interface 101D—including the functions of the block placer 101A and the code generator 101B recited in claim 20. However, POSITA would not recognize Fig. 12 to inherently disclose plural computer programs, as encompassed by the claimed "one or more programs".

6. There is no support in the original disclosure for "execution of the one ***or more programs*** causes the processor to store the secret code in the memory device" (claim 21; emphasis added). The original disclosure:

- Describes the code generator 101B as "configured to produce a removal or release code…which is…stored on the terminal" (col. 5, ll. 47-49). However, the original disclosure does not indicate that these specific functions of the code generator 101B are accomplished via the execution of "one or more programs" as required by claim 21.
- Includes Fig. 12, which is described as "a flow chart illustrating a block placement method" (col. 4, ll. 16-17), and which illustrates a sequence of specific

steps that are executed by/via the block placer 101A, the code generator 101B and the user interface 101D. While the original disclosure does not explicitly state that Fig. 12 shows a computer program, it would be assumed by POSITA that the illustrated flow chart represents a computer program that is executed in order to carry out the disclosed functions of the block placer 101A, the code generator 101B, and the user interface 101D—including the function of the code generator 101B recited in claim 21. However, POSITA would not recognize Fig. 12 to inherently disclose plural computer programs, as encompassed by the claimed "one or more programs".

7. There is no support in the original disclosure for "execution of the one ***or more programs*** causes the processor to: receive a second secret code; determine that the second secret code and the secret code stored in the memory device are the same; and responsive to determining that the second secret code and the secret code stored in the memory device are the same, release the block on the at least one selected track section" (claim 22; emphasis added). The original disclosure:

- Describes the block remover 101C as "programmed to remove the previous block…dependent on the code produced by the code generator" (col. 5, ll. 55-58), explains that "a block cannot be removed without the input of the removal or release code" (col. 5, ll. 59-60), and discloses that "[the] release code is then input into the block remover 101C. After which, the block is removed…" (col. 7, ll. 8-10). However, the original disclosure does not indicate that these specific functions of the block remover 101C are accomplished via the execution of "one or more programs" as required by claim 22.
- Includes Fig. 13, which is described as "a flow chart illustrating a block removal method" (col. 4, ll. 18-19), and which illustrates a sequence of specific steps that are executed by/via the block remover 101C and the user interface 101D. While the original disclosure does not explicitly state that Fig. 13 shows a computer program, it would be assumed by POSITA that the illustrated flow chart represents a computer program that is executed in order to carry out the disclosed functions of the block remover 101C and the user interface 101D—including the

function of the block remover 101C recited in claim 22. However, POSITA would not recognize Fig. 13 to inherently disclose plural computer programs, as encompassed by the claimed "one or more programs".

8. There is no support in the original disclosure for "execution of the one ***or more programs*** causes the processor to extract the second secret code from the voice message" (claim 24; emphasis added).

See the explanation above with respect to claim 22, which also applies to claim 24.

Further, the original disclosure:

- States that "the railway field worker can enter the removal code manually or orally (i.e. including a voice or speech interface part)" (col. 3, ll. 9-11).
- Explains that "a voice or speech interface part may be disposed on the system-side to process a voice message (such as received via a telephone call from the railway field worker, extract the removal code from the voice message, and enter the block removal code" (col. 3, ll. 20-24).
- Indicates that "[the] code can be transmitted through…voice message" (col. 8, ll. 51-53).

Thus, the original disclosure states the possibility of using a voice processing part to receive a voice message and extract the removal code. However, the original disclosure provides no description of the specific components of such a voice processing part nor does it provide any description of the specific function of such components. As explained above, Fig. 13 illustrates a block removal method, and the illustrated flow chart would be assumed by POSITA to represent a computer program that is executed in order to carry out the disclosed functions of the block remover 101C and the user interface 101D—including the function of the block remover 101C recited in claim 24. However, POSITA would not recognize Fig. 13 to inherently disclose plural computer programs, as encompassed by the claimed "one or more programs".

9. There is no support in the original disclosure for "execution of the one ***or more programs*** causes the processor to: receive a second secret code; determine that the second secret code and the secret code stored in the memory device are not the same; and responsive to determining that

the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the at least one selected track section" (claim 25; emphasis added).

See the explanation above with respect to claim 22, which also applies to claim 25.

10. There is no support in the original disclosure for "execution of the one or more programs ***causes the processor to***...transmit the secret code to a remote user terminal" (claim 20, ll. 4-5 and 10; emphasis added) in combination with "the secret code is transmitted to the remote user terminal by text message, email, ***or voice message***" (claim 26; emphasis added).

The original disclosure:

- States that "the railway field worker can enter the removal code manually or orally (i.e. including a voice or speech interface part)" (col. 3, ll. 9-11).
- Explains that "...the terminal 103 sends the release code to the railway traffic control terminal 105. The code can be transmitted through...text message, e-mail or voice message" (col. 8, ll. 50-53).

Thus, the original disclosure indicates that the railway field worker can use the field worker terminal 103 to manually or orally enter the removal code, including through the use of a voice or speech interface part. However, this does not correspond to the subject matter of claim 24 because the claim requires the processor of the railway traffic control (RTC) terminal 105 to transmit the secret code to the field worker terminal 103 by voice message.

The original disclosure also:

- Describes Fig. 10 as showing "an exemplary illustration of a message sent by the railway traffic control terminal 105 to a terminal 103...meant to deliver the release code to the maintenance worker assigned to work on a block track" (col. 8, ll. 40-45).
- Explains that "[by] selecting one of the links embedded in the message, the terminal 103 sends the release code to the railway traffic control terminal 105" (col. 8, ll. 49-51). That is, the field worker uses the field worker terminal 103 to manually select an embedded link, and the terminal 103 then sends the release code to the RTC terminal 105.
- Includes the statement that "[the] code can be transmitted through...text message, e-mail or voice message" (col. 8, ll. 51-53) in the same paragraph that describes

Fig. 10 as showing an example of a message sent by the RTC terminal 105 to a field worker terminal 103 to deliver the release code. However, the statement at col. 8, ll. 51-53 immediately follows the explanation that "...the terminal 103 sends the release code to the railway traffic control terminal 105".

Thus, in its immediate context, the statement at col. 8, ll. 51-53 refers to the transmission from the field worker terminal 103 to the RTC terminal 105—not from the RTC terminal 105 to the field worker terminal 103. Even if this statement is assumed to also apply to the transmission from the RTC terminal 105 to the field worker terminal 103, the original disclosure does not provide support for the "processor" of the RTC terminal 105 functioning to transmit the release code to the field worker terminal 103 by "voice message", as required by claim 26.

11. There is no support in the original disclosure for "execution of the one ***or more programs*** causes the processor to: responsive to receiving the selection of one or more track sections, determine that the at least one selected track section has an existing block; receive a signal from the corresponding interlock of the at least one selected track section that a new block can be established; and responsive to receiving the signal that a new block can be established, permit the block to be placed on the at least one selected track section" (claim 28; emphasis added).

See the explanation above with respect to claim 20, which also applies to claim 28.

12. There is no support in the original disclosure for "execution of the one ***or more programs*** causes the processor to transmit the secret code to the remote user terminal via the network interface" (claim 29; emphasis added).

See the explanation above with respect to claim 20, which also applies to claim 29.

13. There is no support in the original disclosure for "the secret code is transmitted ***only to the remote user terminal***" (claim 30, emphasis added) or for "the processor transmits the secret code ***to only the remote user terminal***" (claim 38, emphasis added). Rather, the original disclosure states that "only the railway traffic control apparatus 105 ***and*** terminal [103] receive the release code generated by the railway traffic control apparatus 105" (col. 6, ll. 65-67, emphasis added). Thus, the secret code is transmitted to both the RTC terminal 105 (specifically to its memory/storage) and the field worker terminal 103.

14. There is no support in the original disclosure for the secret code being generated by a "pseudo-random" process (claim 31). See the explanation in item 17 below.

15. There is no support in the original disclosure for "execution of the one ***or more programs*** causes the processor to: retrieve specific personnel data from the rail personnel database; and determine an electronic address of the remote user terminal to which the secret code is to be transmitted" (claim 32; emphasis added).

See the explanation above with respect to claim 20, which also applies to claim 32.

16. Applicant is required to cancel the new matter in the reply to this Office Action.

Objections to New Matter Added in Previous Examination

17. The amendment filed during the original prosecution of parent Application No. 14/519,727 on May 31, 2016 is objected to under 35 U.S.C. 132(a), which states that no amendment shall introduce new matter into the disclosure of the invention. Specifically, the amendment introduced new matter for the following reasons:

- There is no support in the original disclosure for the description of a "pseudo-random" code/cipher, which was added to the specification and appears at col. 5, l. 49 of Patent No. 9,403,545.
- There is no support in the original disclosure for the description of "another" pager (other than a WIC pager), which was added to the specification and appears at col. 8, l. 57 of Patent No. 9,403,545.

18. Applicant is required to cancel the new matter in the reply to this Office Action.

Application Data Sheet

19. The corrected Application Data Sheet filed on May 7, 2020 (as well as the original ADS filed on December 10, 2019) is defective because it fails to identify the assignee as the applicant. Note that the Applicant Information section has been left blank. Pursuant to 37 CFR 1.172(a), the reissue applicant is the current patent owner if there has been an assignment. Pursuant to 37 CFR 1.46(b), the application must contain an ADS identifying the assignee (patent owner) in the

Applicant Information section. Correction of the ADS is required in response to this Office action.

Claim Rejections – 35 USC § 251

20. The following is a quotation of 35 U.S.C. 251:

> (a) IN GENERAL.—Whenever any patent is, through error, deemed wholly or partly inoperative or invalid, by reason of a defective specification or drawing, or by reason of the patentee claiming more or less than he had a right to claim in the patent, the Director shall, on the surrender of such patent and the payment of the fee required by law, reissue the patent for the invention disclosed in the original patent, and in accordance with a new and amended application, for the unexpired part of the term of the original patent. No new matter shall be introduced into the application for reissue.
>
> (b) MULTIPLE REISSUED PATENTS.—The Director may issue several reissued patents for distinct and separate parts of the thing patented, upon demand of the applicant, and upon payment of the required fee for a reissue for each of such reissued patents.
>
> (c) APPLICABILITY OF THIS TITLE.—The provisions of this title relating to applications for patent shall be applicable to applications for reissue of a patent, except that application for reissue may be made and sworn to by the assignee of the entire interest if the application does not seek to enlarge the scope of the claims of the original patent or the application for the original patent was filed by the assignee of the entire interest.
>
> (d) REISSUE PATENT ENLARGING SCOPE OF CLAIMS. No reissued patent shall be granted enlarging the scope of the claims of the original patent unless applied for within two years from the grant of the original patent.

21. GROUND 1: Claims 20-32 and 38 are rejected under 35 U.S.C. 251 as being based upon new matter added to the patent for which reissue is sought. The added material which is not supported by the prior patent is explained in items 5-15 above.

Claim Rejections - 35 USC § 112(a)

22. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

23. GROUND 2: Claims 20-32, 36 and 38 are rejected under 35 U.S.C. 112(a) as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, at the time the application was filed, had possession of the claimed invention.

Claims 20-32 and 38 recite new matter. The added material which is not supported by the prior patent is explained in items 5-15 above.

24. GROUND 3: Claims 20-32 and 36 also fail to comply with the written description requirement and/or the enablement requirement of 35 USC 112(a) for the following reasons.

The original disclosure does not explain the corresponding structure, in the form of the claimed "one or more programs", that enables the claimed processor to perform:

- The specific functions of the block placer 101A required by claims 20 and 28. As explained above, the original disclosure fails to describe plural programs (as encompassed by the claimed "one or more programs") for enabling the processor to perform these specific functions required by claims 20 and 28.
- The specific functions of the code generator 101B required by claims 20, 21, 26 and 29-32. As explained above, the original disclosure fails to describe plural programs (as encompassed by the claimed "one or more programs") for enabling the processor to perform these specific functions required by claims 20, 21, 26 and 29-32.
- The claimed processor to perform the specific functions of the block remover 101C required by claims 22, 24, 25 and 36. As explained above, the original disclosure fails to describe plural programs (as encompassed by the claimed "one or more programs") for enabling the processor to perform these specific functions required by claims 22, 24, 25 and 36.

When a claim defines the invention in functional language specifying a desired result, the specification must sufficiently identify how the function is performed and/or the desired result is achieved. For computer-implemented inventions in which the invention is software-based, the disclosure must describe the required computer programming in detail by setting forth the specific algorithm, i.e., the specific steps or flowcharts, defined by the software and executed by

the processor to perform the claimed functions. Applicant has not met this requirement for the use of plural programs for accomplishing the functions required by each of (a) claims 20 and 28, (b) claims 20, 21, 26 and 29-32, and (c) claims 22, 24, 25 and 36.

25. GROUND 4: Claims 23, 24, 26 and 36 further fail to comply with the written description requirement and/or the enablement requirement of 35 USC 112(a) for the following reasons.

Claim 23 recites "the second secret code is received in the form of a voice message", and claim 24 recites "...causes the processor to extract the second secret code from the voice message". Similarly, claim 36 recites "the second secret code is received in the form of a voice message, and...extracting, by the processor, the second secret code from the voice message". Further, claim 26 recites "the secret code is transmitted to the remote user terminal by...voice message".

The original disclosure:

- States that "the railway field worker can enter the removal code manually or orally (i.e. including a voice or speech interface part)" (col. 3, ll. 9-11).
- Discloses that "a voice or speech interface part may be disposed on the system-side to process a voice message (such as received via a telephone call from the railway field worker, extract the removal code from the voice message..." (col. 3, ll. 20-24).
- Describes Fig. 10 as showing "an exemplary illustration of a message sent by the railway traffic control terminal 105 to a terminal 103...meant to deliver the release code to the maintenance worker assigned to work on a block track" (col. 8, ll. 40-45).
- Explains that "[by] selecting one of the links embedded in the message, the terminal 103 sends the release code to the railway traffic control terminal 105" (col. 8, ll. 49-51). That is, the field worker uses the field worker terminal 103 to manually select an embedded link, and the terminal 103 then sends the release code to the RTC terminal 105.
- States that "...the terminal 103 sends the release code to the railway traffic control terminal 105. The code can be transmitted through...text message, e-mail or voice message" (col. 8, ll. 50-53).

Thus, the original disclosure indicates that: (a) the railway field worker can use a voice interface part of the field worker terminal 103 to orally enter the removal code in the form of a voice message; and (b) the RTC terminal 105 has a voice interface part for processing the voice message received from the field worker terminal 103 and extracting the removal code from the voice message.

However, the original disclosure provides no description of the specific components of the required voice interface parts. The disclosure also fails to provide a specific description of the specific algorithms, i.e., the specific steps or flowcharts, defined by software and executed by the processors of the field worker terminal 103 and the RTC terminal 105 to perform the claimed functions transmitting a secret code via a voice message and extracting the secret code from the voice message. When a claim defines the invention in functional language specifying a desired result, the specification must sufficiently identify how the function is performed and/or the desired result is achieved. Applicant has not met this requirement for the subject matter of claims 23, 24, 26 and 36.

Claim Rejections - 35 USC § 112(b)

26. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

27. GROUND 5: Claims 27, 28 and 33-39 are rejected under 35 U.S.C. 112(b) as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor regards as the invention.

Claim 27 is indefinite because it further defines the "remote user terminal", but the "remote user terminal" is not positively recited in prior claim 20, i.e., is not a component of the "railway control apparatus" of claim 20. The claimed "railway control apparatus" of claim 20 appears to correspond to the disclosed RTC terminal/apparatus 105. The RTC terminal 105 communicates with the field worker terminal (i.e., "remote user terminal") 103, as indicated by line 10 of claim 20, but does not include the field worker terminal 103. Since the "remote user terminal" is not positively recited, it is unclear how the limitation of claim 27 further limits the "railway control apparatus" of claim 20.

Claim 28 recites "responsive to receiving the selection of one or more track sections" (l. 3), which is not entirely consistent with the prior recitation "receive a selection of at least one track section…" (claim 20, l. 6). Due to this inconsistency, it is unclear whether claim 28 is referring to the selection required by claim 20 or a different selection. The examiner suggests amending claim 28 by changing "one or more track sections" (l. 3) to "the at least one track section".

Claim 28 recites "permit the block to be placed on the at least one selected track section" (ll. 7-8), which is not consistent with the prior recitation "causes the processor to…transmit a block signal…to place a block on the selected track section" (claim 20, ll. 5 and 7-8). That is, claim 20 requires that the processor actively places a block whereas claim 28 requires that the processor only grants some form of permission allowing the placement of a block. Due to this inconsistency, claim 28 appears to contradict claim 20 and/or appears to be broader in at least one respect than claim 20, which renders claim 28 indefinite.

In claim 33, the term "the selected one or more track sections" (ll. 4-5, l. 5, and ll. 6-7) lacks proper antecedent basis and is inconsistent with the prior recitation "a selection of at least one track section" (l. 2). The examiner suggests amending claim 33 by changing "at least one track section" (l. 2) to "one or more track sections".

In claim 35, the term "the secret code stored in the memory device" (ll. 3-4 and ll. 5-6) lacks proper antecedent basis. The examiner suggests amending claim 35 to depend from claim 34.

In claim 37, the term "the secret code stored in the memory device" (ll. 3-4 and ll. 5-6) lacks proper antecedent basis. The examiner suggests amending claim 37 to depend from claim 34.

In claim 39, the term "The method of claim 32" (l. 1) lacks proper antecedent basis and is inconsistent with claim 32, which is drawn to an "apparatus". The examiner suggests amending claim 39 to depend from claim 33. For the purposes of the remainder of this Office action, claim 39 will be considered to depend from claim 33.

Listing of Prior Art

28. The following is a listing of the prior art cited in this Office action together with the shorthand reference used for each document:

"Rahn"	EP Publication No. 1 308 366 B1
"Tamaribuchi et al."	US Publication No. 2012/0176217 A1
"Sheardown et al."	US Publication No. 2011/0006912 A1
"Wise"	WO Publication No. 2004/042663 A1
"Seung"	KR Publication No. 10-1008160 B1
"Baines et al."	US Publication No. 2013/0166114 A1

Pre-AIA – First to Invent

29. The present reissue application contains claims to a claimed invention having an effective filing date on or after March 16, 2013. Accordingly, this application is being examined under the first inventor to file provisions of the AIA.

30. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for any prior art rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

Claim Rejections - 35 USC §§ 102 and 103

31. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

32. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art

to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

33. GROUND 6: Claims 20-23, 25-27, 29-31, 33-35, 37 and 38 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Rahn or, in the alternative, under 35 U.S.C. 103 as obvious over Rahn.

Rahn discloses a railway control apparatus/system comprising:

- A computer-based interlocking (CBI) operator (i.e., station master) terminal 8, which includes a processor that executes computer program instructions stored in a memory device, and input/output devices 3-5 such as a keyboard, mouse, display and printer. See Fig. 1; ¶¶ 0006, 0008, 0018-0019, 0023, 0025.
- A CBI interface module 7 connected to (a) the CBI operator terminal 8 by a local area network or serial interface, and (b) a global system for mobile (i.e., cellular) communication (GSM) module 6. See Fig. 1; ¶¶ 0006, 0008-0009, 0023, 0025-0026. The CBI interface module 7 includes a processor that executes computer program instructions stored in a memory device, and input/output devices 1, 2 such as a keyboard, mouse, display and printer. See Fig. 1; ¶¶ 0018-0019, 0026.
- An A-cell phone 10 carried by an authorized railway worker (i.e., foreman) and one or more B-cell phones 9 carried by other railway workers that communicate with the CBI interface module 7 via the GSM module 6. See Figs. 1-2; ¶¶ 0006, 0008-0009, 0023, 0027-0029, 0034.
- A portable computer 11 associated with the A-cell phone 10 for use by the authorized worker, which portable computer 11 can automate certain functions of the overall system. See Fig. 2; ¶¶ 0028, 0034-0035.

The CBI interface module 7 performs the following functions via its processor:

- Receiving operator input of construction site data including date, time, track section, and duration. See ¶¶ 0006, 0009, 0029.
- Receiving operator input of a selection of an A-cell phone 10 for a given construction site and B-cell phones 9 associated with the A-cell phone 10, and storing the call numbers for the phones 9, 10 together with the track section. See ¶ 0029.

- Randomly generating secret codes in the form of transaction authentication numbers (TANs) for the track section of a given construction site, which TANs are stored in the memory device of the CBI interface module 7. See ¶¶ 0006, 0009, 0011, 0029-0031, 0036.
- Retrieving train traffic data from the CBI operator terminal 8. See ¶¶ 0006, 0009, 0023.
- Generating and transmitting a warning signal to the A-cell phone 10 and the B-cell phones 9 when the train traffic data indicates that a train is approaching a blocked track section currently under construction. See ¶¶ 0006, 0009, 0023, 0035.
- Receiving a TAN transmitted by the authorized worker via the A-cell phone 10 as an indication that all workers have cleared a track section previously under construction, determining that the received TAN matches a particular TAN stored in its memory device, and generating a command (sent to the CBI operator terminal 8) for automatically releasing the block from the track section only when it determines that the received TAN is the same as the particular stored TAN. See ¶¶ 0006, 0009-0011, 0017, 0030, 0035.
- Determining that an approaching train has canceled its route, automatically effecting a new block of the previously blocked track section, and transmitting a message along with a TAN to the A-cell phone 10 indicating to the authorized worker that the construction site may be re-entered. See ¶ 0035.

The CBI operator terminal 8 performs the following functions via its processor:

- Receiving operator input of a selection of a track section to be blocked, which selection is based on the construction site data input via the CBI interface module 7. See ¶¶ 0009, 0031, 0033.
- Placing a block on the selected track section after the CBI interface module 7 receives a TAN from the A-cell phone 10 that matches a particular stored TAN. See ¶¶ 0008, 0031, 0033.
- Automatically releasing the block on the selected track section when the CBI interface module 7 generates a command for automatically releasing the block (discussed above). See ¶¶ 0010, 0017, 0030, 0035.

In one embodiment, the TANs generated by the CBI interface module 7 are printed and given to the authorized worker without any electronic transmission. See ¶ 0029. However, in an alternative embodiment, the transmission of the TANs is automated using the portable computer 11, and the TANs are stored in the portable computer 11 for automated comparison by the portable computer 11. See ¶ 0035. In one implementation of this alternative embodiment, a Nokia Communicator integrates the functions of both the A-cell phone 10 and the portable computer 11, and the TANs are transmitted from the CBI interface module 7 to the Nokia Communicator via a common data interface such as a cable or infrared interface. See ¶ 0035.

In the embodiment shown in Fig. 4, the CBI interface module 7 and the CBI operator terminal 8 (see Fig. 1) are integrated into a CBI operator terminal 8'. See ¶¶ 0046-0047. Thus, in the embodiment of Fig. 4, a single processor (of the integrated terminal 8') executes computer program instructions in order to perform all of the functions of the CBI interface module 7 and the CBI operator terminal 8.

With respect to claims 20 and 33:

- Rahn's apparatus/system is used to control a plurality of track sections in a railway network. See ¶¶ 0030-0031. Further, one CBI interface module 7 is used per interlocking unit. See ¶ 0008. Thus, at least in the Fig. 4 embodiment, the single processor of the integrated CBI operator terminal 8' controls a plurality of track sections, with each track section associated with a corresponding interlock (i.e., interlocking unit).
- The single processor of the integrated CBI operator terminal 8' receives operator input of a selection of a track section to be blocked, transmits a block signal to the interlock associated with the selected track section to place a block on the selected track section, and generates a secret code (i.e., TAN) associated with the selected track section. See the above explanation.
- The single processor of the integrated CBI operator terminal 8' determines that an approaching train has canceled its route, automatically effects a new block of the previously blocked track section, and transmits a message along with a TAN to the A-cell phone 10 indicating to the authorized worker that the construction site may be re-entered. See ¶ 0035. The A-cell phone 10 constitutes a "remote user terminal" since it is located at the construction site and apart from the

integrated CBI operator terminal 8' when the terminal 8' transmits the message along with a TAN to the A-cell phone 10 indicating to the authorized worker that the construction site may be re-entered.

- In the alternative embodiment in which transmission of the TANs is automated using the Nokia Communicator that integrates the functions of both the A-cell phone 10 and the portable computer 11, the TANs are transmitted from the integrated CBI operator terminal 8' to the Nokia Communicator via a common data interface such as a cable or infrared interface. See ¶ 0035. In this embodiment, the Nokia Communicator constitutes a "remote user terminal", as broadly claimed, because (a) it is located apart from the integrated CBI operator terminal 8' by a certain distance when the TANs are transmitted thereto via a cable or infrared interface, and (b) it is located apart from the integrated CBI operator terminal 8' by a significant distance when it is located at the construction site.
- Rahn has a filing date of October 26, 2001. One of ordinary skill in the art would appreciate that, as of October 26, 2001, the Nokia Communicator disclosed for use by Rahn was an early version of a smartphone that combined the functionalities of a cellular phone and a portable computer. Further, one of ordinary skill in the art would also appreciate that there were significant advances in both smartphones and the security of cellular communications between the October 26, 2001 filing date of Rahn and the effective filing date of the claimed invention, which advances allowed for the secure transmission of Rahn's TANs between the CBI interface module 7 (or the integrated CBI operator terminal 8') and a smartphone (i.e., Rahn's A-cell phone 10) via text message, voice message, and email. Accordingly, as of the effective filing date of the claimed invention, it would have been obvious to POSITA to implement the teachings of Rahn by transmitting Rahn's TANs between the CBI interface module 7 (or the integrated CBI operator terminal 8') and the A-cell phone 10 via text message, voice message, and/or email. Such an implementation is consistent with Rahn's teaching that "information transfer is greatly accelerated in time" when electronic transmission takes place via the cell phones 9, 10 and the associated GSM

network. See ¶ 0008. Further, POSITA would recognize the advantageous speed and convenience of such electronic transmission.

With respect to claims 21 and 34, the TANs are stored in the memory device of the CBI interface module 7 or the integrated CBI operator terminal 8'. See the above explanation.

With respect to claims 22, 25, 35 and 37, the CBI interface module 7 or the integrated CBI operator terminal 8' receives a TAN transmitted by the authorized worker via the A-cell phone 10 as an indication that all workers have cleared a track section previously under construction, determines that the received TAN matches a particular TAN stored in its memory device, and generates a command (sent to the CBI operator terminal 8) for automatically releasing the block from the track section only when it determines that the received TAN is the same as the particular stored TAN. See the above explanation.

With respect to claims 23 and 26, Rahn teaches that the authorized worker uses the A-cell phone 10 to transmit TANs to the CBI interface module 7 or the integrated CBI operator terminal 8'. See the above explanation. POSITA would recognize that the A-cell phone 10 would normally be used for voice communications and, therefore, would appreciate that it could be used to transmit the TANs by voice message. Further, as explained above, POSITA would have found it obvious to implement the teachings of Rahn by transmitting Rahn's TANs between the CBI interface module 7 (or the integrated CBI operator terminal 8') and the A-cell phone 10 via text message, voice message, and/or email.

With respect to claim 27, Rahn's A-cell phone 10 is a mobile phone, and the Nokia Communicator is a smartphone.

With respect to claim 29, Rahn's GSM module 6 comprises a cellular network interface. Further, the CBI interface module 7 can also be considered to constitute a network interface.

With respect to claims 30 and 38, the TANs are only known to the CBI interface module 7 and the authorized worker (via the A-cell phone 10 and the portable computer 11 or the Nokia Communicator when TAN transmission is automated). See ¶¶ 0006, 0011.

With respect to claim 31, the TANs or other secret codes are randomly generated. See the above explanation.

34. GROUND 7: Claims 32 and 39 are rejected under 35 U.S.C. 103 as being unpatentable over Rahn in view of Tamaribuchi et al.

Rahn is discussed in detail in GROUND 6.

With respect to claims 32 and 39, Rahn fails to teach that the processor of the CBI interface module 7 (or the integrated CBI operator terminal 8') retrieves specific personnel data from a rail personnel database, and determines an electronic address of the A-cell phone 10 or the Nokia Communicator for transmission of the TANs.

Tamaribuchi et al. teaches a railway control apparatus/system comprising:

- A central control center 100 used by a central operator to control a railway network. See ¶¶ 0052-0053, 0060. The control center 100 is a computer-based unit having a display 110, input unit 120, wireless communication unit 130, storage (i.e., memory) unit 140, control signal communication unit 150, and control unit (i.e., processor) 190. See Fig. 1; ¶¶ 0052, 0061-0067.
- A portable maintenance worker terminal 200 that is also a computer-based unit, such as a portable computer or PDA, including a display 210, input unit 220, wireless communication unit 230, storage (i.e., memory) unit 240, and control unit (i.e., processor) 290. See Fig. 1; ¶¶ 0052, 0068-0073.
- A railway signaling control device 920 controlled by the central control center 100 based upon input from the portable worker terminal 200. See Fig. 1; ¶¶ 0052-0054, 0056-0057, 0067.

Tamaribuchi et al. further teaches that the central operator uses the central control center 100 to create a work order that is (a) stored in the storage unit 140, and (b) transmitted to the portable worker terminal 200 and displayed on the display 210—an example of which is shown in Fig. 2. See ¶¶ 0061-0065, 0075-0078. The work order includes personnel data for an authorized worker (including the worker name "H. O. Tsuji" and the worker telephone number "HHH-0000-1111" shown in display areas A112 and A113 in Fig. 2). See ¶ 0077. POSITA would appreciate from the teachings of Tamaribuchi et al. that this personnel data is input into the central control center 100 and stored in its storage (i.e., memory) unit 140 using some form of database.

Tamaribuchi et al. also teaches that the storage (i.e., memory) unit 140 contains a data structure (i.e., a database) for storing work order numbers, authorized worker PINs, and safety measure data—an example of which is shown in Fig. 6. See ¶¶ 0065, 0107-0114.

Thus, Tamaribuchi et al. shows that it was known in the art, before the effective filing date of the claimed invention, to use a database to store and retrieve personnel data for authorized workers. POSITA would appreciate that the use of such a database would facilitate the necessary communication between Rahn's CBI interface module 7 (or integrated CBI operator terminal 8') and Rahn's A-cell phone 10/portable computer 11 (or Nokia communicator) in a secure and accurate manner. Therefore, from the teachings of Tamaribuchi et al., it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify Rahn by using the processor of the CBI interface module 7 (or the integrated CBI operator terminal 8') to retrieve specific personnel data from a rail personnel database, and determine an electronic address of the A-cell phone 10 or the Nokia Communicator for transmission of the TANs.

Claim Rejections – Double Patenting

35. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

36. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the

examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

37. GROUND 8: Claims 20-39 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 9,517,782. Although the claims at issue are not identical, they are not patentably distinct from each other for the following reasons.

Claims 20-39 are drawn to essentially the same system and method as claims 1-8 of U.S. Patent No. 9,517,782, but claims 20-39 define the system and method more broadly, i.e., claims 1-8 of U.S. Patent No. 9,517,782 recite additional limitations not required by claims 20-39. Claims 20-39 are unpatentable over claims 1-8 of U.S. Patent No. 9,517,782 because the elimination of limitations, with the consequent loss of the corresponding functions, is generally recognized as being within the level of ordinary skill in the art.

38. GROUND 9: Claims 20-39 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-7, 9-16 and 18-41 of U.S. Patent No. RE47,835. Although the claims at issue are not identical, they are not patentably distinct from each other for the following reasons.

Claims 20-39 are drawn to essentially the same system and method as claims 1-7, 9-16 and 18-41 of U.S. Patent No. RE47,835, but claims 20-39 define the system and method more broadly, i.e., claims 1-7, 9-16 and 18-41 of U.S. Patent No. RE47,835 recite additional

limitations not required by claims 20-39. Claims 20-39 are unpatentable over claims 1-7, 9-16 and 18-41 of U.S. Patent No. RE47,835 because the elimination of limitations, with the consequent loss of the corresponding functions, is generally recognized as being within the level of ordinary skill in the art.

Specification

39. The specification is objected to because:

At col. 4, l. 52, "terminal 105" should read "apparatus (i.e., terminal) 105" because element 105 is identified as an "Apparatus" in Figs. 1A, 1B and 2, and because the terms "terminal" and "apparatus" are used interchangeably with reference to element 105 in the specification.

At col. 4, l. 56, "only one terminal" should read "only one terminal 103" because only element 103 is identified as a "Terminal" in Figs. 1A and 1B, but element 105 is also referred to as a "terminal" in the specification.

At col. 5, l. 49, "the terminal" should read "the terminal 105" since both element 103 and element 105 are referred to as terminals.

At col. 8, at l. 57, the acronym "WIC" is undefined.

Appropriate correction is required.

Pertinent Prior Art

40. The following prior art of record is considered pertinent to applicant's disclosure.

41. Sheardown et al. teaches a railway control apparatus/system comprising:

- A portable worker device 70 including a portable locator 70A and an alarm 70B carried by a maintenance worker 40 for transmitting worker location data to a central processing center 50 and for receiving worker alarm signals from the central processing center 50. See Figs. 1 and 14; ¶¶ 0028, 0035, 0038, 0044-0045, 0050-0051, 0064-0066.
- A portable (handheld) GPS unit (see Fig. 18) carried by the maintenance worker 40 for displaying a map of a railway network, the location of the worker 40, and the location of rail vehicles 30. See Fig. 18; ¶ 0070.

- The central processing center 50 having a database with entries that match worker personnel data transmitted by the portable locator 70A, and a database with entries that are used to match/confirm railway vehicle data transmitted by a rail vehicle 30. See Figs. 1 and 8; ¶¶ 0038, 0058.
- A central command center 170 used by a central operator to control safe movement of rail vehicles within the railway network. See Fig. 6; ¶¶ 0055.

Sheardown et al. further teaches that the transmission of data between the portable worker device 70 and the central processing center 50 can take place over a wired network 110 (Fig. 2) or a wireless network (Fig. 4), with encryption used to secure the electronic transmission. See ¶¶ 0038, 0052.

42. Wise teaches a mobile terminal 20 used by an authorized field worker to communicate with a central control terminal 21 via a network 24. See Fig. 2; p. 9, ll. 23-28. As shown in Fig. 10, the control terminal 21 includes a processor 1000, a database 1002, a display 1003 and an operator terminal 1004. See p. 27, l. 22 – p. 28, l. 4. As shown in Figs. 6A-6D, the operator of the control terminal 21 fills in a form displayed on the display 1003 when communicating with the authorized field worker using the mobile terminal 20, wherein the operator of the terminal 21 requires the field worker to meet certain criteria in order to (a) be authorized to begin work at a given work site, and (b) remove a track block (or other restriction) once work is complete and the given work site is no longer occupied by field workers. This procedure is illustrated in Figs. 5A-5H. See p. 25, l. 26 – p. 26, l. 19. As shown in Fig. 5H, the authorized field worker (i.e., the "COSS") calls the operator of the terminal 21 using the mobile terminal 20 and is required to confirm that the previously blocked track sections have been cleared (step S554) in addition to supplying the necessary block removal code (i.e., the safety check number or "SCN" in step S555). See p. 25, ll. 4-9. See also the "Sentinel ID" (i.e., authorized worker ID) field, the "FirstName" and "LastName" (i.e., the authorized worker's name) fields, and the "ARE ALL STAFF COVERED BY THIS SCN CLEAR OF THE LINE?" prompt shown in Fig. 6D.

Further, as shown in Fig. 5H, the operator of the terminal 21 records the name of the authorized field worker (i.e., the "COSS") as well as the time the block was removed ("Actual Withdrawn time" in step S555). See p. 25, ll. 4-9. See also the "Sentinel ID" (i.e., authorized worker ID) field, the "FirstName" and "LastName" (i.e., the authorized worker's name) fields,

and the "Actually Initiated" and "Actual Withdraw" fields shown in Fig. 6D. Note that the "Actually Initiated" and "Actual Withdraw" fields appear to have both a box for entering a time as well as a box for entering the date (i.e., the box containing forward slashes used to separate the month, day and year entries).

43. As shown in Fig. 8, Seung teaches a railway control apparatus comprising an interlock controller 20 which controls the operation of an interlock SG1A via a control unit 30. An authorized worker communicates with the interlock controller 20 via a wireless interface to request access to a track section. In response, the interlock controller 20 approves the request, issues a unique ID associated therewith, and blocks train traffic by controlling the interlock SG1A via the control unit 30 during the scheduled work. Upon completion of the work, the authorized worker communicates with the interlock controller 20 via the wireless interface and supplies the unique ID, which is used by the controller 20 to verify the work completion and remove the block by controlling the interlock SG1A via the control unit 30. See ¶¶ 0022-0025, 0030-0051.

44. Baines et al. teaches a portable authorized worker terminal 104 and additional portable worker terminals 106 that communicate with a station master terminal at a central command center 112 via a satellite or mobile phone network 114. See Fig. 1; ¶¶ 0031-0032. The authorized worker uses the terminal 104 to send a request for a worksite protection zone 120 to the central command center 112, and to send a request to remove the worksite protection zone 120 upon completion of work. See ¶¶ 0033, 0042, 0049. The terminal 104 displays the approved worksite protection zone 120 relative to a location zone 124 of a train 110. See ¶¶ 0033-0034.

Amendments in Reissue Applications

45. Applicant is notified that any subsequent amendment to the specification, claims or drawings must comply with 37 CFR 1.173(b)-(g).

46. Failure to fully comply with 37 CFR 1.173(b)-(g) will generally result in a notification to applicant that an amendment *before final rejection* is not completely responsive. Such an amendment *after final rejection* will not be entered.

Disclosure Obligations

47. Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which the patent for which reissue is sought is or was involved. These proceedings would include interferences, reissues, reexaminations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP 1404, 1442.01 and 1442.04.

Remarks

48. All correspondence relating to this reissue application should be directed:

By EFS:	Registered users may submit via the EFS-Web electronic filing system at: https://efs.uspto.gov/efile/myportal/efs-registered
By Mail[1] to:	Commissioner for Patents United States Patent & Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450
By FAX to:	(571) 273-8300
By hand:	Customer Service Window Randolph Building 401 Dulany Street Alexandria, VA 22314

49. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter C English whose telephone number is (571)272-6671. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:00 pm EST).

[1] Mail Stop REISSUE should only be used for the initial filing of reissue applications, and should not be used for any subsequently filed correspondence in reissue applications. See MPEP 1410.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gay A Spahn, can be reached on (571)272-7731. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/PETER C ENGLISH/
Primary Examiner, Art Unit 3993

Conferees: /GAS/ and /rds/

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/709,126	Pirtle, Ross
	Examiner	Art Unit
	Peter C English	3993

CPC - Searched*		
Symbol	Date	Examiner
B61L 27/0038, 27/0005, 27/02, 27/00, 23/00, 23/06, 23/10, 19/06, 2019/065, 25/06, 25/08	05/11/2021	/PE/

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Reviewed IFW for PAT 9,403,955, PAT RE47,835 and related PAT 9,517,782	05/11/2021	/PE/
See EAST search in parent 15/928,955 (PAT RE47,835)	05/11/2021	/PE/
PE2E Search (see printout)	05/21/2021	/PE/

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

WABTEC EX1002

Submitted by: Paul Teng, Reg. No. 40,837

Form PTO-1449 (substitute)	U.S. Department of Commerce Patent and Trademark Office	Application No.	Filed 12/10/2019 ~~Herewith~~
		First Named Inventor: Ross PIRTLE	
		Art Unit:	
		Examiner Name: Peter C. ENGLISH	
		Atty. Docket No.: 7552/85663-Reissue-A	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document Number Number-Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Inventor or Applicant
	A1	9185710 B2	11-17-2015	Tamaribuchi et al.
	A2	5390894	02-21-1995	Fukawa et al.
	A3	5926465	07-20-1999	Pedersen et al.
	A4	20070/0057431 A1	03-08-2007	Pirtle et al.
	A5	20070/0176054 A1	08-02-2007	Mally
	A6	20110/0036976 A1	02-17-2011	Ginsberg et al.
	A7	20110/0233342 A1	09-29-2011	NICHTER
	A8	20110/0315961 A1	12-22-2011	Ecton et al.
	A9	20130/0134285 A1	05-30-2013	Sharon
	A10	8478463	07-02-2013	Knott et al.

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.	Foreign Patent Document Country Code, Number, Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Translation
	B1	WO 2004/026631 A1	05-21-2004	JARVIS FACILITIES LIMITED; FASTLINE LIMITED	
	B2	EP 1308348 B1	03-08-2006	ALCATEL	X
	~~B3~~	~~KR 10-1008160 B1~~	~~01-13-2011~~	~~DAEA TI Co., Ltd.~~	~~X~~
	B4	EP 1084080 A2	05-16-1984	Kawasaki Jukogyo Kabushiki Kaisha	
*		KR 10-1008160 B1	01-13-2011	DAEA TI Co., Ltd.	X

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article, title of the item (book, magazine, symposium, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
*	C1	J.B. CALVERT, "Centralized Traffic Control", May 29, 1999, 4 pages.
*	C2	FRANK W. BRYAN, "Railroad's traffic control systems", May 1, 2006, 5 pages.

EXAMINER /PETER C ENGLISH/	DATE CONSIDERED 05/11/2021

*EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609: Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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WABTEC EX1002

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.C.E/

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		Art Unit:	
		Examiner Name: Peter C. ENGLISH	
		Atty. Docket No.: 7552/85663-Reissue-A	

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U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document Number Number-Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Inventor or Applicant
	A11	20 13 /0 16 85 03 A1	07-04-2013	Cooper et al.
	A12	20 13 /0 18 70 10 A1	07-25-2013	KIM
	A13	20 13 /0 20 13 16 A1	08-08-2013	BINDER et al.
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	A19	20 11 /0 00 69 12 A1	01-13-2011	Sheardown et al.
	A20	20 11 /0 22 69 10 A1	09-22-2011	Bock et al.
	A21	20 11 /0 27 84 01 A1	11-17-2011	Sheardown et al.
	A22	8 0 6 1 6 6 2	11-22-2011	Bartek
	A23	20 12 /0 17 62 17 A1	07-12-2012	TAMARIBUCHI et al.
	A24	20 13 /0 16 61 14 A1	06-27-2013	Baines et al.
	A25	20 13 /0 30 42 86 A1	11-14-2013	Ehrler et al.
	A26	20 14 /0 10 40 81 A1	04-17-2014	Cross et al.

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Examiner Initials*	Cite No.	Foreign Patent Document Country Code, Number, Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Translation

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article, title of the item (book, magazine, symposium, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
*	C3	KYLE MCINNES, "BlackBerry-Based WIC Pager Pilot Program at Children's Hospital", ~~2010~~ June 21, 2010, 6 pages.
*	C4	JAI C.S., "Healthcare Communication Interface: WIC Pager, Philips Emergin", October 8, 2010, 2 pages.

EXAMINER	/PETER C ENGLISH/	DATE CONSIDERED	05/11/2021

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WABTEC EX1002

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.C.E/

Submitted by: Paul Teng, Reg. No. 40,837

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		First Named Inventor: Ross PIRTLE	
		Art Unit:	
		Examiner Name: Peter C. ENGLISH	
		Atty. Docket No.: 7552/85663-Reissue-A	

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Examiner Initials*	Cite No.	Document Number Number-Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Inventor or Applicant
	A27	20140/3462/86A1	11-27-2014	Tonguz et al.
	A28	20150/1082/84A1	04-23-2015	Pirtle
	A29	20150/3678/73A1	12-24-2015	IBENDORF et al.
	A30	20160/0355/07A1	02-04-2016	BRABAND et al.
	A31	9517/7782A1	12-13-2016	Pirtle

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.	Foreign Patent Document Country Code, Number, Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant	Translation

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article, title of the item (book, magazine, symposium, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
*	C5	"Fatal Accidents Involving Roadway Workers-In-Charge and Lone Workers", March 9, 2012, Fatality Analysis of Maintenance-of-way Employees and Signalmen (FAMES) Committee, 5 pages.
*	C6	"Introduction to the FAMES Committee", May 21, 2012, Fatality Analysis of Maintenance-of-way Employees and Signalmen (FAMES) Committee, 9 pages.
*	C7	CASEYJONZ et al., "Centralized traffic control", ~~2013, Wikipedia~~ July 31, 2013, Wikipedia, 7 pages.
*	C8	AARON-TRIPEL et al., "Train dispatcher", August 23, 2013, Wikipedia, 2 pages.
*	C9	MASAKI KATAHIRA et al., "Recent Train Traffic Control Systems", Hitachi, Ltd., 1999, pp. 153-160 of unidentified document.
*	C10	"SCC Centralized traffic control system for lines and area junctions", Ansaldo STS, undated, 7 pages.
*	C11	"How Computers Work", by Ron White, (Que Corporation 1999), pp. 274-275.

EXAMINER /PETER C ENGLISH/	DATE CONSIDERED 05/11/2021

*EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609: Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

*ENTRY CORRECTED/COMPLETED BY EXAMINER.

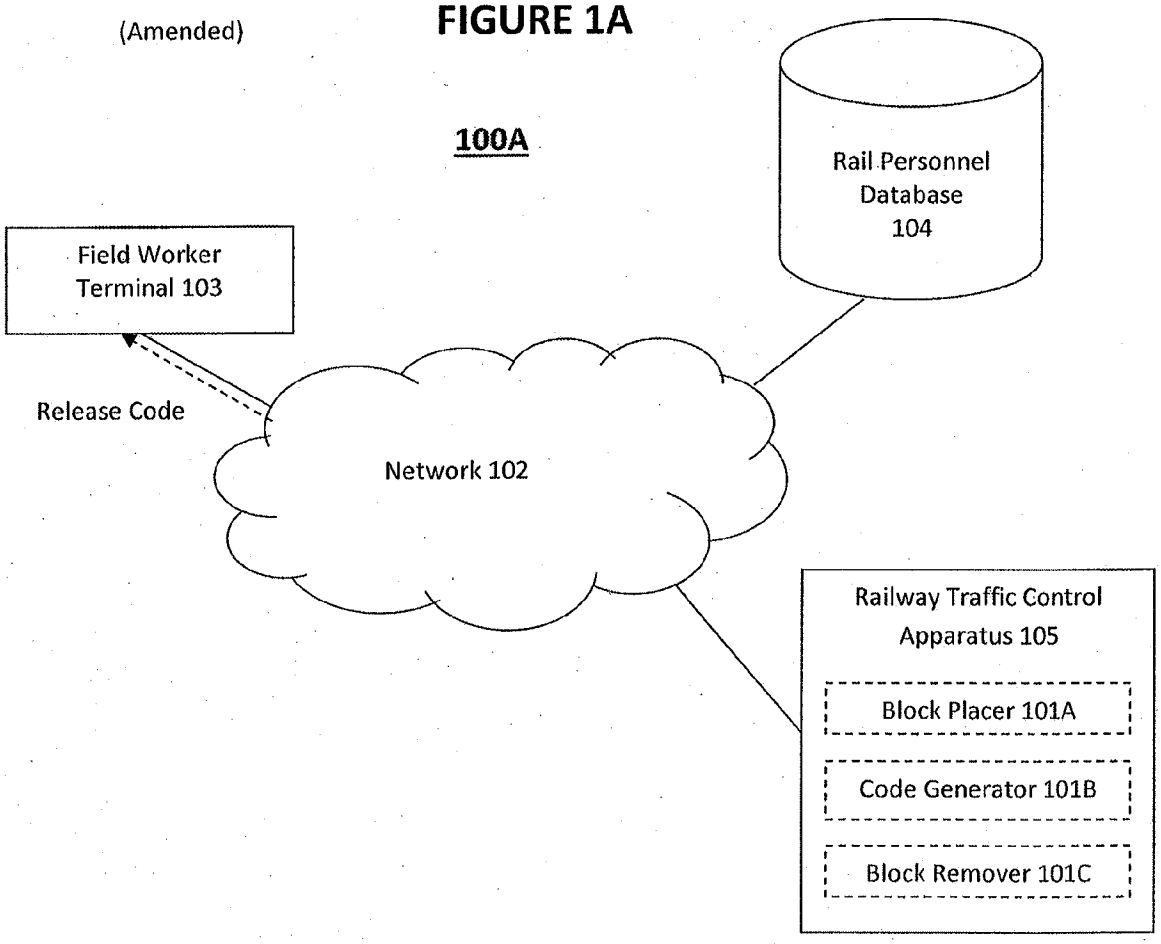
ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.C.E/

Receipt date: 12/10/2019
16/709,126
GAU 3993

ENTER - Approved
by Examiner
/PE/
5/6/2021

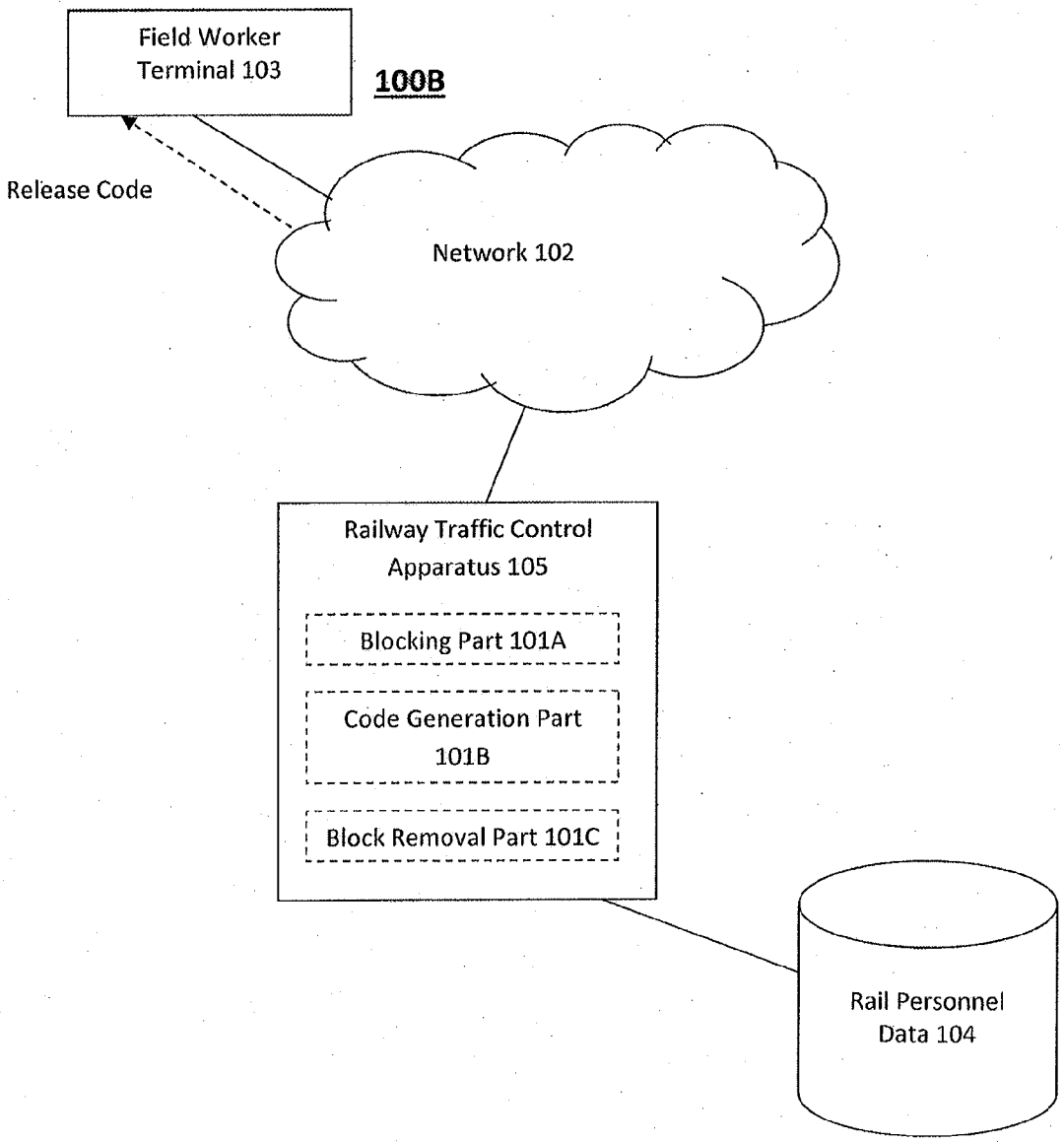
(Amended)

FIGURE 1A



(Amended)

FIGURE 1B



(Amended)

FIGURE 2

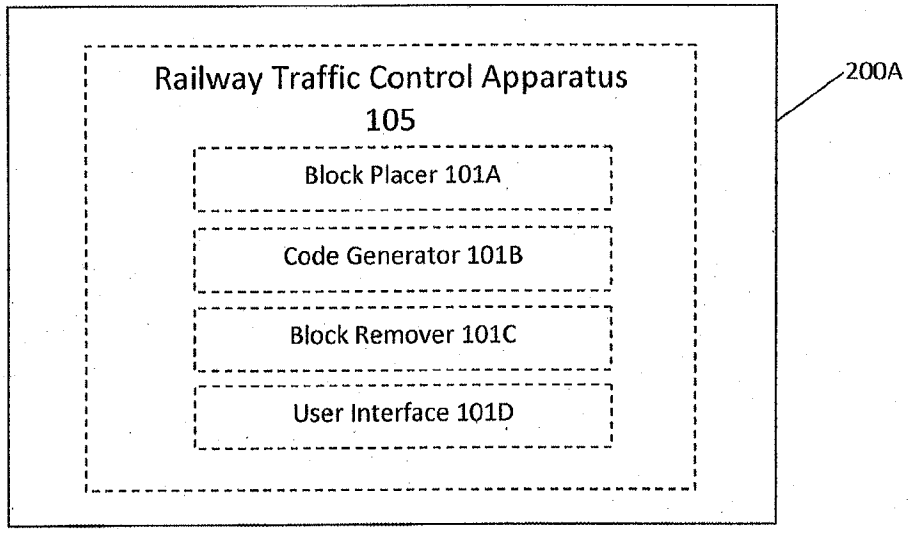
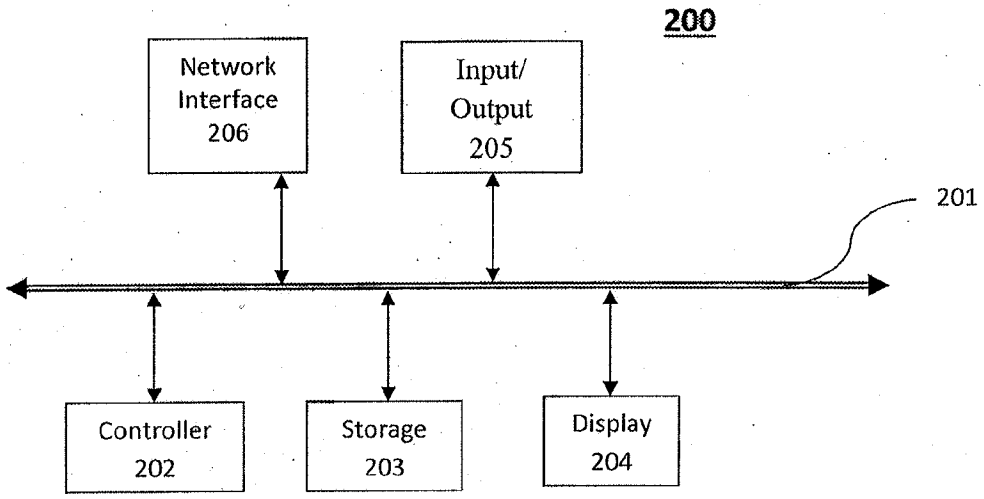
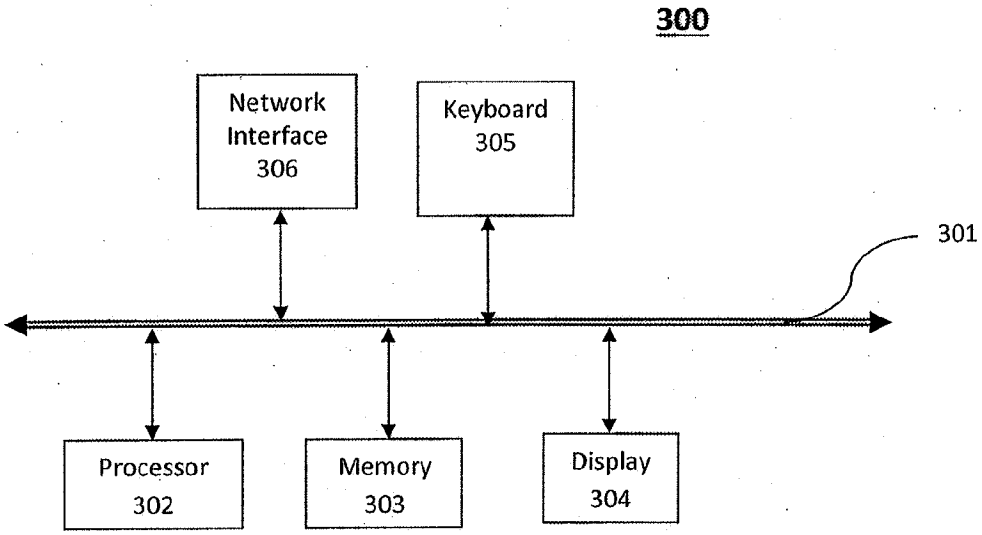


FIGURE 3A



(Amended) **FIGURE 3B**



(Amended) **FIGURE 5**

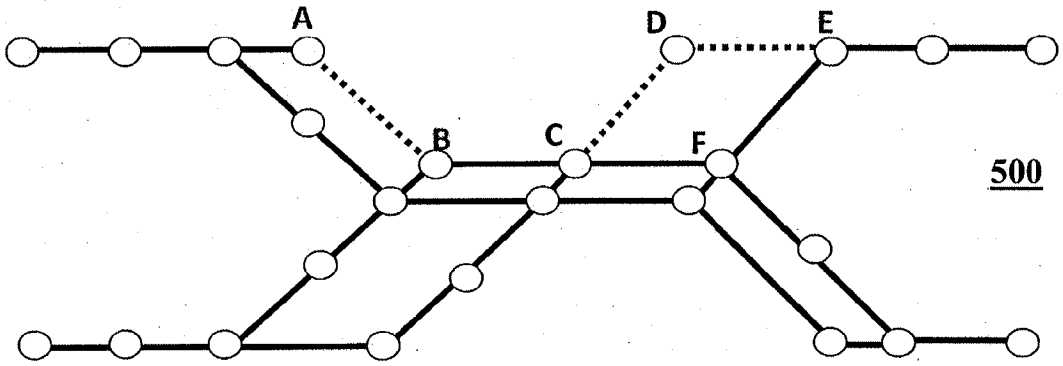
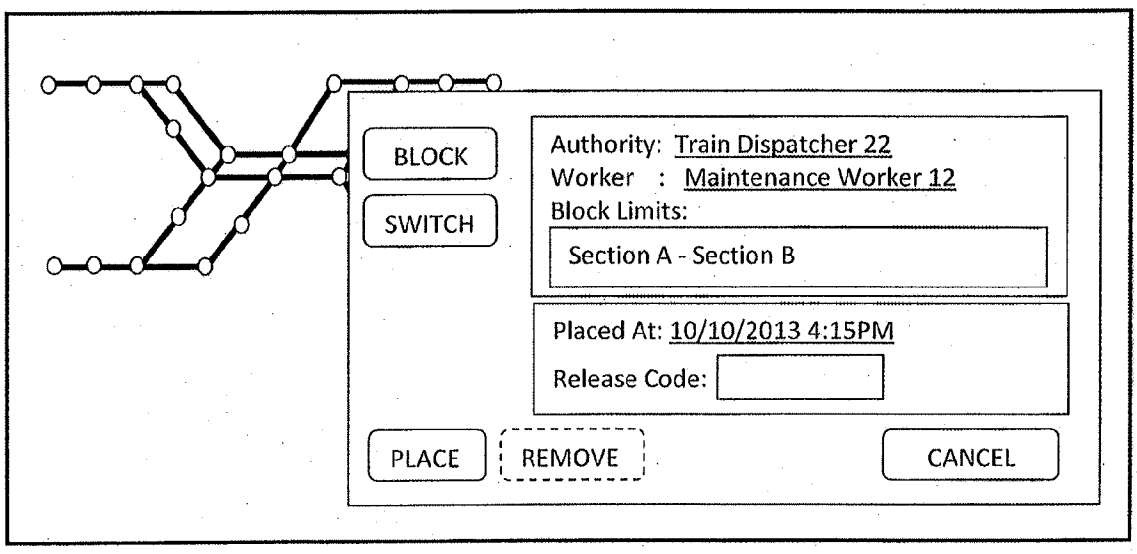


FIGURE 6



(Amended)

FIGURE 7

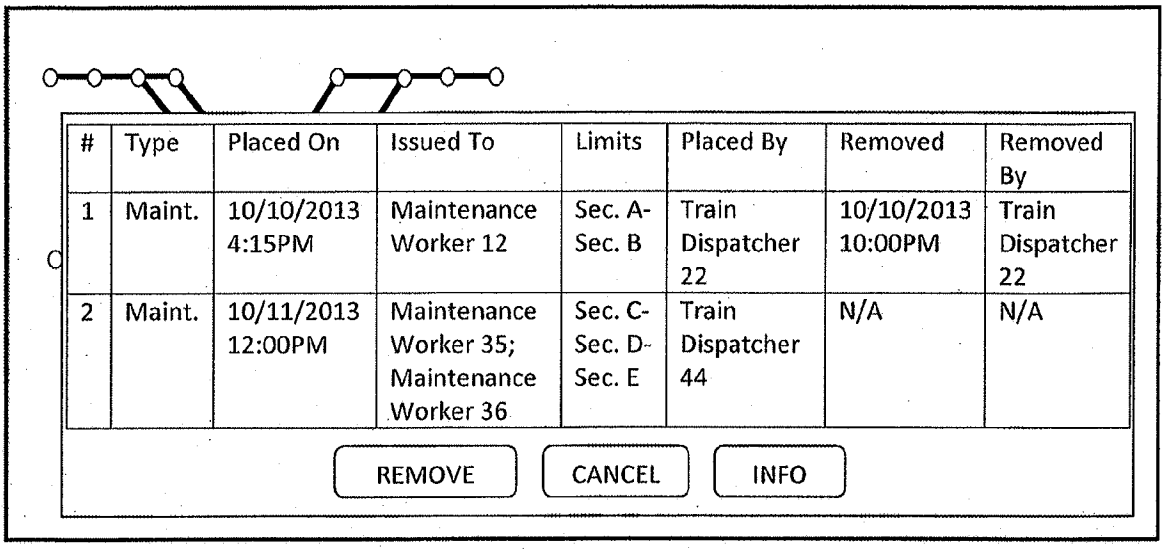
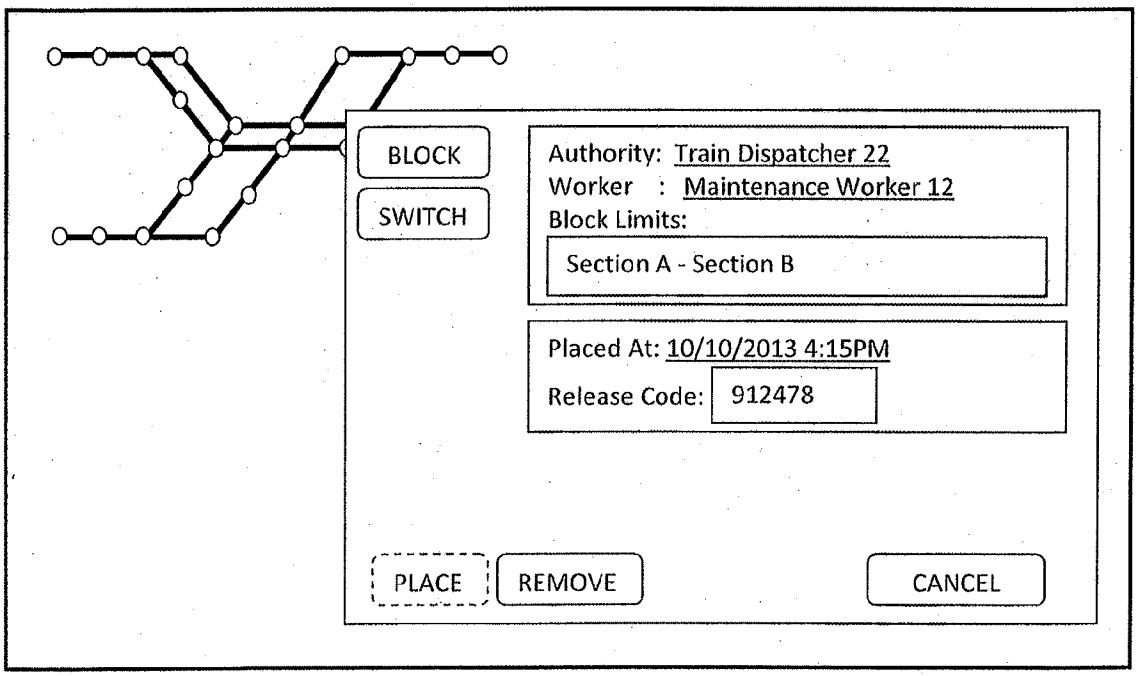
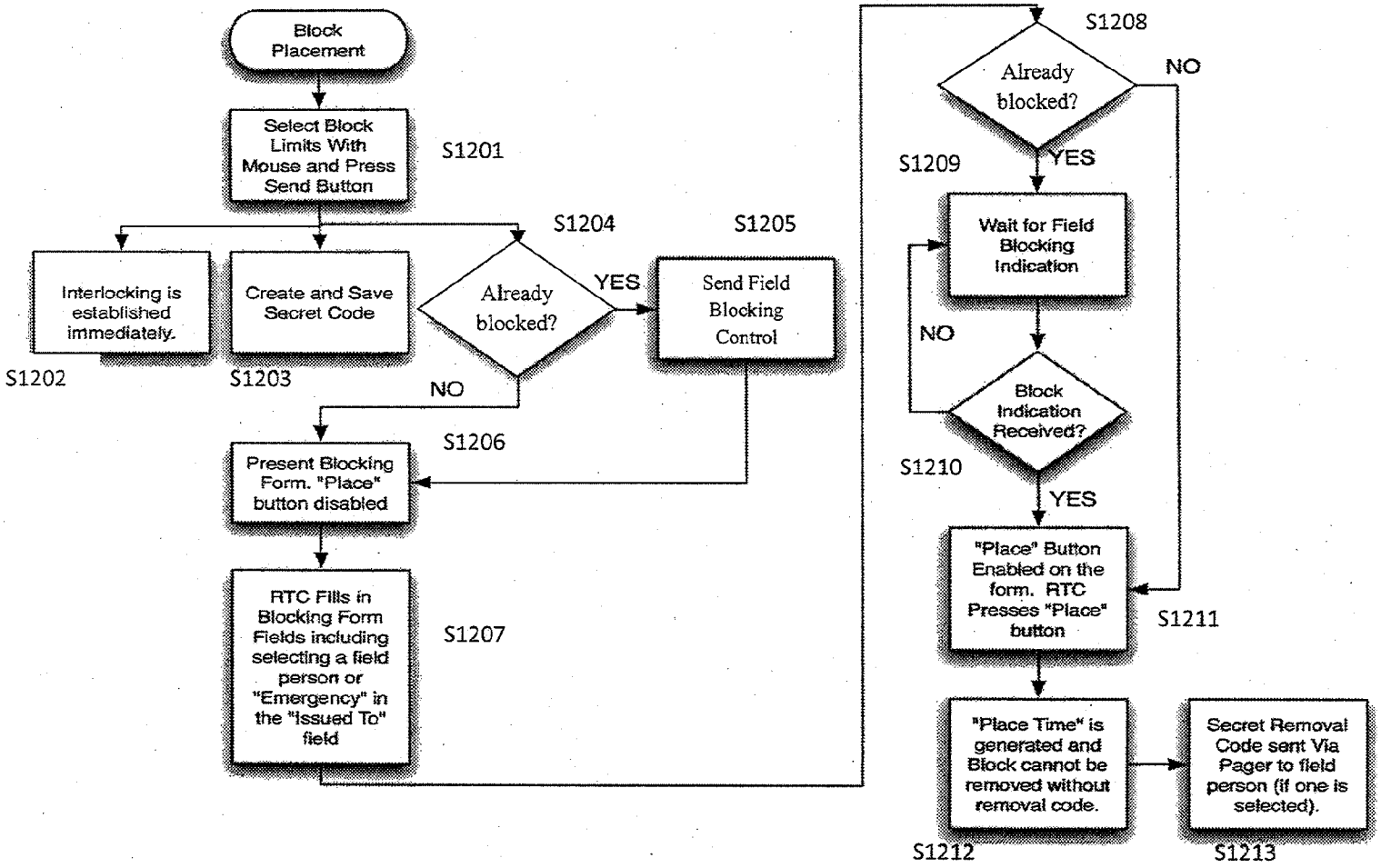


FIGURE 8



(Amended) **FIGURE 12**



WABTEC EX1002

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L20	2411	B61L27/0038.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:26 AM
L21	1498	B61L27/0005.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:26 AM
L22	66	B61L27/02.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:26 AM
L23	527	B61L27/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:26 AM
L24	1211	B61L23/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:26 AM
L25	835	B61L23/06.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:26 AM
L26	139	B61L23/10.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:26 AM
L27	2000	B61L19/06.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:27 AM
L28	136	B61L2019/065.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:27 AM
L29	357	B61L25/06.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:27 AM
L30	732	B61L25/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:27 AM
L31	9089	(rail or railroad or railway or track) with interlock	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:28 AM
L32	410728	(rail or railroad or railway or track) with block$3	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:29 AM
L35	398239	(code or passcode or password) with block$3	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:30 AM
L37	19022	(L31 or L32) and L35	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:31 AM
L46	85262	(code or passcode or password) with cellular	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:43 AM

L47	5899	(code or passcode or password) with pager	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:43 AM
L48	127068	(code or passcode or password) with phone	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:43 AM
L49	120103	(code or passcode or password) with telephone	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2019/01/15 10:43 AM
L65	1	RE47835.pn.	(USPAT)	ADJ	ON	ON	2021/05/06 08:22 AM
L66	31	("5390880" | "5727758" | "5924653" | "6113037" | "6145792" | "7624952" | "8061662" | "8478463" | "9187105" | "9517782" | "20070055743" | "20070176054" | "20110006912" | "20110037619" | "20110226910" | "20110238242" | "20110278401" | "20110313596" | "20120176217" | "20130135109" | "20130166114" | "20130168503" | "20130187010" | "20130201316" | "20130234774" | "20130304286" | "20140104081" | "20140346286" | "20150108284" | "20150367873" | "20160035507").pn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	ADJ	ON	ON	2021/05/11 05:10 PM
L67	43	((WO-2004042663-A1 OR KR-101008160-B1 OR EP-1308366-A1).did. AND FPRS.dbnm.) OR ((US-9517782-B2 OR US-9403545-B2 OR US-9751544-B2 OR US-8478463-B2 OR US-6145792-A OR US-6113037-A OR US-5727758-A OR US-9902411-B2 OR US-9434396-B2 OR US-8952805-B2 OR US-5924651-A OR US-3976272-A OR US-	(USPAT; US-PGPUB; FPRS; USOCR; IBM_TDB; EPO; JPO; DERWENT; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO))	ADJ	ON	ON	2021/05/12 01:59 PM

		9187105-B2 OR US-7624952-B1 OR US-RE47835-E OR US-8061662-B1 OR US-5924653-A OR US-5390880-A).did. AND USPT.dbnm.) OR ((US-20150108284-A1 OR US-20140104081-A1 OR US-20130166114-A1 OR US-20130135109-A1 OR US-20120176217-A1 OR US-20110278401-A1 OR US-20110226910-A1 OR US-20110006912-A1 OR US-20160280241-A1 OR US-20160035507-A1 OR US-20150367873-A1 OR US-20140346286-A1 OR US-20130304286-A1 OR US-20130234774-A1 OR US-20130201316-A1 OR US-20130187010-A1 OR US-20130168503-A1 OR US-20110313596-A1 OR US-20110238242-A1 OR US-20070055743-A1 OR US-20070176054-A1 OR US-20110037619-A1).did. AND PGPB.dbnm.)					
L68	21	67 AND code	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/12 02:00 PM
L69	6	67 AND password	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/12 02:00 PM
L70	0	67 AND passcode	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO;	ADJ	ON	ON	2021/05/12 02:00 PM

			JPO; DERWENT)				
L74	545111	(code OR passcode OR password) near5 transmi$5	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 08:54 AM
L75	179111	(code OR passcode OR password) near5 send$3	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 08:54 AM
L76	296108	(code OR passcode OR password) near5 communicat$3	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 08:55 AM
L77	5923	37 AND (74 OR 75 OR 76)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 08:55 AM
L78	32	L77 AND (L20 OR L21 OR L22 OR L23 OR L24 OR L25 OR L26 OR L27 OR L28 OR L29 OR L30)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 08:56 AM
L79	2569	L77 AND (L46 OR L47 OR L48 OR L49 OR smartphone OR pda)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 08:58 AM
L80	187810	(code OR passcode OR password) WITH random	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 09:00 AM
L81	195259	(code OR passcode OR password) WITH $random	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 09:00 AM
L82	36929	(code OR passcode OR password) near5 secret	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 09:01 AM
L83	436	79 AND (80 OR 81 OR 82)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 09:01 AM
L84	260500	(worker OR work OR maintenance) near7 safety	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 09:11 AM
L85	19	79 AND 84	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 09:12 AM
L86	26	77 AND 84	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	ADJ	ON	ON	2021/05/21 09:13 AM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

DO NOT ENTER -
Does not comply
with 37 CFR 1.173
/PE/
5/6/2021

ABSTRACT

Tools (such as system, apparatus, methodology, etc.) may be provided to control traffic over a railway track section, when a railway worker is working on or near the track section. Move particularly, when traffic over the track section is to be blocked, a release code is generated and sent to an electronic contact address of the railway worker. Traffic through the track section is blocked until the release code is entered in the system.

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BIB DATA SHEET

CONFIRMATION NO. 1509

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
16/709,126	12/10/2019 RULE	246	3993	7552/85663-Reissue-A

APPLICANTS

RAILWARE, INC., Hauppauge, NY, Assignee (with 37 CFR 1.172 Interest);

INVENTORS

Ross Pirtle, Commack, NY;

**** CONTINUING DATA ***************************

This application is a REI of 14/519,727 10/21/2014 PAT 9403545
and is a CON of 15/928,955 03/22/2018 PAT RE47835
which is a REI of 14/519,727 10/21/2014 PAT 9403545
which claims benefit of 61/893,547 10/21/2013

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

12/16/2019

NOTE: More than one reissue application has been filed for PAT 9403545:

1) **15/928,955 (PAT RE47,835 E); and**
2) **16/709,126 (this application).**

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
❑ Yes ☑ No	❑ Yes ☑ No	/PETER C ENGLISH/ Examiner's Signature	❑ Initials	NY	11	20	2

ADDRESS

COOPER & DUNHAM LLP
90 PARK AVENUE, 21 ST. FLOOR
NEW YORK, NY 10016
UNITED STATES

TITLE

TOOLS FOR RAILWAY TRAFFIC CONTROL

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
3160	No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	❑ All Fees ❑ 1.16 Fees (Filing) ❑ 1.17 Fees (Processing Ext. of time) ❑ 1.18 Fees (Issue) ❑ Other _____ ❑ Credit

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/709,126	12/10/2019	Ross Pirtle	7552/85663-Reissue-A	1509

23432 7590 08/23/2021
COOPER & DUNHAM LLP
90 PARK AVENUE, 21 ST. FLOOR
NEW YORK, NY 10016

EXAMINER	
ENGLISH, PETER C	

ART UNIT	PAPER NUMBER
3993	

NOTIFICATION DATE	DELIVERY MODE
08/23/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DUSPTO@cooperdunham.com
patcomm-in-grp@cooperdunham.com
pdocketing@cooperdunham.com

WABTEC EX1002

Applicant-Initiated Interview Summary	Application No. 16/709,126	Applicant(s) Pirtle, Ross		
	Examiner Peter C English	Art Unit 3993	AIA (First Inventor to File) Status Yes	Page 1 of 2

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
Peter C English	Primary Examiner	Telephonic
Gay Spahn	SPE	
Glenn Dawson	Primary Examiner	
Paul Teng	Attorney of Record	

Date of Interview: 18 August 2021

Issues Discussed:

35 U.S.C. 112

See the attached interview agenda.

Discussed the examiner's findings of new matter (items 5-15 on pp. 2-8 of the prior Office action) and the corresponding rejections under 35 USC 251 (GROUND 1 on p 9 of the prior Office action) and 35 USC 112(a) (GROUND 2 on p. 10 of the prior Office action). Applicant's representative proposed amending lines 4-5 of claim 20 to eliminate the recitation of "one or more programs" and instead recite "a memory device storing executable instructions, wherein execution of the executable instructions..." The examiner agreed that this would constitute an improvement over the original claim language. However, the examiner explained the need in the applicant's response to explain how the original disclosure provides support for the specific algorithm covered by the claims.

Also discussed the rejection of claims 23, 24, 26 and 36 under 35 USC 112(a) for lack of written description and/or enablement (GROUND 4 on pp. 11-12 of the prior Office action). Applicant's representative argued there would be no need for a person of ordinary skill in the art to write specific computer programming for the claimed receipt, extraction and transmission of a secret code via voice message; rather, one would chose from an available library of software. Applicant's representative also indicated the intention to file a declaration under 37 CFR 1.132 attesting to these facts. The examiner noted that it would be helpful to point to disclosure in the original specification of such a selection from an available library of software. The examiner also explained the need to disclose the manner in which the claimed functions are performed, i.e., how the applicant's invention achieves the intend results, as opposed to requiring a person of ordinary skill in the art to devise their own solution.

Objections

See above explanation with respect to the examiner's findings of new matter.

Other

See above explanation with respect to the rejection under 35 USC 251.

Applicant-Initiated Interview Summary	**Application No.** 16/709,126	**Applicant(s)** Pirtle, Ross		
	Examiner Peter C English	**Art Unit** 3993	**AIA (First Inventor to File) Status** Yes	**Page** **2 of 2**

/PETER C ENGLISH/ Primary Examiner, Art Unit 3993	Conferees: /GKD/ and /GAS/

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

WABTEC EX1002

Discuss the issues raised in the Office Action (OA) regarding the following terms:

- "... execution of the one or more programs causes the processor to ..." (OA, sect. 5-9, 11-12, 15);

- Enablement - voice message (OA, section 25)

WABTEC EX1002

English, Peter

From: Paul Teng <PTENG@COOPERDUNHAM.COM>
Sent: Monday, August 16, 2021 4:31 PM
To: English, Peter
Subject: RE: Reissue Application No. 16/709,126 [our Dkt. 7552/85663-Reissue-A] -- agenda for telephone interview scheduled for August 18, 10am

CAUTION: This email has originated from a source outside of USPTO. **PLEASE CONSIDER THE SOURCE** before responding, clicking on links, or opening attachments.

Examiner,

Understood. Thank you.

Paul Teng
COOPER & DUNHAM LLP
90 Park Avenue, 21st Floor
New York, NY 10016
Tel.: (212) 278-0400
Email: PTeng@cooperdunham.com
Mobile: (516) 424-5401

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From: English, Peter <Peter.English@USPTO.GOV>
Sent: Monday, August 16, 2021 4:03 PM
To: Paul Teng <PTENG@COOPERDUNHAM.COM>
Subject: RE: Reissue Application No. 16/709,126 [our Dkt. 7552/85663-Reissue-A] -- agenda for telephone interview scheduled for August 18, 10am

Mr. Teng,

I've set up an audio conference for the interview.

Please follow these instructions when connecting:

Dial **571-273-0000**

When prompted, enter the:
Meeting Number followed by the pound key: **26671#**
Attendee Access Code followed by the pound key: **46671#**

The other USPTO participants will be Gay Spahn (Supervisory Reexamination Specialist) and Glenn Dawson (Reexamination Specialist).

The interview will be limited to 30 minutes per MPEP 713.01.

Peter English
USPTO
Art Unit 3993

From: Paul Teng <PTENG@COOPERDUNHAM.COM>
Sent: Monday, August 16, 2021 1:02 PM
To: English, Peter <Peter.English@USPTO.GOV>
Subject: Reissue Application No. 16/709,126 [our Dkt. 7552/85663-Reissue-A] -- agenda for telephone interview scheduled for August 18, 10am

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Examiner,

The date and time (Weds., August 18, 10am) proposed in the message you left on my voicemail works fine for me.

Please find attached an agenda for the telephone interview.

Unless you tell me otherwise, I will call from you at 571-272-6671 on August 18, 10am.

Thank you.

Paul Teng
COOPER & DUNHAM LLP
90 Park Avenue, 21st Floor
New York, NY 10016
Tel.: (212) 278-0400
Email: PTeng@cooperdunham.com
Mobile: (516) 424-5401

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Dkt. 7552/85663-Reissue-A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Ross Pirtle

Applicant: RAILWARE, INC.

Reissue Application No.: 16/709,126 filed December 10, 2019 Art Unit: 3993

Original Patent No.: 9,403,545 granted on August 2, 2016 Examiner: Peter English

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

Confirmation No.: 1509

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R. § 1.132 OF ROSS PIRTLE

Sir:

I, Ross Pirtle, hereby declare as follows:

1. I am the inventor of the invention for which reissue of a patent is sought in the above-identified United States Reissue Patent Application. I have been active in the computer software or programming profession for over thirty years.

2. It is my understanding that each of claims 23, 24, 26 and 36 of the above-identified Reissue Patent Application has been rejected by the United States Patent and Trademark Office (USPTO) for the reason that the specification of the patent for which reissue is sought allegedly does not adequately describe components of, and an algorithm for, a voice interface part.

3. Based on my experience, a person skilled in the art looking to implement the claimed railway control apparatus would not have needed to engage in undue experimentation to implement an algorithm for a voice or speech interface because numerous ready-made voice or speech interface code were available at the time of filing via a DLL (Dynamic Link Library) or

library of routines.

4. For example, as shown in the attached document entitled "C# -Voice/Speech to text -Stack Overflow" (January 2011), the mindset of a programmer when developing or writing code for a software application more than ten years ago was to seek existing code via an API (application programming interface) or library when there is a need for converting voice/speech into text (and for converting text to speech).

5. Further, the attached document entitled ".NET – What is the difference between System.Speech.Recognition and Microsoft.Speech.Recognition?" (June 2010) shows that such DLLs were available and employed both for server code development as well as client code development.

6. In addition, the attached document entitled "Speech Input API for Android" (March 2010) shows that such approach was employed for non-Microsoft platforms as well.

7. Thus, persons skilled in the art, such as application developers, were aware of, and routinely resorted to, DLLs and libraries of routines, via an SDK (software development kit) or otherwise, for implementing the disclosed voice interface part regardless of the platform for which the application was being developed.

I hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: October 8, 2021

/Ross Pirtle/
Ross Pirtle

Voice/Speech to text [closed]

Asked 10 years, 8 months ago Active 9 years, 1 month ago Viewed 45k times

18

Closed. This question does not meet Stack Overflow guidelines. It is not currently accepting answers.

Want to improve this question? Update the question so it's on-topic for Stack Overflow.

Closed 5 years ago.

Improve this question

I need an API or library (preferably free) that will convert voice/speech through a microphone, into text (string).

Additionally, I will need an API or library that can do text-to-speech.

I'd like to use C# and .NET, but other languages will suffice.

Thanks.

c# .net speech-recognition voice-recognition speech-to-text

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asked Jan 13 '11 at 6:40
charles_bar
255 1 4 6

6 Answers

Active Oldest Votes

15

You can use CMU Sphinx as it is pretty open and scalable solution and I think it can be used at both client and server side:

http://cmusphinx.sourceforge.net/

If you are looking for a Microsoft desktop solution then you can use SAPI:

http://msdn.microsoft.com/en-us/magazine/cc163663.aspx

On server side, you can use Microsoft Unified Communication, but do consider licencing as well:

http://www.microsoft.com/uc/en/gb/default.aspx

Update:

This thread has also some good reference:

C# Speech Recognition - Is this what the user said?

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edited May 23 '17 at 11:54
Community Bot
1 1

answered Jan 13 '11 at 7:28
ShahidAzim
1,326 1 9 15

Just updated answer with one more link. – ShahidAzim Jan 13 '11 at 7:37

1 You don't need UCS if you only need speech recognition on Windows Server. You can download the free Microsoft Speech Platform - microsoft.com/downloads/en/... – Michael Levy Jan 14 '11 at 21:42

I didn't know about that, thanks for your post and it looks interesting. – ShahidAzim Jan 18 '11 at 16:51

Here is a complete example using C# and System.Speech for converting from speech to text

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WABTEC EX1002

Step 1: Configuring the SpeechRecognitionEngine

```
_speechRecognitionEngine = new SpeechRecognitionEngine();
_speechRecognitionEngine.SetInputToDefaultAudioDevice();
_dictationGrammar = new DictationGrammar();
_speechRecognitionEngine.LoadGrammar(_dictationGrammar);
_speechRecognitionEngine.RecognizeAsync(RecognizeMode.Multiple);
```

At this point your object is ready to start transcribing audio from the microphone. You need to handle some events though, in order to actually get access to the results.

Step 2: Handling the SpeechRecognitionEngine Events

```
_speechRecognitionEngine.SpeechRecognized -= new EventHandler(SpeechRecognized); _speechRecognitionEngine.SpeechHypothesized
-= new EventHandler(SpeechHypothesizing);

_speechRecognitionEngine.SpeechRecognized += new EventHandler(SpeechRecognized);
_speechRecognitionEngine.SpeechHypothesized += new EventHandler(SpeechHypothesizing);

private void SpeechHypothesizing(object sender, SpeechHypothesizedEventArgs e) { ///real-time results from the engine string
realTimeResults = e.Result.Text; }

private void SpeechRecognized(object sender, SpeechRecognizedEventArgs e) { ///final answer from the engine string finalAnswer =
e.Result.Text; }
```

That's it. If you want to use a pre-recorded .wav file instead of a microphone, you would use

```
_speechRecognitionEngine.SetInputToWaveFile(pathToTargetWavFile);
```

instead of

```
_speechRecognitionEngine.SetInputToDefaultAudioDevice();
```

There are a bunch of different options in these classes and they are worth exploring in more detail.

http://ellismis.com/2012/03/17/converting-or-transcribing-audio-to-text-using-c-and-net-system-speech/

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answered Mar 17 '12 at 12:13



builtorious
7,739 3 47 74

can we use SpeechRecognitionEngine for android applications using MONO Framework??? – Awais Tariq Jun 20 '12 at 7:47

Nope. Need some Visual Studio for that. – builtorious Jun 21 '12 at 1:47

1 @builtorious Incorrect. Mono is a Linux emulator for .NET, so yes, this will work with Mono. *Also: Visual Studio is an IDE, not a programming language.* – AlBlopher Apr 3 '17 at 16:25 ✓

See Using c++ to call and use Windows Speech Recognition

2 Which says:

Microsoft provides speech recognition engines for both client and server versions of Windows. Both can be programmed with C++ or with .NET languages. The traditional API for programming in C++ is known as SAPI. The .NET framework namepsaces for client and server speech are System.Speech and Microsoft.Speech.

SAPI documentation

WABTEC EX1002

Lots of earlier questions have addressed this. See Prototype based on speech recognition , getting started with speech recognition and speech synthesis , and SAPI and Windows 7 Problem for examples.

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edited May 23 '17 at 12:17 Community Bot 1 1

answered Jan 14 '11 at 21:29 Michael Levy 13.8k 15 60 96

I'd like to use C# and .NET, but other languages will suffice. Check this if you are open to C++ Festival

-1

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answered Jan 13 '11 at 6:48 Mahesh 32.8k 17 82 112

There is a builtin DLL in every Windows OS for Text2Speach. You will find the according dll in c:\Programs\Shared Folders\Microsoft Shared\Speech\sapi.dll (sAPI - speach api) - I am not quite sure about the path - but in anyway you may search for sapi.dll.

-1

Afterwards you may use the following code snippet

```
SpVoice oVoice = new SpVoice();
oVoice.Voice = oVoice.GetVoices("","").Item(0); // 0 indicating what kind of speaker
you want
oVoice.Volume = 50;
oVoice.Speak("hello world", SpeechVoiceSpeakFlags.SVSFDefault);
oVoice = null;
```

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answered Jan 13 '11 at 7:01 Pilgerstorfer Franz 8,163 3 39 51

This is the path for Win7 C:\Windows\System32\Speech\Common – Serkan Hekimoglu Jan 13 '11 at 7:36

Speech to Text... not the other way around. – Rob Hay Sep 12 '11 at 7:32

1 @RobHay "Additionally, I will need an API or library that can do text-to-speech" so I think my answer is - at least - partially correct. – Pilgerstorfer Franz Jul 28 '12 at 12:12

For text to speech conversion you have to follow 3 steps:

-1

1.Add System.Speech reference.

2.Add Headers;

using System.Speech;

using System.Speech.Synthesis;

3.Add the following code where textBox1 is a Text Box default name.

```
SpeechSynthesizer speaker = new SpeechSynthesizer();
speaker.Rate = 1;
speaker.Volume = 100;
speaker.Speak(textBox1.Text);
```

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answered Feb 6 '12 at 9:23 Rishi Jagati 606 1 6 28

works perfectly, this should be an accepted answer ;) – hdoghmen May 16 '15 at 13:21

5 Except it is going the opposite direction from the question; instead of speech-to-text, this shows text-to-speech. – B. Clay Shannon Apr 12 '16 at 15:36

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WABTEC EX1002

What is the difference between System.Speech.Recognition and Microsoft.Speech.Recognition?

Asked 11 years, 3 months ago Active 8 years ago Viewed 46k times

80

42

There are two similar namespaces and assemblies for speech recognition in .NET. I'm trying to understand the differences and when it is appropriate to use one or the other.

There is System.Speech.Recognition from the assembly System.Speech (in System.Speech.dll). System.Speech.dll is a core DLL in the .NET Framework class library 3.0 and later

There is also Microsoft.Speech.Recognition from the assembly Microsoft.Speech (in microsoft.speech.dll). Microsoft.Speech.dll is part of the UCMA 2.0 SDK

I find the docs confusing and I have the following questions:

System.Speech.Recognition says it is for "The Windows Desktop Speech Technology", does this mean it cannot be used on a server OS or cannot be used for high scale applications?

The UCMA 2.0 Speech SDK (http://msdn.microsoft.com/en-us/library/dd266408%28v=office.13%29.aspx) says that it requires Microsoft Office Communications Server 2007 R2 as a prerequisite. However, I've been told at conferences and meetings that if I do not require OCS features like presence and workflow I can use the UCMA 2.0 Speech API without OCS. Is this true?

If I'm building a simple recognition app for a server application (say I wanted to automatically transcribe voice mails) and I don't need features of OCS, what are the differences between the two APIs?

.net speech-recognition speech ucma2.0 ocs

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asked Jun 4 '10 at 19:54
Michael Levy
12.8k 15 65 98

4 Answers

Active Oldest Votes

103

The short answer is that Microsoft.Speech.Recognition uses the Server version of SAPI, while System.Speech.Recognition uses the Desktop version of SAPI.

The APIs are mostly the same, but the underlying engines are different. Typically, the Server engine is designed to accept telephone-quality audio for command & control applications; the Desktop engine is designed to accept higher-quality audio for both command & control and dictation applications.

You can use System.Speech.Recognition on a server OS, but it's not designed to scale nearly as well as Microsoft.Speech.Recognition.

The differences are that the Server engine won't need training, and will work with lower-quality audio, but will have a lower recognition quality than the Desktop engine.

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answered Jun 6 '10 at 2:39
Eric Brown
13.4k 7 29 68

53

I found Eric's answer really helpful, I just wanted to add some more details that I found.

System.Speech.Recognition can be used to program the desktop recognizers. SAPI and Desktop recognizers have shipped in the products:

- Windows XP: SAPI v5.1 and no recognizer
- Windows XP Tablet Edition: SAPI v5.1 and Recognizer v6.1
- Windows Vista: SAPI v5.3 and Recognizer v8.0
- Windows 7: SAPI v5.4 and Recognizer v8.0?

Servers come with SAPI, but no recognizer.

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- Windows Server 2003: SAPI v5.1 and no recognizer
- Windows Server 2008 and 2008 R2: SAPI v5.3? and no recognizer

Desktop recognizers have also shipped in products like office.

- Microsoft Office 2003: Recognizer v6.1

Microsoft.Speech.Recognition can be used to program the server recognizers. Server recognizers have shipped in the products:

- Speech Server (various versions)
- Office Communications Server (OCS) (various versions)
- UCMA – which is a managed API for OCS that (I believe) included a redistributable recognizer
- Microsoft Server Speech Platform – recognizer v10.2

The complete SDK for the Microsoft Server Speech Platform 10.2 version is available at http://www.microsoft.com/downloads/en/details.aspx?FamilyID=1b1604d3-4f66-4241-9a21-90a294a5c9a4. The speech engine is a free download. Version 11 is now available at http://www.microsoft.com/download/en/details.aspx?id=27226.

For Microsoft Speech Platform SDK 11 info and downloads, see:

- Language packs - http://www.microsoft.com/en-us/download/details.aspx?id=27224
- Runtime engine - http://www.microsoft.com/en-us/download/details.aspx?id=27225
- SDK - http://www.microsoft.com/en-us/download/details.aspx?id=27226
- MSDN Documentation - http://msdn.microsoft.com/en-us/library/hh361408

Desktop recognizers are designed to run inproc or shared. Shared recognizers are useful on the desktop where voice commands are used to control any open applications. Server recognizers can only run inproc. Inproc recognizers are used when a single application uses the recognizer or when wav files or audio streams need to be recognized (shared recognizers can't process audio files, just audio from input devices).

Only Desktop speech recognizers include a dictation grammar (system provided grammar used for free text dictation). The class System.Speech.Recognition.DictationGrammar has no complement in the Microsoft.Speech namespace.

You can use use the APIs to query determine your installed recongizers

- Desktop: System.Speech.Recognition.SpeechRecognitionEngine.InstalledRecognizers()
- Server: Microsoft.Speech.Recognition.SpeechRecognitionEngine.InstalledRecognizers()

I found that I can also see what recognizers are installed by looking at the registry keys:

- Desktop recognizers: HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Speech\Recognizers\Tokens
- Server recognizers: HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Speech Server\v10.0\Recognizers\Tokens

--- Update ---

As discussed in Microsoft Speech Recognition - what reference do I have to add?, Microsoft.Speech is also the API used for the Kinect recognizer. This is documented in the MSDN article http://msdn.microsoft.com/en-us/library/hh855387.aspx

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edited May 23 '17 at 12:17 — Community Bot — 1 1

answered Jun 8 '10 at 15:50 — Michael Levy — 12.6k 15 60 98

3 If I read the docs correctly, only Desktop speech recognizers include the dictation grammar (system provided grammar used for free text dictation). The class System.Speech.Recognition.DictationGrammar has no complement in the Microsoft.Speech namespace. – Michael Levy Jun 14 '10 at 22:49

According do MSDN API there is a DictationGrammar and a WildcardGrammar in C# (and I use it). But I don't know how to activate it through XML (hacking parser ?) see also: stackoverflow.com/questions/12101120/... – Jean-Philippe Encausse Sep 25 '12 at 20:51

I installed Italian language downloaded from microsoft.com/en-us/download/details.aspx?id=27224 but System.Speech.Recognition.SpeechRecognitionEngine.InstalledRecognizers shows en-US as only active language for speech recognition. I miss something? – P.G.W. Nov 13 '20 at 11:41

Here is the link for the Speech Library (MS Server Speech Platform):

7 Microsoft Server Speech Platform 10.1 Released (SR and TTS in 26 languages)

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edited Feb 19 '14 at 9:54
Nikolay Shmyrev
24k 5 38 85

answered Oct 1 '10 at 19:02
Switch Commerce
169 2 4

2 10.2 was released recently too. microsoft.com/downloads/en/... – Michael Levy Oct 2 '10 at 17:22

Thanks for the info. I see that now includes a grammar validator. I was breaking my head trying to find errors in the ones I'm creating. Where should I keep watching for news about future releases? – Switch Commerce Oct 4 '10 at 18:19

"Where should I keep watching for news about future releases?" is a great question!!! microsoft.com/speech/developer.aspx is out of date. The speech blogs like blogs.msdn.com/b/speak and blogs.msdn.com/b/speech don't always have the latest updates. You might try gotspeech.net or the related sites like speech.net. But as you can see, I haven't found a great source to keep up to date either. – Michael Levy Oct 5 '10 at 19:49

1 most recent at the time of writing is version 11 - microsoft.com/en-us/download/details.aspx?id=27226 – George Birbilis Sep 1 '15 at 16:05

btw, since grammar validator was mentioned above, see msdn.microsoft.com/en-us/library/hh378407%28v=office.14%29.aspx for a list of grammar tools – George Birbilis Jan 4 '16 at 22:16

5 Seems Microsoft wrote an article that clears things up regarding the differences between Microsoft Speech Platform and Windows SAPI - https://msdn.microsoft.com/en-us/library/jj127858.aspx. A difference I found myself while converting Speech recognition code for Kinect from Microsoft.Speech to System.Speech (see https://github.com/birbilis/HotSpotizer) was that the former supports SGRS grammars with tag-format=semantics/1.0-literals, while the latter doesn't and you have to convert to semantics/1.0 by changing x to out="x"; at tags

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answered Sep 9 '15 at 20:55
George Birbilis
2,340 2 26 33

3 btw, you may find my SpeechLib code useful (Speechlib.codeplex.com). You can remove the System.Speech reference from there and use Microsoft.Speech instead and set the appropriate conditional compilation symbol (see the sources) to use Microsoft.Speech in the code (mostly affects the using clauses, rest of the code is identical) – George Birbilis Jan 4 '16 at 22:04

1 the SpeechLib mentioned at the above comment has moved to github.com/Xamarcon/SpeechLib (since Codeplex is freezed to archive mode now) – George Birbilis May 17 '18 at 11:14

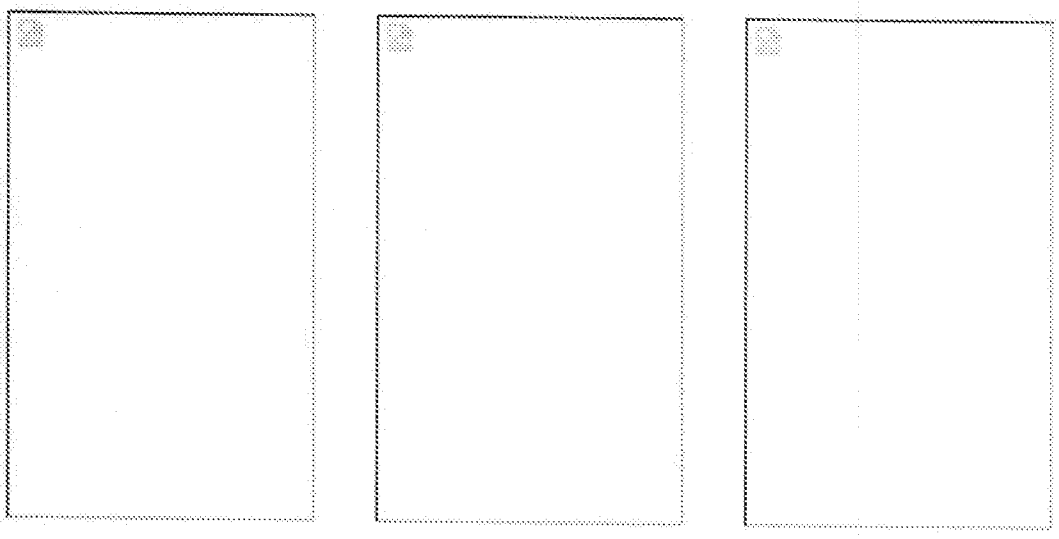
WABTEC EX1002

Speech Input API for Android

05 March 2010

People love their mobile phones because they can stay in touch wherever they are. That means not just talking, but e-mailing, texting, microblogging, and so on. So, in addition to search by voice and voice shortcuts like "Navigate to", we included a voice-enabled keyboard in Android 2.1, which makes it even easier to stay connected. Now you can dictate your message instead of typing it. Just tap the new microphone button on the keyboard, and you can speak just about anywhere you would normally type.

We believe speech can fundamentally change the mobile experience. We would like to invite every Android application developer to consider integrating speech input capabilities via the Android SDK. One of my favorite apps in the Market that integrates speech input is Handcent SMS, because you can dictate a reply to any SMS with a quick tap on the SMS popup window.



Speech input integrated into Handcent SMS

The Android SDK makes it easy to integrate speech input directly into your own

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recognition service on the device that's registered to receive a `RecognizerIntent`. Google's Voice Search application, which is pre-installed on many Android devices, responds to a `RecognizerIntent` by displaying the "Speak now" dialog and streaming audio to Google's servers—the same servers used when a user taps the microphone button on the search widget or the voice-enabled keyboard. (You can check if Voice Search is installed in `Settings → Applications → Manage applications`.)

One important tip: for speech input to be as accurate as possible, it's helpful to have an idea of what words are likely to be spoken. While a message like "Mom, I'm writing you this message with my voice!" might be appropriate for an email or SMS message, you're probably more likely to say something like "weather in Mountain View" if you're using Google Search. You can make sure your users have the best experience possible by requesting the appropriate *language model*: "free_form" for dictation, or "web_search" for shorter, search-like phrases. We developed the "free form" model to improve dictation accuracy for the voice keyboard on the Nexus One, while the "web search" model is used when users want to search by voice.

Google's servers currently support English, Mandarin Chinese, and Japanese. The web search model is available in all three languages, while free-form has primarily been optimized for English. As we work hard to support more models in more languages, and to improve the accuracy of the speech recognition technology we use in our products, Android developers who integrate speech capabilities directly into their applications can reap the benefits as well.



Labels: Android 2.1 , IME , Speech Input , Text and Input



Global Google developer blogs

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Amendments to the Specification

Please amend the Cross-Reference to Relation Applications section, at column 1, lines 3-9, of the subject U.S. patent (No. 9,403,545) for which reissue is sought, in the following manner (with markings indicating changes relative to said patent):

CROSS-REFERENCE TO RELATED APPLICATIONS [APPLICATION]

[This application] Notice: The following multiple reissue applications have been filed for reissue of U.S. Patent No. 9,403,545:

(1) Reissue Application No. 15/928,955 filed on March 22, 2018 and reissued as U.S. Reissue Patent No. RE47,835;

(2) This Reissue Application 16/709,126, filed on December 10, 2019, which is a reissue continuation of Reissue Application No. 15/928,955.

U.S. Patent No. 9,403,545 claims the benefit of U.S. Provisional Application No. 61/893,547, filed Oct. 21, 2013 and entitled "SYSTEM, APPARATUS AND METHOD FOR RAILWAY TRAFFIC CONTROL".

Please amend the paragraph at column 5, lines 47-54, in the following manner:

The code generator 101B is configured to produce a removal or release code, such as a cipher which is random, [pseudo-random,] secret, etc., and stored on the computer [terminal]. A new random cipher may be generated for each instance of traffic blocking. This removal or release code is then sent to [another terminal] terminals belonging to the railway personnel who are scheduled to travel, inspect or work on the specific rails being blocked.

Please amend the paragraphs at column 8, lines 58-63, in the following manner:

FIG. 10 shows an exemplary illustration of a message sent by the railway traffic control [terminal] apparatus 105 to a terminal 103 at a corresponding address of a maintenance worker assigned to work on a blocked track. The message is meant to deliver the release code to the maintenance worker assigned to work on a blocked

track. In addition to relaying the code, the message may include, but not limited to, information regarding the section of track that is being blocked, the date and time that the track was blocked, who initiated the track block, and links to quickly respond to the message. By selecting one of the links embedded in the message, the terminal 103 sends the release code to the railway traffic control [terminal] apparatus 105. The code can be transmitted through, but not limited to, text message, e-mail or voice message. In the present embodiment being illustrated, the terminal 103 is depicted as a mobile phone. The terminal 103 could be any communication device such as, but not limited to, mobile phone or smartphone, tablet, [WIC (or another)] pager, PDA, etc.

Amendments to the Claims

Please amend the claims, in the following manner.

Claims 1-19 (canceled).

20. (previously added; amended) A railway control apparatus for centralized control of a centrally controllable railway network including plural railways and a plurality of railway interlocks dispersed in said plural railways, comprising:

a processor for controlling a plurality of track sections in the railway network, wherein each track section is associated with a corresponding interlock and is disposed in any of said plural railways of said railway network that is managed by centralized control operation from the railway control apparatus, the processor controlling, by said centralized control operation, one or more interlocks amongst the plurality of railway interlocks dispersed in said plural railways of said railway network, to block railway traffic to one or more specified track sections; and

a memory device storing computer-executable instructions, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:

receive a selection of at least one track section amongst the plurality of track sections;

transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the selected track section by said centralized control operation from the railway control apparatus;

generate a secret code associated with the at least one selected track section; and

transmit the secret code to a remote user terminal.

21. (previously added; amended) The railway control apparatus of claim 20, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to store the secret code in the memory device.

22. (previously added; amended) The railway control apparatus of claim 21, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:

receive a second secret code;

determine that the second secret code and the secret code stored in the memory device are the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are the same, release the block on the at least one selected track section.

23. (previously added) The railway control apparatus of claim 22, wherein the second secret code is received in the form of a voice message.

24. (previously added; amended) The railway control apparatus of claim 23, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to extract the second secret code from the voice message.

25. (previously added; amended) The railway control apparatus of claim 21, wherein execution of the computer-executable instructions by the processor causes the railway control

apparatus to:

receive a second secret code;

determine that the second secret code and the secret code stored in the memory device are not the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the at least one selected track section.

26. (previously added; amended) The railway control apparatus of claim 20, wherein the secret code is transmitted to the remote user terminal by messaging or email.

27. (previously added; amended) The railway control apparatus of claim 20, wherein the remote user terminal is a mobile phone, a smartphone, a tablet computer, a pager, or a personal digital assistant, and execution of the computer-executable instructions by the processor causes the railway control apparatus to transmit the secret code to said mobile phone, smartphone, tablet computer, pager, or personal digital assistant.

28. (previously added; amended) A railway control apparatus comprising:

a processor for controlling a plurality of track sections in a railway network, wherein each track section is associated with a corresponding interlock; and

a memory device storing computer-executable instructions, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:

receive a selection of at least one track section amongst the plurality of track sections;

responsive to receiving the selection of the at least one track section, determine that the at least one selected track section has an existing block;

receive a signal from the corresponding interlock of the at least one selected track section that a new block can be established;

responsive to receiving the signal that a new block can be established, transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the at least one selected track section;

generate a secret code associated with the at least one selected track section; and

transmit the secret code to a remote user terminal.

29. (previously added; amended) The railway control apparatus of claim 20, further comprising:

a network interface, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to transmit the secret code to the remote user terminal via the network interface.

30. (previously added; amended) The railway control apparatus of claim 20, wherein only the railway control apparatus and the remote user terminal receive the secret code.

31. (previously added; amended) The railway control apparatus of claim 20, wherein the secret code is generated by a random process.

32. (previously added; amended) The railway control apparatus of claim 20, further

comprising:

a rail personnel database comprising information related to a plurality of rail personnel;

wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:

retrieve specific personnel data from the rail personnel database; and

determine an electronic address of the remote user terminal to which the secret code is to be transmitted.

33. (previously added; amended) A method comprising:

receiving, by a processor, a selection of at least one selected track section in a centrally controlled railway network, wherein each track section corresponds to an interlock;

responsive to receiving the selection of the at least one selected track section, determining, by the processor, that the at least one selected track section has an existing block;

receiving, by the processor, a signal from the corresponding interlock of the at least one selected track section that a new block can be established;

responsive to receiving the signal that a new block can be established, transmitting, by the processor, a block signal to the corresponding interlock of the selected at least one selected track section to place a block on the selected at least one selected track section;

generating, by the processor, a secret code associated with the selected at least one selected track section;

transmitting, by the processor, the secret code to a remote user terminal.

34. (previously added) The method of claim 33, further comprising:

storing the secret code in a memory device.

35. (previously added; amended) The method of claim 34, further comprising:

receiving, by the processor, a second secret code;

determining, by the processor, that the second secret code and the secret code stored in the memory device are the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are the same, releasing, by the processor, the block on the selected at least one selected track section.

36. (previously added) The method of claim 35, wherein the second secret code is received in the form of a voice message, and further comprising:

extracting, by the processor, the second secret code from the voice message.

37. (previously added; amended) The method of claim 34, further comprising:

receiving, by the processor, a second secret code;

determining, by the processor, that the second secret code and the secret code stored in the memory device are not the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the selected at least one selected track section.

38. (previously added; amended) The method of claim 33, wherein only the processor

and the remote user terminal receive the secret code.

39. (previously added; amended) The method of claim 33, further comprising:

retrieving, by the processor, specific personnel data from a rail personnel database; and

determining, by the processor, an electronic address of the remote user terminal to which the secret code is to be transmitted.

REMARKS

Firstly, applicant sincerely thanks the Examiner (Peter English), Supervisory Patent Examiner (SPE) Gay Spahn and Primary Examiner Glenn Dawson for the courtesies extended to the undersigned in the telephone interview conducted on August 18, 2021 in connection with the subject reissue application.

This reissue application for reissue of U.S. Patent No. 9,403,545 was filed with new claims 20-39 which were presented by Preliminary Amendment filed concurrently with the reissue application on December 10, 2019. Patent claims 1-19 were canceled by said Preliminary Amendment filed concurrently with this reissue application. By the present Amendment, each of claims 20-22, 24-33, 35 and 37-39 has been amended to address various formal issues and/or otherwise clarify the subject matter claimed thereby, and claim 28 has been amended by rewriting it in independent form. As evident from the citation of support indicated in the section (entitled "Support For Claim Changes") below, such claim amendments are duly supported in the patent disclosure. Accordingly, entry of the amendments is respectfully requested.

Upon entry of this Amendment, claims 20-39 remain pending in this reissue application, and claims 20, 28 and 33 would be in independent form.

SUPPORT FOR CLAIM CHANGES

Pursuant to 37 C.F.R. § 1.173(c), an explanation of support, which can be found (without limitation) in the drawings and specification (column:line) of U.S. Patent No. 9,403,545, for amended claims 20-22, 24-25, 28-32 and 38 is set forth in the following table (wherein markings indicate the changes to the claims, with brackets delimiting terms deleted, and underlining indicating terms added).

claims	support in patent disclosure [column:line(s)]
20. A railway control apparatus for centralized control of a centrally controllable railway network including plural railways and a plurality of railway interlocks dispersed in said plural railways, comprising:	
a processor for controlling a plurality of track sections in [a] the railway network, wherein each track section is associated with a corresponding interlock and is disposed in any of said plural railways of said railway network that is managed by centralized control operation from the railway control apparatus, the processor controlling, by said centralized control operation, one or more interlocks amongst the plurality of railway interlocks dispersed in said plural railways of said railway network, to block railway traffic to one or more specified track sections; and	5:29-46; 7:10-20; Fig. 5.
a memory device storing [one or more programs of executable] computer-executable instructions, wherein execution of the [one or more programs causes] computer-executable instructions by the processor causes the railway control apparatus to:	303; 5:21-28.
receive a selection of at least one track section amongst the plurality of track sections;	Figs. 6 and 12; 9:8-11.
transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the selected track section by said centralized control operation from the railway control apparatus;	9:11-16.
generate a secret code associated with the at least one selected track section; and	9:16-18.
transmit the secret code to a remote user terminal.	9:52-54.
21. The railway control apparatus of claim 20, wherein execution of the [one or more programs causes] computer-executable instructions by the processor causes the railway control apparatus to store the secret code in the memory device.	6:33-44; 9:16-18.
22. The railway control apparatus of claim 21, wherein execution of the [one or more programs causes] computer-executable instructions by the processor causes the railway control apparatus to:	6:33-44.

receive a second secret code;	10:6.
determine that the second secret code and the secret code stored in the memory device are the same; and	10:7-9.
responsive to determining that the second secret code and the secret code stored in the memory device are the same, release the block on the at least one selected track section.	7:6-9.
23. The railway control apparatus of claim 22, wherein the second secret code is received in the form of a voice message.	3:22-24; 8:53.
24. The railway control apparatus of claim 23, wherein execution of the [one or more programs causes] computer-executable instructions by the processor causes the railway control apparatus to extract the second secret code from the voice message.	3:22-24.
25. The railway control apparatus of claim 21, wherein execution of the [one or more programs causes] computer-executable instructions by the processor causes the railway control apparatus to:	6:33-44.
receive a second secret code;	10:6.
determine that the second secret code and the secret code stored in the memory device are not the same; and	Fig. 13, S1309, "NO; 10:9-11.
responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the at least one selected track section.	Fig. 13; 10-51-55.
26. The railway control apparatus of claim 20, wherein the secret code is transmitted to the remote user terminal by [text message,] messaging or email [, or voice message].	2:55-57; 3:12-14; 8:50-53.

27. The railway control apparatus of claim 20, wherein the remote user terminal is a mobile phone, a smartphone, a tablet computer, a pager, or a personal digital assistant, and execution of the computer-executable instructions by the processor causes the railway control apparatus to transmit the secret code to said mobile phone, smartphone, tablet computer, pager, or personal digital assistant.	10:53-57.
28. [The] A railway control apparatus [of claim 20] comprising:	
a processor for controlling a plurality of track sections in a railway network, wherein each track section is associated with a corresponding interlock; and	5:29-46; 7:10-20; Fig. 5.
a memory device storing computer-executable instructions, wherein execution of the [one or more programs causes to:] computer-executable instructions by the processor causes the railway control apparatus to:	303; 5:21-28; Fig. 12.
receive a selection of at least one track section amongst the plurality of track sections;	Figs. 6 and 12; 9:8-11.
responsive to receiving the selection of the at least one selected track section [one or more track sections], determine that the at least one selected track section has an existing block;	9:9-21.
receive a signal from the corresponding interlock of the at least one selected track section that a new block can be established; [and]	9:38-43.
responsive to receiving the signal that a new block can be established, [permit the block to be placed] transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the at least one selected track section;	9:11-16, 43-44
generate a secret code associated with the at least one selected track section; and	9:16-18
transmit the secret code to a remote user terminal.	9:52-54
29. The railway control apparatus of claim 20, further comprising: a network interface, wherein execution of the [one or more programs causes] computer-executable instructions by the processor causes the railway control apparatus to transmit the secret code to the remote user terminal via the network interface.	6:41-44; 11:14-17.

30. The railway control apparatus of claim 20, wherein [the secret code is transmitted] only [to] the railway control apparatus and the remote user terminal receive the secret code.	6:61-67.
31. The railway control apparatus of claim 20, wherein the secret code is generated by a random [or pseudorandom] process.	5:47-49
32. The railway control apparatus of claim 20, further comprising:	
a rail personnel database comprising information related to a plurality of rail personnel;	104
wherein execution of the [one or more programs causes] computer-executable instructions by the processor causes the railway control apparatus to:	
retrieve specific personnel data from the rail personnel database; and	6:48-56.
determine an electronic address of the remote user terminal to which the secret code is to be transmitted.	12:46-50.
33. A method comprising:	
receiving, by a processor, a selection of at least one track section in a centrally controlled railway network, wherein each track section corresponds to an interlock;	Figs. 6 and 12; 9:8-11.
responsive to receiving the selection of the at least one selected track section, determining, by the processor, that the at least one selected track section has an existing block;	
receiving, by the processor, a signal from the corresponding interlock of the at least one selected track section that a new block can be established;	
responsive to receiving the signal that a new block can be established, transmitting, by the processor, a block signal to the corresponding interlock of the [selected one or more track sections] at least one selected track section to place a block on the [selected one or more track sections] at least one selected track section;	9:11-16.
generating, by the processor, a secret code associated with the [selected one or more track sections] at least one selected track section;	9:16-18.

transmitting, by the processor, the secret code to a remote user terminal.	9:52-54.
34. The method of claim 33, further comprising: storing the secret code in a memory device.	6:33-44; 9:16-18.
35. The method of claim 34 [33], further comprising:	6:33-44.
receiving, by the processor, a second secret code;	10:6.
determining, by the processor, that the second secret code and the secret code stored in the memory device are the same; and	10:7-9.
responsive to determining that the second secret code and the secret code stored in the memory device are the same, releasing, by the processor, the block on the [selected one or more track sections] at least one selected track section.	7:6-9.
36. The method of claim 35, wherein the second secret code is received in the form of a voice message, and further comprising:	3:22-24; 8:53.
extracting, by the processor, the second secret code from the voice message.	3:22-24.
37. The method of claim 34 [33], further comprising:	
receiving, by the processor, a second secret code;	10:6.
determining, by the processor, that the second secret code and the secret code stored in the memory device are not the same; and	Fig. 13, S1309, "NO; 10:9-11.
responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the [selected one or more track sections] at least one selected track section.	Fig. 13; 10-51-55.
38. The method of claim 33, wherein [the processor transmits the secret code to] only the processor and the remote user terminal receive the secret code.	6:61-67.
39. The method of claim 33 [32], further comprising:	

retrieving, by the processor, specific personnel data from a rail personnel database; and	6:48-56.
determining, by the processor, an electronic address of the remote user terminal to which the secret code is to be transmitted.	12:46-50.

specification

The May 26, 2021 Office Action (section 3 thereof) indicates that the amendment filed on May 7, 2020 was objected to and that the amended cross-reference to related applications should refer to "(2) ***This*** Reissue Application 16/709,126 ..." In addition, the May 26, 2021 Office Action (section 17 thereof) indicates that the amendments filed during prosecution of original Application No. 14/519,727 were objected to under 35 U.S.C. 132(a), including that there is allegedly no support in the original disclosure for "... a removal or release code, such as a cipher which is ... ***pseudo-random*** ..." (column 5, line 49), nor purportedly for "... any communication device such as, but not limited to, ... WIC ***or another*** pager ..." (column 8, line 57).

In this Amendment, the specification has been amended as required.

Regarding the term "random" as used in the original application, it is respectfully pointed out that a cypher or code, generated by a code generator (e.g., computer hardware and/or software), although said to be random or randomly generated, is understood in the art (as appreciated by the Patent Office examiner who examined the original application) to encompass "pseudo-random codes" which do not appear to embody any definite pattern but might actually consist of a deterministic sequence, e.g., determinable based on a "seed" and the algorithm used to generate the code.

Regarding reference to "pager" at column 8, line 57, it is respectfully noted that the person of ordinary skill in the art (POSA) would understand, and the Patent Office examiner who

examined the original application understood, the original disclosure (reproduced below) corresponding to column 8, lines 53-57, as providing a list of examples which is clearly inclusive (as evident by use of the phrases "*including but not limited to*" and "etc." in connection therewith) and not exclusive.

> "... it should be understood that the subject matter of this disclosure can be utilized by any computing device *including but not limited to* PDAs, cell phones, personal, notebook and workstation computers, kiosks, other information terminals, WIC pager *etc.* ..."

Withdrawal of the aforementioned objection is respectfully requested.

formal issues as to claims

The May 26, 2021 Office Action (in sections 4-16, 21 and 21,) indicates that the claim amendments filed on December 10, 2019 were objected to under 35 U.S.C. 132(a) and under 35 U.S.C. 251, as purportedly introducing new matter, and more specifically, that there is allegedly no support in the original disclosure for "... execution of the one ***or more programs*** causes the processor..." (claims 20-22, 24-25, 28-29 and 32), nor purportedly for "... the secret code is transmitted to the remote user terminal by text message, email , ***or voice message***" (claim 26), nor purportedly for "... the secret code is transmitted ***only*** *to the remote user terminal*" (claim 30) or "... the processor transmits the secret code *to* ***only*** *the remote user terminal*" (claim 38), nor purportedly for "... the secret code is generated by a random ***or pseudorandom*** process", and consequently the Office Action (sections 20-21 thereof) rejects claims 20-32 and 38 under 35 U.S.C. 251 as purportedly being based upon new matter added to the patent for which reissue is sought, and the Office Action (section 23 thereof) rejects claims 20-32, 36 and 38 under 35 U.S.C. §112(a) as purportedly failing to comply with the written description requirement, and the Office Action (section 24 thereof) rejects claims 20-32 and 36 under 35 U.S.C. §112(a) as

purportedly failing to comply with the written description requirement and/or the enablement requirement. The May 26, 2021 Office Action (in sections 21, 23 and 24) also indicates that claims 20-32 and 38 were rejected under 35 U.S.C. 251, as purportedly being based on new matter, claims 20-32, 36 and 38 were rejected under 35 U.S.C. §112(a) as purportedly failing to comply with the written description requirement, and claims 20-32 and 36 were rejected under 35 U.S.C. §112(a) as purportedly failing to comply with the written description requirement and/or the enablement requirement. In section 27 of the Office Action, claims 27, 28 and 33-39 were rejected under 35 U.S.C. §112(b) as purportedly indefinite.

In this Amendment, each of the aforementioned claims has been amended as required.

In claim 20, "... storing ***one or more programs*** *of executable instructions*, wherein execution of ***the one or more programs*** causes the processor" has been replaced by "... storing ***computer-executable instructions***, wherein execution of ***the computer-executable instructions*** by the processor ...", and in claims 21-22, 24-25, 28-29 and 32, "... execution of the ***one or more programs*** causes the processor ..." has been replaced by "... execution of the ***computer-executable instructions*** by the processor ..." Such claim amendments were proposed in the telephone interview conducted on August 18, 2021. As understood, such amendments overcome or avoid the objections as to the term "execution of one or more programs".

The Office Action refers to various suggestions in the patent disclosure that the subject matter of this patent disclosure can be computer implemented.

For example, as a prelude to the detailed description provided in the subject patent, it is pointed out at, e.g., column 4, lines 35-39 (reproduced below), that:

> "... examples of implementations of the subject matter of this patent disclosure in several computing environments. However, it should be understood that the subject matter of this disclosure can be utilized by any computing device..."

Further, the summary provided at column 2, lines 42-53 (reproduced below), points out the subject matter of this patent disclosure can largely be computer implemented:

> "For example, a centralized railway control system may be adapted (such as via computer hardware, software, or a combination) to include providing on a user terminal a user interface including a block placing part to place a block on one or more specified track sections to permit a railway field worker to enter the track sections while blocking railway traffic to said track sections, generating a removal code and transmitting the removal code to the electronic contact address of the railway field worker, and permitting the block to the track sections to be removed only upon entry of the removal code in the centralized railway control system. Such process may be largely automated via programming ..."

The detailed description provided in the subject patent likewise suggests, e.g., at column 5, lines 21-28, and column 6, lines (reproduced below),with reference to Figs. 3A-3B, that the apparatuses and methods in such subject matter can be computer implemented:

> "Fig. 2 shows a terminal 100A which is configured (such as via one or more *programs of instructions executable by a processor* of a computer or another electronic device) with a railway traffic blocking apparatus 101 ... The terminal 100A can be any electronic device including a processor, storage and display, such as shown by way of examples in Figs. 3A and 3B.
>
> ...
>
> Fig. 3B shows an exemplary constitution of a computer 300 which can be configured by appropriate programming to operate as the railway traffic control apparatus 105 (Fig. 1A). The computer 300 shown in Fig. 3B includes a processor 302, and various elements connected to the processor 302 by an internal bus 301, such as a memory 303, display 304, keyboard 305 and network interface 306..."

As such, applicant maintains that the original/patent disclosure provides adequate support for the subject matter claimed in the present application, since the person skilled in the art guided by the original/patent disclosure would understand that the various aspects of such computer-implemented subject matter would be obtainable via execution of instructions executable by a processor.

In claim 26, "... the secret code is transmitted to the remote user terminal by [ext

message, email, or voice message ..." has been replaced by "... the secret code is transmitted to the remote user terminal by messaging or email ...", as disclosed in the original application, at page 7, lines 8-10.

In claim 30, "... the secret code is transmitted only to the remote user terminal ..." has been replaced by "... only the railway control apparatus and the remote user terminal receive the secret code ...", consistent with the disclosure in the original application, at page 18, lines 15-17. Similarly, in claim 38, "... the processor transmits the secret code to only the remote user terminal ..." has been replaced by "... only the processor and the remote user terminal receive the secret code ..." Applicant maintains, however, that this amendment does not alter the scope of this claim. As the processor in the claimed embodiment *generates* the secret code, it does not, strictly speaking, *receive* the secret code. The only device that receives the secret code from the processor in the claimed embodiment is the remote user terminal.

In claim 31, "... the secret code is generated by a random or pseudorandom process ..." has been replaced by "... the secret code is generated by a random process ..." However, as discussed *supra*, a cypher or code, said to be generated by a random process, is understood in the art to encompass "pseudo-random codes" which do not appear to embody any definite pattern but might actually consist of a deterministic sequence, e.g., determinable based on knowledge of the "seed" and algorithm used in the process.

In section 25 of the Office Action, claims 23, 24, 26 and 36 were rejected under 35 U.S.C. §112(a) as purportedly failing to comply with the written description requirement and/or the enablement requirement. More specifically, the Office Action (top of page 12) states as follows:

> Thus, the original disclosure indicates that: (a) the railway field worker can use a voice interface part of the field worker terminal 103 to orally enter the removal code in the form of a voice message; and (b) the RTC terminal 105 has a voice interface part for processing the voice message received from the field worker terminal 103 and extracting the removal code from the voice message.
>
> However, the original disclosure provides no description of the specific components of the required voice interface parts. The disclosure also fails to provide a specific description of the specific algorithms, i.e., the specific steps or flowcharts, defined by software and executed by the processors of the field worker terminal 103 and the RTC terminal 105 to perform the claimed functions transmitting a secret code via a voice message and extracting the secret code from the voice message. When a claim defines the invention in functional language specifying a desired result, the specification must sufficiently identify how the function is performed and/or the desired result is achieved. Applicant has not met this requirement for the subject matter of claims 23, 24, 26 and 36.

Applicant respectfully points out that the patent disclosure additionally states, in the Brief Summary section thereof (and reflecting the original written description), as follows:

> "... In another aspect ... a voice or speech interface part may be disposed on the system-side to process a voice message (such as received via a telephone call from the railway field worker, extract the removal code from the voice message ..." (column 3, lines 3-24).

Thus, applicant maintains that the patent disclosure provides adequate written description that the invention can encompass instances in which the secret code is received via a voice message from the railway worker.

Regarding the voice or speech interface part, applicant respectfully points out (as discussed) that a person of ordinary skill in the art (POSA) at the time of filing would have known that a typical user interface on a computer or terminal would employ various input/output software provisions from a library of standard routines. Such provision from a library can typically include, amongst others, a voice or speech interface, as pointed out in the subject

patent, at column 6, lines 10-17 (reproduced below).

> ... In the example of **Fig. 3A**, terminal device 200 includes a controller (or processor) 202 that communicates with a number of other components, including storage 203, display 204, input/output (such as mouse, touchpad, stylus, microphone and/or speaker with voice/speech interface and/or recognition software, etc.) 205 and a network interface 206, by way of an internal bus 201.

A Declaration Under 37 C.F.R. § 1.132 is submitted herewith to establish that the person skilled in the art looking to implement the claimed railway control apparatus would not have needed to engage in undue experimentation to implement an algorithm for a voice or speech interface because numerous ready-made voice or speech interface code were available at the time of filing via a DLL (Dynamic Link Library) or library of routines, such as provided in an SDK (software development kit) or otherwise.

Thus, persons skilled in the art, such as application developers, would not need guidance as to an algorithm that is used in a voice or speech interface, since they were aware of, and routinely resorted to, DLLs and libraries of routines, via an SDK (software development kit) or otherwise, for implementing the disclosed voice interface part regardless of the platform for which the application was being developed.

Accordingly, applicant maintains that the requirements under 35 U.S.C. §112(a) as to claims 23, 24, 26 and 36 have been met in the present instance.

cited art

In the Office Action (section 33 thereof), claims 20-23, 25-27, 29-31, 33-35, 37 and 38 were rejected under 35 U.S.C. § 102(a)(1) as purportedly anticipated by Rahn et al. (EP 1 308 366 B1) or, in the alternative, under 35 U.S.C. § 103 as purportedly unpatentable over Rahn. In section 34 of the Office Action, claims 32 and 39 were rejected as purportedly unpatentable over Rahn in view of Tamaribuchi et al. (US 2012/0176217 A1).

However, applicant respectfully submits that the cited art does not disclose or suggest the aspects, as recited in amended claim 20, of a railway control apparatus for *centralized control of a centrally controllable railway network including plural railways and a plurality of railway interlocks dispersed in the plural railways*, comprising ... controlling a plurality of track sections in the railway network, wherein each track section is associated with a corresponding interlock and is disposed in any of the plural railways of the railway network that is managed by centralized control operation from the railway control apparatus, *the processor controlling, by the centralized control operation, one or more interlocks amongst the plurality of railway interlocks dispersed in the plural railways of the railway network, to block railway traffic to one or more specified track sections*; and ... transmit a block signal to the corresponding interlock associated with the at least one selected track section, to *place a block on the selected track section by the centralized control operation from the railway control apparatus* ...

As discussed during examination of parent Reissue Application No. 15/928,955 (of which the present application is a continuation), the apparatus shown in Figs. 1 and 2 of Rahn, as understood by applicant, does ***NOT*** perform centralized control of a centrally controllable railway network including plural railways and a plurality of railway interlocks dispersed in the plural railways, ***NOR*** does such apparatus proposed by Rahn control, by centralized control operation, one or more interlocks amongst the plurality of railway interlocks dispersed in the plural railways of the railway network, to block railway traffic to one or more specified track sections ..., ***NOR*** does such apparatus proposed by Rahn place a block on the selected track section by centralized control operation from the railway control apparatus .

Instead, as previously pointed out, what Rahn deems to be its invention is a device that, based on detection of an approaching train, warns work crews on a railway track and that

includes:

(a) an interface to an existing (i.e. conventional) CBI (computer-based interlocking) or electronic interlocking unit or module and
(b) an interface with a radio network (e.g., GSM).

Operation of the device proposed by Rahn, including interaction with the CBI or interlocking unit, is described in Rahn, [0009] (reproduced below, with emphasis added). Such arrangement is also summarized in each of paragraphs [0006] and [0008] of Rahn, and in independent claims 1 and 7.

> **[0009]** The device according to the invention for warning work crews is characterized in that provision is made of an interface with an electronic interlocking module and of an interface with a radio network, that the device is suitable for receiving information about at least one train from the electronic interlocking module and comparing it with stored information about at least one construction site area, and that the device is suitable, for the case in which a train is approaching a construction site area, for automatically sending out a warning signal via the radio interface to at least one radio telephone, the call number of which is stored in the device. The information about a current construction site, e.g., date, time, track section, is input in the device before it is put in operation. ***The operator (station master) of the CBI unit blocks the relevant track section for the input time period, e.g., 8 o'clock to 10 o'clock or 7 o'clock to whenever.*** Track workers who are in the danger zone during the time period are warned via the warning signal about the approaching train. The warning signal is sent out by radio; at least one track worker, e.g., the construction site foreman, has a radio telephone by means of which he can receive the warning signal.

As pointed out in Rahn, [0008], one device is needed per interlocking unit. The CBI interface listens in on the data stream, at the interlocking unit, of train information which is data (e.g., position of each train) and is NOT command, and based on comparison of the data with stored information which was entered previously regarding nearby construction site area (i.e. workers working near the railway track), determines when a train is approaching such work area and issues a warning of approaching train, if necessary, to the workers at the nearby work area.

Such device proposed by Rahm is specific, as an interface, to a corresponding CBI unit

and does ***NOT*** ... perform centralized control of a centrally controllable railway network including plural railways and a plurality of railway interlocks dispersed in the plural railways.

In the arrangement proposed by Rahn, the command to the interlocking unit is, as is in typical conventional systems, supplied from an operator terminal (8 in Fig. 1) which is coupled to the device via a local area network (LAN) or serial interface (e.g., USB) connection (see Rahn, [0023]). Such operator terminal, even if (and applicant does ***NOT*** concede that) it is arranged to issue commands to multiple interlocking units, likewise is ***NOT*** a railway control apparatus that performs ***centralized*** *control of a centrally controllable railway network including plural railways and a plurality of railway interlocks dispersed in the plural railways*. Instead, the operator terminal is clearly configured for localized command of the interlocking unit.

As such, ***neither*** the device proposed by Rahn ***nor*** the operator terminal is a railway control apparatus that *controls, by centralized control operation, one or more interlocks amongst the plurality of railway interlocks dispersed in the plural railways of the railway network, to block railway traffic to one or more specified track sections*.

Likewise, ***neither*** the device proposed by Rahn ***nor*** the operator terminal is a railway control apparatus that places a block on the selected track section by centralized control operation from the railway control apparatus.

Rahn, [0007] (reproduced below), refers to the European Train Control System (ETCS) and to use of the RBC (Radio Block Center).

> **[0007]** The invention is particularly suited for use in the new ETCS (ETCS = European Train Control System). In the case of ETCS Level 3, ***the CBI unit can be replaced by an RBC*** and the CBI operator terminal can be replaced by an RBC operator terminal (RBC = Radio Block Center). In contrast to CBI units, in which information about the trains is transmitted by means of axle counters and electric and/or fiber optic cables, in the case of RBCs the information about the trains is transmitted directly to the RBC via radio (by means of GSM-R) by the trains, wherein the trains read in information via balises.

However, in the Radio Block Center (RBC) arrangement to which Rahn refers, the RBC replaces the CBI or interlocking unit and the RBC communicates directly with the onboard computer on the train. The RBC in such arrangement proposed by Rahn does ***NOT*** control each interlock amongst the plurality of railway interlocks dispersed in said plural railways of said railway network, to block railway traffic to the specified track sections. It is submitted that the person of ordinary skill in the art (POSA) would understand Rahn as suggesting instead that control, including blocking control, in such arrangement would entail direct communication by the RBC with the train.

Further, Rahn proposes the use of Transaction Authentication Numbers (TANs), as discussed in Rahn, [0029]-[0030] and [0033] (reproduced below), to authenticate the radio communication between (a) the work crew (or more specifically, the foreman of the work crew) and (b) the user (also referred to in Rahn as "station master") of the operator terminal through which the interlocking unit is locally controlled.

> **[0029]** If a construction site is to be set up on the track, the track in question is input via an input means (e.g., computer mouse or keyboard) on the CBI interface module. In addition, an A-cell phone is selected for the construction site and the call number of the A-cell phone is stored together with the construction site track. Furthermore, a number of so-called TANs are advantageously generated in the CBI interface module via a random number program, printed out, and stored together with the call number of the A-cell phone. The ***foreman in charge of the construction site takes the printed-out TAN list with him*** to the construction site. ***For security reasons there is no electronic transmission of TANs because the connection could be bugged.*** If a second construction site is set up on the same interlocking unit, then for this construction site the call number of another selected A-cell phone and the construction site track or tracks will also be stored and a list with new TANs will also be generated, printed out, and stored, wherein the CBI interface module will not accept any TANs that coincidentally also exist in the first construction site. In a preferred embodiment, the call numbers of the B-cell phones associated with the A-cell phone are stored in addition to the call number of the A-cell phone so that a collective call can be made.
>
> **[0030]** If the construction site concerns several, for example sequentially

> arranged, track sections (e.g., mobile construction site) or if several construction sites on different track sections are to be worked on one after another, then separate TANs will be assigned and read out for each track section. The last TAN of a track section then permanently cancels the blocking of this section. ***When the work on the track section in question is complete, the construction site foreman therefore radios the last TAN to the station master***. Instead of the last one, another TAN of the TANs assigned to the track section in question can also be used as a signal for canceling the blocking.
>
> **...**
>
> **[0033]** In the method according to the invention, the construction site foreman in question only needs to communicate once with the station master upon the start of the construction work. Afterwards all warning processes run automatically. In this communication, the foreman informs the station master of the start of the work and the station master blocks the line. The station master can also specify the time of the blocking and cancellation of the blocking via radio for a single construction site in the same way as described for a mobile construction site. This line will be blocked for passage by a normal input in the CBI operator terminal 8. In the CBI unit, this line can be marked as blocked, provided with an identifier, and displayed on the operating monitor. The identifier reads, for example, RO1 for work crew (Ger.: *Rotte*) 1 and RO2 for work crew 2, etc.

Thus, according to Rahn, the list of TANs is printed out and the printed list is provided to the foreman. The requirement of printing the list was due to, as Rahn explicitly communicates, mistrust by Rahn of electronic transmission security and not due to the lack technological know-how to transmit such list by electronic transmission. Thus, applicant maintains that Rahn ***teaches away*** from practicing the aforementioned aspects of amended claim 20.

As MPEP 2143 points out, "[w]hen the prior art teaches away from combining certain known elements, discovery of successful means of combining them is more likely to be ***nonobvious***", citing *KSR,* 550 U.S. at 416, 82 USPQ2d at 1395.

Applicant submits that the cited art, even when considered along with common sense and common knowledge to one skilled in the art, does ***NOT*** render unpatentable the aforementioned aspects of amended claim 20 and that therefore, each of independent claim 20 and any claims depending therefrom is submitted to be allowable over the cited art.

Claims 28 and 33

None of the references were cited against the aspects recited in claim 28 which formerly depended from claim 20. By this amendment, claim 28 has been amended into independent form. It is submitted that independent apparatus claim 28 is allowable over the cited art.

Independent method claim 33 has been amended to include aspects similar to such aspects that were recited in formerly-dependent claim 28 and therefore each of amended claim 33 and any claims depending therefrom is submitted to be allowable over the cited art as well.

non-statutory obviousness-type double patenting

In section 37 of the Office Action, claims 20-39 were rejected on the ground of non-statutory obviousness-type double patenting as purportedly unpatentable over claims 1-8 of commonly-owned U.S. Patent No. 9,517,782. In section 38 of the Office Action, claims 20-39 were rejected on the ground of non-statutory obviousness-type double patenting as purportedly unpatentable over claims 1-7, 9-16 and 18-41 of commonly-owned U.S. Patent No. RE47,835.

Terminal Disclaimers over Patent No. 9,517,782 and Patent No. RE47,835, respectively, are submitted concurrently herewith, thus obviating the non-statutory obviousness-type double patenting rejections. The Patent Office is hereby authorized to charge the sum of $340.00 for the statutory disclaimer fee for the two Terminal Disclaimers (2x$160.00) to Deposit Account No. 03-3125.

Withdrawal of the obviousness-type double patenting rejection is respectfully requested.

Application Data Sheet

The May 26, 2021 Office Action (in section 19) indicates that the Application Data Sheet (ADS) must be corrected such that the Applicant Information therein, as required by 37 CFR 1.172(a) and 37 CFR 1.46(b), indicates the assignee as the applicant in this reissue application.

A supplemental Application Data Sheet is submitted concurrently herewith, to identify the Assignee as Applicant of this reissue application.

additional remarks

Applicant earnestly solicits the allowance of the application. If another amendment is needed to advance this application to condition for allowance, the Examiner is respectfully requested to call the undersigned attorney.

If an extension of time is required to make this response timely, this paper should be considered to be a petition for such an extension of time. The Patent Office is hereby authorized to charge any required fees in connection with this response, to Deposit Account No. 03-3125.

Respectfully submitted,

/Paul Teng/

Paul Teng, Reg. No. 40,837
Attorney for Applicant
90 Park Avenue, 21st Floor
New York, New York 10016
Tel.: (212) 278-0400

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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 7552/65863-Reissue-A

In re Application of: RAILWARE, INC.

Application No.: 16/709,126

Filed: December 10, 2019

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

The applicant, RAILWARE, INC., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 9,517,782 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for any during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

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is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☑ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☐ The undersigned is an attorney or agent of record. Reg. No. _____

/Ross Pirtle/ — Signature
October 8, 2021 — Date

Ross Pirtle — Typed or printed name

President — Title
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☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 7552/85683-Reissue-A

In re Application of: RAILWARE, INC.

Application No.: 16/709,126

Filed: December 10, 2019

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

The applicant, RAILWARE, INC., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. RE47,835 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for any during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☑ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☐ The undersigned is an attorney or agent of record. Reg. No. _____

/Ross Pirtle/ — Signature
October 8, 2021 — Date

Ross Pirtle — Typed or printed name

President — Title
_____ — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16709126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Ross		Pirtle	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Commack	State/Province	NY	Country of Residence	US

Mailing Address of Inventor:

Address 1	c/o Railware, Inc.
Address 2	750 Veterans Memorial Hwy, Suite 200

City	Hauppauge	State/Province	NY
Postal Code	11788	Country i	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence information of this application.

Customer Number	23432
Email Address	Add Email Remove Email

Application Information:

Title of the Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL		
Attorney Docket Number	7552/85663-Reissue-A	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	11	Suggested Figure for Publication (if any)	

WABTEC EX1002

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16709126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	23432		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16709126	Continuation of	15928955	2018-03-22	RE47835	2020-02-04

WABTEC EX1002

PTO/AIA/14 (02-18)
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	Application Number	16709126
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	Ross		Pirtle	

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City	Hauppauge	State/Province	NY
Postal Code	11788	Country	US

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Title of the Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL		
Attorney Docket Number	7552/85663-Reissue-A	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16709126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

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Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

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When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16709126	Continuation of	15928955	2018-03-22	RE47835	2020-02-04

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16709126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15928955	reissued of	14519727	2014-10-21	9403545	2016-08-02
Prior Application Status	Expired			Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
14519727	Claims benefit of provisional	61893547	2013-10-21		
Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16709126	reissued of	14519727	2014-10-21	9403545	2016-08-02

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[1] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[1]	Filing Date (YYYY-MM-DD)	Access Code[1] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16709126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant must opt-out of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is ONLY reviewed and processed with the INITIAL filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant DOES NOT authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant DOES NOT authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16709126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

(◉) Assignee	( ) Legal Representative under 35 U.S.C. 117	( ) Joint Inventor
( ) Person to whom the inventor is obligated to assign.	( ) Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	RAILWARE, INC.		
Mailing Address Information For Applicant:			
Address 1	750 Veterans Memorial Hwy, Suite 200		
Address 2			
City	Hauppauge	**State/Province**	NY
Country	US	Postal Code	11788
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	7552/85663-Reissue-A
	Application Number	16709126
Title of Invention	TOOLS FOR RAILWAY TRAFFIC CONTROL	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	RAILWARE, INC.

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	750 Veterans Memorial Hwy, Suite 200		
Address 2			
City	Hauppauge	**State/Province**	NY
Country i	US	Postal Code	11788
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet must be signed by a patent practitioner if one or more of the applicants is a juristic entity (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, all joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of all joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Paul Teng/			Date (YYYY-MM-DD)	2021-10-09
First Name	Paul	Last Name	Teng	Registration Number	40837

Additional Signature may be generated within this form by selecting the Add button.

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Electronic Patent Application Fee Transmittal

Application Number:	16709126
Filing Date:	10-Dec-2019
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross Pirtle
Filer:	Paul Teng
Attorney Docket Number:	7552/85663-Reissue-A

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 2 months with $0 paid	1252	1	640	640
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	1814	2	170	340
		Total in USD ($)		**980**

Electronic Acknowledgement Receipt

EFS ID:	43991907
Application Number:	16709126
International Application Number:	
Confirmation Number:	1509
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross Pirtle
Customer Number:	23432
Filer:	Paul Teng
Filer Authorized By:	
Attorney Docket Number:	7552/85663-Reissue-A
Receipt Date:	09-OCT-2021
Filing Date:	10-DEC-2019
Time Stamp:	14:39:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$980
RAM confirmation Number	E202109E40294960
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		PetitionForTwoMonthsExtensionAndAmendment2021May26nonfinalOfficeAction_85663-Reissue-A.pdf	265360 b09866f7eecd12cf9d2d34f109cea984060fce3b	yes	30

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Extension of Time	1	1
	Amendment/Req. Reconsideration-After Non-Final Reject	2	30

Warnings:					
Information:					
2	Affidavit-traversing rejectns or objectns rule 132	Rule132DeclarationAndSupportingDocuments.pdf	2096134 fb356fa24f2970494b1130e4ec0f86e629ed0301	no	11
Warnings:					
Information:					
3	Terminal Disclaimer Filed	TerminalDisclaimerOverUS9517782.pdf	274186 9ed615fe647c4c609cb57f0c8ae6ee947719951b	no	1
Warnings:					
Information:					
4	Terminal Disclaimer Filed	TerminalDisclaimerOverRE47835.pdf	275558 3aaf2ccf501fb61026b13e43c4df2f5b912ded0e	no	1
Warnings:					
Information:					
5	Application Data Sheet	16709126_2ndSupplApplicationDataSheet.pdf	2643209 91293905741d553ee1f73eb488fa57537446b2ef	no	9
Warnings:					
Information:					

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This is not an USPTO supplied ADS fillable form					
6	Fee Worksheet (SB06)	fee-info.pdf	40644 ab1c76e57afa0a51a5ee54418ff2ba4a255f21fb	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	5595091	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Dkt. 7552/85663-Reissue-A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Ross Pirtle

Applicant: RAILWARE, INC.

Reissue Application No.: 16/709,126 filed December 10, 2019 Art Unit: 3993

Original Patent No.: 9,403,545 granted on August 2, 2016 Examiner: Peter English

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

Confirmation No.: 1509

This correspondence is being filed electronically via the Electronic Filing System (EFS) with the U.S. Patent and Trademark Office (USPTO).

October 9, 2021

Date

90 Park Avenue, 21st Floor
New York, New York 10016
Tel.: (212) 278-0400

Commissioner for Patents
Alexandria, VA 22313-1450

SUMMARY OF TELEPHONE INTERVIEW WITH EXAMINER, PETITION FOR TWO-MONTHS EXTENSION OF TIME, AND AMENDMENT IN RESPONSE TO MAY 26, 2021 NON-FINAL OFFICE ACTION IN REISSUE APPLICATION

Sir:

This Amendment is submitted in response to the non-final Office Action dated May 26, 2021, in connection with the subject application. Applicant hereby petitions for an extension of time of two months, to extend the due date to October 26, 2021, for responding to the May 26, 2021 non-final Office Action. The Patent Office is hereby authorized to charge the $640.00 statutory extension fee for the two-month extension of time, to Deposit Account No. 03-3125.

Amendments to the Specification begin on page 2 of this paper. Amendments to the Claims begin on page 4 of this paper. **Remarks** begin on page 11 of this paper.

A Declaration Under 37 C.F.R. § 1.132 of Ross Pirtle is submitted herewith. Further, Terminal Disclaimers over Patent No. 9,517,782 and Patent No. RE47,835, respectively, are submitted concurrently herewith. In addition, a supplemental Application Data Sheet is submitted concurrently herewith, to identify the Assignee as Applicant.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
* 16/709,126 *	16/709,126	Pirtle, Ross	
	Examiner	**Art Unit**	
	ENGLISH, PETER C	3993	

Document Code - DISQ	**Internal Document - DO NOT MAIL**

TERMINAL DISCLAIMER	☑ APPROVED	☐ DISAPPROVED
Date Filed: **09 October 2021**	**This patent is subject to a Terminal Disclaimer**	

Approved/Disapproved by:

/PAMELA A YOUNG/

Technology Center: OPLC

Telephone: (571)272-3622

2 TD

WABTEC EX1002

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/709,126	12/10/2019	Ross Pirtle	7552/85663-Reissue-A	1509

23432 7590 11/23/2021
c/o COOPER & DUNHAM LLP
90 PARK AVENUE, 21st Fl
NEW YORK, NY 10016

EXAMINER	
ENGLISH, PETER C	

ART UNIT	PAPER NUMBER
3993	

NOTIFICATION DATE	DELIVERY MODE
11/23/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DUSPTO@cooperdunham.com
patcomm-in-grp@cooperdunham.com
pdocketing@cooperdunham.com

WABTEC EX1002

Office Action Summary	Application No. 16/709,126	Applicant(s) Pirtle, Ross	
	Examiner Peter C English	Art Unit 3993	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 09 October 2021.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☑ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 20-39 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 23-24 and 36 is/are rejected.

8) ☑ Claim(s) 20-22,25-35 and 37-39 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☑ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 10 December 2019 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

WABTEC EX1002

DETAILED ACTION

Status of Submissions

1. This Office action is responsive to the applicant's response filed on October 9, 2021, which has been entered.

Objections to Amendments – Formalities

2. The amendments to the specification filed on October 9, 2021 are objected to as failing to comply with 37 CFR 1.173(b)(1). The precise point in the specification must be identified where any added or rewritten paragraph is located.

3. The specification is not amended properly because:

- The rewritten paragraph located at column 8, lines 40-57 is inaccurately identified as being located at "column 8, lines 58-63".

4. The claim amendments filed on October 9, 2021 are objected to as failing to comply with 37 CFR 1.173(b)(2),(d) and (g). All amendments must be made relative to the patent claims in effect as of the filing date of this reissue application, with appropriate status indicators used relative to the patent claims. Further, new claims must be underlined in their entirety.

5. The claims are not amended properly because:

- In claims 20-39, the status indicator "(previously added…" does not properly reflect the status of these claims relative to the patent claims. Rather, the status indicator "(new)" should be used for all new claims.
- New claim 33 is not underlined in its entirety. Note the break in underlining in line 8 of the claim.

6. The amendments must be placed into compliance with 37 CFR 1.173(b)-(g) in response to this Office action.

Application Data Sheet

7. The corrected Application Data Sheet (ADS) filed on October 9, 2021 is acceptable. Therefore, the previous objection to the ADS has been withdrawn.

Claim Rejections - 35 USC § 112(a)

8. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

9. GROUND 1: Claims 23, 24 and 36 fail to comply with the written description requirement of 35 USC 112(a) for the following reasons.

Claim 23 recites "the second secret code is received in the form of a voice message", and claim 24 recites "execution of the computer-executable instructions by the processor causes the railway control apparatus to extract the second secret code from the voice message". Similarly, claim 36 recites "the second secret code is received in the form of a voice message, and further comprising extracting, by the processor, the second secret code from the voice message".

The original disclosure:

- States that "the railway field worker can enter the removal code manually or orally (i.e. including a voice or speech interface part)" (col. 3, ll. 9-11).
- Discloses that "a voice or speech interface part may be disposed on the system-side to process a voice message (such as received via a telephone call from the railway field worker, extract the removal code from the voice message…" (col. 3, ll. 20-24).
- Describes Fig. 10 as showing "an exemplary illustration of a message sent by the railway traffic control terminal 105 to a terminal 103…meant to deliver the release code to the maintenance worker assigned to work on a block track" (col. 8, ll. 40-45).
- Explains that "[by] selecting one of the links embedded in the message, the terminal 103 sends the release code to the railway traffic control terminal 105"

(col. 8, ll. 49-51). That is, the field worker uses the field worker terminal 103 to manually select an embedded link, and the terminal 103 then sends the release code to the RTC terminal 105.

- States that "...the terminal 103 sends the release code to the railway traffic control terminal 105. The code can be transmitted through...text message, e-mail or voice message" (col. 8, ll. 50-53).

Thus, the original disclosure indicates that: (a) the railway field worker can use a voice interface part of the field worker terminal 103 to orally enter the removal code in the form of a voice message; and (b) the RTC terminal 105 has a voice interface part for processing the voice message received from the field worker terminal 103 and extracting the removal code from the voice message.

However, the original disclosure provides no description of the specific components of the required voice interface parts. The disclosure also fails to provide a specific description of the specific algorithms, i.e., the specific steps or flowcharts, defined by software and executed by the processors of the field worker terminal 103 and the RTC terminal 105 to perform the claimed functions of transmitting a secret code via a voice message and extracting the secret code from the voice message. When a claim defines the invention in functional language specifying a desired result, the specification must sufficiently identify how the function is performed and/or the desired result is achieved. Applicant has not met this requirement for the subject matter of claims 23, 24 and 36.

Terminal Disclaimers

10. The terminal disclaimers filed on October 9, 2021 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of U.S. Patent No. 9,517,782 and U.S. Patent No. RE47,835 have been reviewed and are accepted. The terminal disclaimers have been recorded. Accordingly, the prior double patent rejections have been overcome.

Specification

11. The specification is objected to because:

At col. 4, l. 52, "terminal 105" should read "apparatus (i.e., terminal) 105" because element 105 is identified as an "Apparatus" in Figs. 1A, 1B and 2, and because the terms "terminal" and "apparatus" are used interchangeably with reference to element 105 in the specification.

At col. 4, l. 56, "only one terminal" should read "only one terminal 103" because only element 103 is identified as a "Terminal" in Figs. 1A and 1B, but element 105 is also referred to as a "terminal" in the specification.

Appropriate correction is required.

Pertinent Prior Art

12. The following is a listing of the prior art cited in this Office action together with the shorthand reference used for each document:

"Rahn"	EP Publication No. 1 308 366 B1
"Tamaribuchi et al."	US Publication No. 2012/0176217 A1
"Sheardown et al."	US Publication No. 2011/0006912 A1
"Wise"	WO Publication No. 2004/042663 A1
"Seung"	KR Publication No. 10-1008160 B1
"Baines et al."	US Publication No. 2013/0166114 A1

13. The prior art listed above is considered pertinent to applicant's invention.

14. See the detailed discussion of the teachings of Rahn in item 33 (pp. 15-19) of the prior Office action mailed on May 26, 2021.

15. See the detailed discussion of the teachings of Tamaribuchi et al. in item 34 (pp. 20-21) of the prior Office action mailed on May 26, 2021.

16. See the detailed discussion of the teachings of Sheardown et al., Wise, Seung and Baines et al. in items 41-44 (pp. 23-25) of the prior Office action mailed on May 26, 2021.

Allowable Subject Matter

17. Claims 20-22, 25-27 and 29-32 are objected to (see items 4-5 above) but recite allowable subject matter because the prior art fails to teach a computer-implemented railway control apparatus, as defined in claim 20, that performs the functions of (a) receiving a selection of a track section, (b) transmitting a block signal to an interlock associated with the selected track section, (c) generating a secret code associated with the selected track section, and (d) transmitting the secret code to a remote user terminal, wherein the computer-implemented railway control apparatus:

- Provides centralized control of a centrally controllable railway network including plural railways and a plurality of railway interlocks dispersed in the plural railways.
- Comprises a processor for controlling a plurality of track sections in the railway network, wherein each track section is associated with a corresponding interlock and is disposed in any of the plural railways of the railway network that is managed by centralized control operation from the railway control apparatus, the processor controlling, by said centralized control operation, one or more interlocks amongst the plurality of railway interlocks dispersed in the plural railways, to block railway traffic to one or more specified track sections.

18. Claim 28 is objected to (see items 4-5 above) but recites allowable subject matter because the prior art fails to teach a computer-implemented railway control apparatus, as defined in claim 28, that performs the functions of (a) receiving a selection of a track section, (b) responsive to the selection, determining that the selected track section has an existing block, (c) receiving a signal from a corresponding interlock of the selected track section that a new block can be established, (d) responsive to receiving the signal that a new block can be established, transmitting a block signal to the corresponding interlock of the selected track section, (e) generating a secret code associated with the selected track section, and (f) transmitting the secret code to a remote user terminal.

19. Claims 33-35 and 37-39 are objected to (see items 4-5 above) but recite allowable subject matter because the prior art fails to teach a computer-implemented method, as defined in claim

33, that performs the functions of (a) receiving a selection of a track section, (b) responsive to the selection, determining that the selected track section has an existing block, (c) receiving a signal from a corresponding interlock of the selected track section that a new block can be established, (d) responsive to receiving the signal that a new block can be established, transmitting a block signal to the corresponding interlock of the selected track section, (e) generating a secret code associated with the selected track section, and (f) transmitting the secret code to a remote user terminal.

Response to Arguments and Evidence

20. Applicant's arguments and evidence filed on October 9, 2021 have been fully considered. The evidence is in the form of the declaration of Ross Pirtle under 37 CFR 1.132.

21. The applicant argues that the claims have been amended such that they overcome the rejections set forth in the prior Office action mailed on May 26, 2021. The examiner agrees with the exception of current GROUND 1 (see above).

22. With respect to current GROUND 1, applicant argues that a skilled artisan would know to employ various input/output software—including voice recognition software—from a library of standard routines. This argument is not persuasive because (a) it is not supported by any disclosure in the applicant's specification concerning the use of a known library of standard software, and (b) it relates to the enablement requirement rather than the separate written description requirement. See the further explanation below.

DOES THE SPECIFICATION DISCLOSE STRUCTURE THAT ACHIEVES THE CLAIMED FUNCTIONS IN SUFFICIENT DETAIL?

I. Authorities Relied Upon

See the discussion of the following decisions/guidance in the APPENDIX:

- *Ex Parte Smith*
- *Ex parte Jiajun Zhu et al. '727*
- *Ex parte Jiajun Zhu et al. '723*

- The 2109 § 112 Guidance[1]

II.A. For computer-implemented apparatus claims 23 and 24, does the specification adequately disclose the computer and the algorithm(s) that achieve the claimed functions in sufficient detail, i.e., how the inventor intends to achieve the claimed functions?

Claims 23 and 24 require that the claimed computer-implemented apparatus comprises computer-executable instructions that, when executed by the claimed processor, perform the following functions:

Function #1	Receive a second secret code (see claim 22 from which claim 23 depends) in the form of a voice message (see claim 23).
Function #2	Extract the second secret code from the voice message (see claim 24).

Based upon his review of applicant's disclosure, and in consideration of the state of the computer-implemented control system art at the time of applicant's invention, the examiner has found that:

- Based upon the special functions required by claims 23 and 24, the claimed computer-implemented apparatus necessarily comprises a computer system having a particular configuration, i.e., it is specially configured and specially programmed in order to carry out the particular functions that are claimed.
- The applicant's claimed invention is not only a computer-implemented invention, but primarily a software-implemented invention. That is, the distinctive features of the invention arise from the special programming instructions that are necessarily required to be executed by a special purpose computer processor in order to implement the claimed computer-implemented invention and perform the special functions required by the claims.
- A general purpose computer "processor", as recited generically in independent claim 20, does not constitute sufficient structure for performing all of the claimed functions since it lacks the special programming required.

[1] The USPTO guidance entitled "Examining Computer-Implemented Functional Claim Limitations for Compliance With 35 U.S.C. 112", 84 Fed. Reg. 57 (Jan. 7, 2019), which is referred to herein as the "2019 § 112 Guidance".

- Function #1 is not a relatively basic computer-implemented function. Rather, a specific and detailed algorithm is required in order to receive input in the form of a voice message.
- Function #2 is not a relatively basic computer-implemented function. Rather, a complex algorithm is required in order to extract a secret code from a voice message.

In the case of computer-implemented inventions that rely upon special software (special programming) to execute the claimed functions, the structure disclosed in the specification must be more than a general purpose computer or microprocessor. Rather, the specification must adequately disclose the algorithm(s) that achieve the claimed function(s) in sufficient detail, i.e., how the inventor intends to achieve the claimed function(s). The algorithm(s) may be expressed as a mathematical formula, in prose, as a flow chart, or in any other manner that provides sufficient structure. Regardless of the manner in which it is expressed, the algorithm(s), by definition, must constitute a finite sequence of specific logic steps for performing a particular task.

With respect to the algorithm(s) required for performing Function #1 and Function #2, the examiner has found that the disclosure at col. 3, ll. 9-11, col. 3, ll. 20-24, and col. 8, ll. 49-53 provides a broad overview of a voice interface used transmit a removal code from the remote user terminal, and another voice interface used by the railway traffic controller to process the voice message received from the remote user terminal. However, this portion of the disclosure does not define a specific algorithm or step-by-step process for performing each of Function #1 and Function #2.

There is a distinction between language that simply describes the function to be performed and the required disclosure of an algorithm(s) by which it is performed. In other words, it is not enough to disclose desired results or intended outcomes; rather, the means of achieving those results/outcomes must be disclosed in the form of a specific algorithm(s) that describes how the claimed function(s) is performed.

Further, it is not sufficient for the applicant to simply state or later argue that a skilled artisan could theoretically write the necessary algorithm(s) and/or would know what software to employ to accomplish the claimed function(s), i.e., to show that the enablement requirement of 35 U.S.C. 112(a) is met. The inquiry is whether one skilled in the art would understand the

patent specification itself to disclose, in sufficient detail, the necessary software-based algorithm(s) used by applicant for performing the claimed function(s).

In addition, a description that merely renders the invention obvious does not satisfy the written description requirement. Sufficient information must be provided to show that the inventor had possession of the claimed invention, including details about how a disclosed general purpose computer or processor is programmed to achieve the desired outcomes defined by the claimed functions.

Accordingly, with respect to Function #1 and Function #2, the examiner has found that the specification fails to adequately disclose the algorithm(s) that achieve the claimed function(s) in sufficient detail, i.e., how the inventor intends to achieve the claimed function(s).

II.B. For independent computer-implemented method claim 36, does the specification adequately disclose the computer and the algorithm(s) that achieve the claimed functions in sufficient detail, i.e., how the inventor intends to achieve the claimed functions?

Claim 36 recites the same Function #1 and Function #2 as claims 23 and 24. Therefore, the analysis provided above with respect to claims 23 and 24 applies equally to claim 36.

23. The evidence presented by way of the declaration of Ross Pirtle under 37 CFR 1.132 is not persuasive because it addresses the question of enablement[2], but does not pertain to the separate written description requirement. See the further explanation above.

Final Action

24. **THIS ACTION IS MADE FINAL.**

25. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action.

26. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

[2] See item 3 of the declaration, which asserts that a skill artisan "…would not have needed to engage in undue experimentation to implement an algorithm for a voice or speech interface…"

27. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Amendments in Reissue Applications

28. Applicant is notified that any subsequent amendment to the specification, claims or drawings must comply with 37 CFR 1.173(b)-(g).

29. Failure to fully comply with 37 CFR 1.173(b)-(g) will generally result in a notification to applicant that an amendment *before final rejection* is not completely responsive. Such an amendment *after final rejection* will not be entered.

Disclosure Obligations

30. Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which the patent for which reissue is sought is or was involved. These proceedings would include interferences, reissues, reexaminations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP 1404, 1442.01 and 1442.04.

Remarks

31. All correspondence relating to this reissue application should be directed:

By EFS: Registered users may submit via the EFS-Web electronic filing system at: https://efs.uspto.gov/efile/myportal/efs-registered

By Mail[3] to:	Commissioner for Patents United States Patent & Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450
By FAX to:	(571) 273-8300
By hand:	Customer Service Window Randolph Building 401 Dulany Street Alexandria, VA 22314

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter C English whose telephone number is (571)272-6671. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:00 pm EST). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gay A Spahn, can be reached on (571)272-7731. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/PETER C ENGLISH/
Primary Examiner, Art Unit 3993

Conferees: /rds/ and /E.D.L/
SPRS, Art Unit 3993

[3] Mail Stop REISSUE should only be used for the initial filing of reissue applications, and should not be used for any subsequently filed correspondence in reissue applications. See MPEP 1410.

APPENDIX

Discussion of Cases Dealing with Computer-Implemented Functional Claim Limitations and Compliance with 35 U.S.C. 112

Informative PTAB Decision

The Patent Trial and Appeal Board (PTAB) has issued an informative decision that supports the Examiner's finding that the claims do not comply with 35 U.S.C. 112(a).

Ex Parte Smith

In *Ex Parte Smith* (Appeal 2012-007631 decided 14 March 2013),[4] the PTAB construed a claim directed to a computer-implemented method reciting steps set forth using functional language. The PTAB found that the claimed functions could not be executed by a commercially available off-the-shelf (i.e., general purpose) processor without additional programming. The PTAB evaluated whether the specification disclosed an algorithm that transforms a general purpose computer into a special purpose computer that performs the claimed functions. The PTAB found that the specification contained a flow chart and accompanying description that simply restated the claimed functions without conveying to one of ordinary skill in the art how the processor ensured that the claimed functions are performed.

Because the specification failed to disclose an algorithm for performing all of the recited functions, the PTAB concluded that the method claim failed to satisfy the written description requirement of 35 U.S.C. 112(a). The PTAB noted that a description that merely renders the invention obvious does not satisfy the written description requirement. This finding correlates with Part II of the USPTO guidance (herein, the "2019 § 112 Guidance") entitled "Examining Computer-Implemented Functional Claim Limitations for Compliance With 35 U.S.C. 112", 84 Fed. Reg. 57 (Jan. 7, 2019) [5], which (i.e., Part II) addresses computer-implemented functional claim limitations that do not necessarily invoke 35 U.S.C. 112(f).

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[4] Available at: https://www.uspto.gov/sites/default/files/ip/boards/bpai/decisions/inform/ex_parte_smith_fd2012007631.pdf

[5] Available at: https://www.federalregister.gov/documents/2019/01/07/2018-28283/examining-computer-implemented-functional-claim-limitations-for-compliance-with-35-usc-112

Other PTAB Decisions

The PTAB has issued other opinions that, while not designated as precedential or informative, are nevertheless instructive.

***Ex parte Jiajun Zhu et al. '727* (Appeal 2020-005727)**

In *Ex parte Jiajun Zhu et al. '727* (Appeal 2020-005727 decided 04 November 2020),[6] the PTAB considered claims directed to computer-implemented methods reciting steps (i.e., functions) performed by a computing device. Specifically, the PTAB addressed whether such claims comply with the written description requirement of 35 U.S.C. 112(a). In doing so, the PTAB provided a detailed discussion of the 2019 § 112 Guidance. Specifically, the PTAB explained that:

- The 2019 § 112 Guidance addresses examination of computer-implemented functional claims that recite only the idea of a solution or outcome to a problem but fail to recite details of how the solution or outcome is accomplished.[7]
- When examining computer-implemented functional claims (including computer-implemented method claims), the examiner should determine whether the specification discloses the computer and the algorithm(s) that achieve the claimed functions in sufficient detail such that one of ordinary skill in the art can reasonably conclude that the inventor possessed the claimed subject matter at the time of filing.
- It is not enough that a skilled artisan could theoretically write a computer program(s) to achieve the claimed functions because a specification must explain how the inventor intends to achieve the claimed functions to satisfy the written description requirement.
- An algorithm can be expressed in any understandable terms such as in prose or as a flow chart. Recital of actual computer code is not necessary. However, sufficient information must be provided to show that the inventor had possession

[6] Retrievable at: https://developer.uspto.gov/ptab-web/#/search/decisions

[7] See Part II of the 2019 § 112 Guidance, which addresses computer-implemented functional claim limitations that do not necessarily invoke 35 U.S.C. 112(f).

> of the claimed invention. Such "sufficient information" constitutes details about how a disclosed general purpose computer or processor is programmed to achieve the desired outcomes defined by the claimed functions.

In *Ex parte Jiajun Zhu et al. '727*, the PTAB found that the specification described an outline of the desired results that the computer is expected to achieve, but missing from the specification was the algorithm or logic flow or instructions which would explain how a general purpose computer is programmed to perform the claimed functions. Absent the disclosure of the necessary algorithm(s), the specification failed to convey possession of the computer-implemented invention. Accordingly, the PTAB concluded that the claims failed to comply with the written description requirement of 35 U.S.C. 112(a). Thus, computer-implemented functional limitations require the disclosure of the necessary algorithm (i.e., how the claimed functions are achieved) in order to satisfy 35 U.S.C. 112(a).

***Ex parte Jiajun Zhu et al. '723* (Appeal 2020-005723)**

In *Ex parte Jiajun Zhu et al. '723* (Appeal 2020-005723 decided 04 November 2020),[8] the PTAB considered similar claims and made similar findings to those addressed in *Ex parte Jiajun Zhu et al. '727* (discussed above).

[8] Retrievable at: https://developer.uspto.gov/ptab-web/#/search/decisions

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/709,126	Pirtle, Ross
	Examiner	Art Unit
	Peter C English	3993

CPC - Searched*		
Symbol	Date	Examiner
B61L 27/0038, 27/0005, 27/02, 27/00, 23/00, 23/06, 23/10, 19/06, 2019/065, 25/06, 25/08	05/11/2021	/PE/

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Reviewed IFW for PAT 9,403,955, PAT RE47,835 and related PAT 9,517,782	05/11/2021	/PE/
See EAST search in parent 15/928,955 (PAT RE47,835)	05/11/2021	/PE/
PE2E Search (see printout)	05/21/2021	/PE/
Search updated	11/16/2021	/PE/

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

WABTEC EX1002

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/709,126	Filing Date 12/10/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	02/09/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/TYWANA P LOVELACE/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Electronic Acknowledgement Receipt

EFS ID:	44959516
Application Number:	16709126
International Application Number:	
Confirmation Number:	1509
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross Pirtle
Customer Number:	23432
Filer:	Paul Teng
Filer Authorized By:	
Attorney Docket Number:	7552/85663-Reissue-A
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Time Stamp:	18:48:02
Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response After Final Action	16709126_AmendmentInResponseTo2021-11-23finalOfficeAction_85663-Reissue-A.pdf	202170 d9400cc1d66c8da10f9f41213953861176af3cf7	no	17

Warnings:

WABTEC EX1002

Information:	
Total Files Size (in bytes):	202170

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

EXPEDITED PROCEDURE REQUESTED Dkt. 85663-Reissue-A
RESPONSE UNDER 37 C.F.R. § 1.116 TO FINAL REJECTION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Ross Pirtle

Applicant: RAILWARE, INC.

Reissue Application No.: 16/709,126 filed December 10, 2019 Art Unit: 3993

Original Patent No.: 9,403,545 granted on August 2, 2016 Examiner: Peter C. English

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

Confirmation No.: 1509

This correspondence is being filed electronically with the U.S. Patent and Trademark Office (USPTO).

February 9, 2022

Date

90 Park Avenue, 21st Floor
New York, New York 10016
Tel.: (212) 336-8195

Commissioner for Patents
Alexandria, VA 22313-1450

AMENDMENT IN RESPONSE UNDER 37 C.F.R. § 1.116 TO
NOVEMBER 23, 2021 FINAL OFFICE ACTION IN REISSUE APPLICATION

Sir:

This Amendment is submitted in response to the final Office Action dated November 23, 2021, in connection with the subject reissue application.

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims begin on page 4 of this paper.

Remarks begin on page 10 of this paper.

Amendments to the Specification

Please amend the Cross-Reference to Relation Applications section, at column 1, lines 3-9, of the subject U.S. patent (No. 9,403,545) for which reissue is sought, in the following manner (with markings indicating changes relative to said patent):

CROSS-REFERENCE TO RELATED APPLICATIONS [APPLICATION]

[This application] Notice: The following multiple reissue applications have been filed for reissue of U.S. Patent No. 9,403,545:

(1) Reissue Application No. 15/928,955 filed on March 22, 2018 and reissued as U.S. Reissue Patent No. RE47,835;

(2) This Reissue Application 16/709,126, filed on December 10, 2019, which is a reissue continuation of Reissue Application No. 15/928,955.

U.S. Patent No. 9,403,545 claims the benefit of U.S. Provisional Application No. 61/893,547, filed Oct. 21, 2013 and entitled "SYSTEM, APPARATUS AND METHOD FOR RAILWAY TRAFFIC CONTROL".

Please amend the paragraph at column 4, lines 50-60, in the following manner:

FIG. 1A shows schematically an exemplary embodiment in which a system 100A includes a railway traffic control apparatus (i.e., terminal) 105, rail personnel data 104 and a terminal 103, each connected to the network 102. FIG. 1B shows schematically another exemplary embodiment, in which rail personnel contact data 104 is accessed directly by the railway traffic control apparatus 105. While only one terminal 103 is connected to the network 102 in the example shown in FIG. 1A as well as in the example shown in FIG. 1B, it should be appreciated that the network environment can have an arbitrary number of devices (of various types).

Please amend the paragraph at column 5, lines 47-54, in the following manner:

The code generator 101B is configured to produce a removal or release code,

such as a cipher which is random, [pseudo-random,] secret, etc., and stored on the computer [terminal]. A new random cipher may be generated for each instance of traffic blocking. This removal or release code is then sent to [another terminal] terminals belonging to the railway personnel who are scheduled to travel, inspect or work on the specific rails being blocked.

Please amend the paragraphs at column 8, lines 40-63, in the following manner:

FIG. 10 shows an exemplary illustration of a message sent by the railway traffic control [terminal] apparatus 105 to a terminal 103 at a corresponding address of a maintenance worker assigned to work on a blocked track. The message is meant to deliver the release code to the maintenance worker assigned to work on a blocked track. In addition to relaying the code, the message may include, but not limited to, information regarding the section of track that is being blocked, the date and time that the track was blocked, who initiated the track block, and links to quickly respond to the message. By selecting one of the links embedded in the message, the terminal 103 sends the release code to the railway traffic control [terminal] apparatus 105. The code can be transmitted through, but not limited to, text message, e-mail or voice message. In the present embodiment being illustrated, the terminal 103 is depicted as a mobile phone. The terminal 103 could be any communication device such as, but not limited to, mobile phone or smartphone, tablet, [WIC (or another)] pager, PDA, etc.

In another embodiment, once the rail traffic controller unblocks a section of track, the railway traffic control [terminal] apparatus 105 may send a message to the worker, or plurality of workers, associated with working on the previously blocked track in order to inform them that the track has been unblocked and is no longer a safe environment to work in.

Amendments to the Claims

Please amend the claims, in the following manner.

Claims 1-19 (canceled).

20. (new) A railway control apparatus for centralized control of a centrally controllable railway network including plural railways and a plurality of railway interlocks dispersed in said plural railways, comprising:

a processor for controlling a plurality of track sections in the railway network, wherein each track section is associated with a corresponding interlock and is disposed in any of said plural railways of said railway network that is managed by centralized control operation from the railway control apparatus, the processor controlling, by said centralized control operation, one or more interlocks amongst the plurality of railway interlocks dispersed in said plural railways of said railway network, to block railway traffic to one or more specified track sections; and

a memory device storing computer-executable instructions, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:

receive a selection of at least one track section amongst the plurality of track sections;

transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the selected track section by said centralized control operation from the railway control apparatus;

generate a secret code associated with the at least one selected track section; and

transmit the secret code to a remote user terminal.

21. (new) The railway control apparatus of claim 20, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to store the secret code in the memory device.

22. (new) The railway control apparatus of claim 21, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:

receive a second secret code;

determine that the second secret code and the secret code stored in the memory device are the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are the same, release the block on the at least one selected track section.

Claims 23-24 (canceled).

25. (new) The railway control apparatus of claim 21, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:

receive a second secret code;

determine that the second secret code and the secret code stored in the memory device are not the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the at least one selected track section.

26. (new) The railway control apparatus of claim 20, wherein the secret code is transmitted to the remote user terminal by messaging or email.

27. (new) The railway control apparatus of claim 20, wherein the remote user terminal is a mobile phone, a smartphone, a tablet computer, a pager, or a personal digital assistant, and execution of the computer-executable instructions by the processor causes the railway control apparatus to transmit the secret code to said mobile phone, smartphone, tablet computer, pager, or personal digital assistant.

28. (new) A railway control apparatus comprising:

a processor for controlling a plurality of track sections in a railway network, wherein each track section is associated with a corresponding interlock; and

a memory device storing computer-executable instructions, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:

receive a selection of at least one track section amongst the plurality of track sections;

responsive to receiving the selection of the at least one track section, determine that the at least one selected track section has an existing block;

receive a signal from the corresponding interlock of the at least one selected track section that a new block can be established;

responsive to receiving the signal that a new block can be established, transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the at least one selected track section;

generate a secret code associated with the at least one selected track section; and

transmit the secret code to a remote user terminal.

29. (new) The railway control apparatus of claim 20, further comprising:

a network interface, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to transmit the secret code to the remote user terminal via the network interface.

30. (new) The railway control apparatus of claim 20, wherein only the railway control apparatus and the remote user terminal receive the secret code.

31. (new) The railway control apparatus of claim 20, wherein the secret code is generated by a random process.

32. (new) The railway control apparatus of claim 20, further comprising:

a rail personnel database comprising information related to a plurality of rail personnel;

wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:

retrieve specific personnel data from the rail personnel database; and

determine an electronic address of the remote user terminal to which the secret code is to be transmitted.

33. (new) A method comprising:

receiving, by a processor, a selection of at least one selected track section in a centrally controlled railway network, wherein each track section corresponds to an interlock;

responsive to receiving the selection of the at least one selected track section, determining, by the processor, that the at least one selected track section has an existing block;

receiving, by the processor, a signal from the corresponding interlock of the at least one selected track section that a new block can be established;

responsive to receiving the signal that a new block can be established, transmitting, by the processor, a block signal to the corresponding interlock of the selected at least one selected track section to place a block on the selected at least one selected track section;

generating, by the processor, a secret code associated with the selected at least one selected track section;

transmitting, by the processor, the secret code to a remote user terminal.

34. (new) The method of claim 33, further comprising:

storing the secret code in a memory device.

35. (new) The method of claim 34, further comprising:

receiving, by the processor, a second secret code;

determining, by the processor, that the second secret code and the secret code stored in the memory device are the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are the same, releasing, by the processor, the block on the selected at least one selected track section.

Claim 36 (canceled).

37. (new) The method of claim 34, further comprising:

receiving, by the processor, a second secret code;

determining, by the processor, that the second secret code and the secret code stored in the memory device are not the same; and

responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the selected at least one selected track section.

38. (new) The method of claim 33, wherein only the processor and the remote user terminal receive the secret code.

39. (new) The method of claim 33, further comprising:

retrieving, by the processor, specific personnel data from a rail personnel database; and

determining, by the processor, an electronic address of the remote user terminal to which the secret code is to be transmitted.

REMARKS

This application for reissue of U.S. Patent No. 9,403,545 was filed on December 10, 2019 along with a Preliminary Amendment in which patent claims 1-19 were canceled and new claims 20-39 were added (and later each of claims 20-22, 24-33, 35 and 37-39 was amended, via Amendment filed on October 9, 2021). By the present Amendment, claims 23. 24 and 36 have been cancelled, without disclaimer or prejudice to applicant's right to pursue similar claims at a later stage. None of the remaining claims have been amended, but the listing of such claims *supra* now comports with the formal requirements, including as to the status of each of such claims and the underlining of claim 33, in said listing. Since no new matter and no new issues are raised by the amendments nor by said listing, entry of the amendments is respectfully requested. Upon entry of this Amendment, claims 20-22, 25-35 and 37-39 would remain pending in this reissue application, and claims 20, 28 and 33 remain in independent form.

specification

The November 23, 2021 Office Action indicates that the amendments to the specification via the October 9, 2021 Amendment were objected to under 37 CFR 1.173(b)(1). More specifically, the November 23, 2021 Office Action (section 3 thereof) states as follows:

> 3. The specification is not amended properly because:
>
> - The rewritten paragraph located at column 8, lines 40-57 is inaccurately identified as being located at "column 8, lines 58-63".

Since the November 23, 2021 Office Action, as currently understood, seems to indicate that none of said amendments to the specification have been entered, all of the amendments to the specification have been repeated, except that the paragraphs at column 8, lines 40-63 are correctly identified in the Amendments to the Specification section *supra*, in this response.

The November 23, 2021 Office Action (section 11 thereof) also indicates that the specification is objected to for the following reason:

> At col. 4, l. 52, "terminal 105" should read "apparatus (i.e., terminal) 105" because element 105 is identified as an "Apparatus" in Figs. 1A, 1B and 2, and because the terms "terminal" and "apparatus" are used interchangeably with reference to element 105 in the specification.
>
> At col. 4, l. 56, "only one terminal" should read "only one terminal 103" because only element 103 is identified as a "Terminal" in Figs. 1A and 1B, but element 105 is also referred to as a "terminal" in the specification.
>
> Appropriate correction is required.

Accordingly, the paragraph at column 4, lines 50-60, is being amended in accordance with the requirement indicated in the Office Action.

claims

The November 23, 2021 Office Action indicates that the amendments to the claims via the October 9, 2021 Amendment were objected to under 37 CFR 1.173(b)(1). More specifically, the November 23, 2021 Office Action (section 5 thereof) states as follows:

> 5. The claims are not amended properly because:
>
> - In claims 20-39, the status indicator "(previously added…" does not properly reflect the status of these claims relative to the patent claims. Rather, the status indicator "(new)" should be used for all new claims.
> - New claim 33 is not underlined in its entirety. Note the break in underlining in line 8 of the claim.

In addition, the November 23, 2021 Office Action (section 9 thereof) indicates that claims 23, 24 and 36 were rejected under 35 U.S.C. §112(a) as purportedly failing to comply with the written description requirement.

In the Amendments to the Claims section *supra* of this response, claims 23. 24 and 36 have been cancelled, without disclaimer or prejudice to applicant's right to pursue similar claims at a later stage, and the listing of the remaining claims in the Amendments to the Claims section now comports with the formal requirements, including as to the status of each of such claims and the underlining of claim 33.

SUPPORT FOR CLAIMS PENDING

Pursuant to 37 C.F.R. § 1.173(c), an explanation of support, which can be found (without limitation) in the drawings and specification (column:line) of U.S. Patent No. 9,403,545, for amended claims 20-22, 24-25, 28-32 and 38 is set forth in the following table.

claims	support in patent disclosure [column:line(s)]
20. A railway control apparatus for centralized control of a centrally controllable railway network including plural railways and a plurality of railway interlocks dispersed in said plural railways, comprising:	
a processor for controlling a plurality of track sections in the railway network, wherein each track section is associated with a corresponding interlock and is disposed in any of said plural railways of said railway network that is managed by centralized control operation from the railway control apparatus, the processor controlling, by said centralized control operation, one or more interlocks amongst the plurality of railway interlocks dispersed in said plural railways of said railway network, to block railway traffic to one or more specified track sections; and	5:29-46; 7:10-20; Fig. 5.
a memory device storing computer-executable instructions, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:	303; 5:21-28.
receive a selection of at least one track section amongst the plurality of track sections;	Figs. 6 and 12; 9:8-11.

transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the selected track section by said centralized control operation from the railway control apparatus;	9:11-16.
generate a secret code associated with the at least one selected track section; and	9:16-18.
transmit the secret code to a remote user terminal.	9:52-54.
21. The railway control apparatus of claim 20, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to store the secret code in the memory device.	6:33-44; 9:16-18.
22. The railway control apparatus of claim 21, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:	6:33-44.
receive a second secret code;	10:6.
determine that the second secret code and the secret code stored in the memory device are the same; and	10:7-9.
responsive to determining that the second secret code and the secret code stored in the memory device are the same, release the block on the at least one selected track section.	7:6-9.
Claim 23-24 (canceled).	
25. The railway control apparatus of claim 21, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:	6:33-44.
receive a second secret code;	10:6.
determine that the second secret code and the secret code stored in the memory device are not the same; and	Fig. 13, S1309, "NO; 10:9-11.

responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the at least one selected track section.	Fig. 13; 10-51-55.
26. The railway control apparatus of claim 20, wherein the secret code is transmitted to the remote user terminal by messaging or email.	2:55-57; 3:12-14; 8:50-53.
27. The railway control apparatus of claim 20, wherein the remote user terminal is a mobile phone, a smartphone, a tablet computer, a pager, or a personal digital assistant, and execution of the computer-executable instructions by the processor causes the railway control apparatus to transmit the secret code to said mobile phone, smartphone, tablet computer, pager, or personal digital assistant.	10:53-57.
28. A railway control apparatus comprising:	
a processor for controlling a plurality of track sections in a railway network, wherein each track section is associated with a corresponding interlock; and	5:29-46; 7:10-20; Fig. 5.
a memory device storing computer-executable instructions, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:	303; 5:21-28; Fig. 12.
receive a selection of at least one track section amongst the plurality of track sections;	Figs. 6 and 12; 9:8-11.
responsive to receiving the selection of the at least one selected track section, determine that the at least one selected track section has an existing block;	9:9-21.
receive a signal from the corresponding interlock of the at least one selected track section that a new block can be established;	9:38-43.
responsive to receiving the signal that a new block can be established, transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the at least one selected track section;	9:11-16, 43-44
generate a secret code associated with the at least one selected track section; and	9:16-18

transmit the secret code to a remote user terminal.	9:52-54
29. The railway control apparatus of claim 20, further comprising: a network interface, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to transmit the secret code to the remote user terminal via the network interface.	6:41-44; 11:14-17.
30. The railway control apparatus of claim 20, wherein only the railway control apparatus and the remote user terminal receive the secret code.	6:61-67.
31. The railway control apparatus of claim 20, wherein the secret code is generated by a random process.	5:47-49
32. The railway control apparatus of claim 20, further comprising:	
a rail personnel database comprising information related to a plurality of rail personnel;	104
wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:	
retrieve specific personnel data from the rail personnel database; and	6:48-56.
determine an electronic address of the remote user terminal to which the secret code is to be transmitted.	12:46-50.
33. A method comprising:	
receiving, by a processor, a selection of at least one track section in a centrally controlled railway network, wherein each track section corresponds to an interlock;	Figs. 6 and 12; 9:8-11.
responsive to receiving the selection of the at least one selected track section, determining, by the processor, that the at least one selected track section has an existing block;	
receiving, by the processor, a signal from the corresponding interlock of the at least one selected track section that a new block can be established;	

responsive to receiving the signal that a new block can be established, transmitting, by the processor, a block signal to the corresponding interlock of the at least one selected track section to place a block on the at least one selected track section;	9:11-16.
generating, by the processor, a secret code associated with the at least one selected track section;	9:16-18.
transmitting, by the processor, the secret code to a remote user terminal.	9:52-54.
34. The method of claim 33, further comprising: storing the secret code in a memory device.	6:33-44; 9:16-18.
35. The method of claim 34, further comprising:	6:33-44.
receiving, by the processor, a second secret code;	10:6.
determining, by the processor, that the second secret code and the secret code stored in the memory device are the same; and	10:7-9.
responsive to determining that the second secret code and the secret code stored in the memory device are the same, releasing, by the processor, the block on the at least one selected track section.	7:6-9.
Claim 36 (canceled).	
37. The method of claim 34, further comprising:	
receiving, by the processor, a second secret code;	10:6.
determining, by the processor, that the second secret code and the secret code stored in the memory device are not the same; and	Fig. 13, S1309, "NO; 10:9-11.
responsive to determining that the second secret code and the secret code stored in the memory device are not the same, maintaining the block on the at least one selected track section.	Fig. 13; 10-51-55.
38. The method of claim 33, wherein only the processor and the remote user terminal receive the secret code.	6:61-67.
39. The method of claim 33, further comprising:	

retrieving, by the processor, specific personnel data from a rail personnel database; and	6:48-56.
determining, by the processor, an electronic address of the remote user terminal to which the secret code is to be transmitted.	12:46-50.

additional remarks

Applicant earnestly solicits the allowance of the application. If another amendment is needed to advance this application to condition for allowance, the Examiner is respectfully requested to call the undersigned attorney.

If an extension of time is required to make this response timely, this paper should be considered to be a petition for such an extension of time. The Patent Office is hereby authorized to charge any required fees in connection with this response, to Deposit Account No. 03-3125.

Respectfully submitted,

/Paul Teng/

Paul Teng, Reg. No. 40,837
Attorney for Applicant
Customer 23432
90 Park Avenue, 21st Floor
New York, New York 10016
Tel.: (212) 336-8195

Litigation Search Report CRU 3999

Reexamination Control No. 16/709,126

To:	ENGLISH	**From:**	MANUEL SALDANA
Location:	REM04D39	**Location:**	REM04C71
Art Unit:	3993	**Phone:**	571-272-7740
Date:	15 February 2022	**E-mail:**	MANUEL.SALDANA@USPTO.GOV

Search Notes

NO LITIGATION FOUND FOR US PAT. 9,403,545

1. Performed a KeyCite Search in Westlaw, which retrieves all history on the patent including any litigation.
2. Performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.
3. Performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.
4. Performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.
5. Performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

LexisNexis

User Name: Manuel Saldana
Date and Time: Tuesday, February 15, 2022 1:41:00 PM EST
Job Number: 164368739

Document (1)

1. *US Patent Issued to RAILWARE on Aug. 2 for "Tools for railway traffic control" (New York Inventor)*

Client/Matter: -None-
Search Terms: 9403545
Search Type: Natural Language
Narrowed by:

Content Type	Narrowed by
News	-None-

US Patent Issued to RAILWARE on Aug. 2 for "Tools for railway traffic control" (New York Inventor)

US Fed News

August 2, 2016 Tuesday 2:09 PM EST

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Length: 197 words

Dateline: ALEXANDRIA, Va.

Body

ALEXANDRIA, Va., Aug. 2 -- United States Patent no. 9,403,545, issued on Aug. 2, was assigned to RAILWARE INC. (Hauppauge, N.Y.).

"Tools for railway traffic control" was invented by Ross Pirtle (Commack, N.Y.). According to the abstract* released by the U.S. Patent & Trademark Office: "Tools (such as system, apparatus, methodology, etc.) may be provided to control traffic over a railway track section, when a railway worker is working on or near the track section. Move particularly, when traffic over the track section is to be blocked, a release code is generated and sent to an electronic contact address of the railway worker. Traffic through the track section is blocked until the release code is entered in the system." The patent was filed on Oct. 21, 2014, under Application No. 14/519,727. *For further information, including images, charts and tables, please visit: http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=9403545&OS=9403545&RS=9403545 For any query with respect to this article or any other content requirement, please contact Editor at hisyndication@hindustantimes.com

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NOTICE OF ALLOWANCE AND FEE(S) DUE

23432 7590 02/24/2022

Gary J. Gershik; John P. White;
Christopher C. Dunham; Paul Teng
90 PARK AVENUE, 21st Fl
NEW YORK, NY 10016

EXAMINER
ENGLISH, PETER C

ART UNIT	PAPER NUMBER
3993	

DATE MAILED: 02/24/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/709,126	12/10/2019	Ross Pirtle	7552/85663-Reissue-A	1509

TITLE OF INVENTION: TOOLS FOR RAILWAY TRAFFIC CONTROL

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/24/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23432 7590 02/24/2022

Gary J. Gershik; John P. White;
Christopher C. Dunham; Paul Teng
90 PARK AVENUE, 21st Fl
NEW YORK, NY 10016

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/709,126	12/10/2019	Ross Pirtle	7552/85663-Reissue-A	1509

TITLE OF INVENTION: TOOLS FOR RAILWAY TRAFFIC CONTROL

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/24/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
ENGLISH, PETER C	3993	246-003000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/709,126	12/10/2019	Ross Pirtle	7552/85663-Reissue-A	1509

23432 7590 02/24/2022

Gary J. Gershik; John P. White;
Christopher C. Dunham; Paul Teng
90 PARK AVENUE, 21st Fl
NEW YORK, NY 10016

EXAMINER	
ENGLISH, PETER C	
ART UNIT	PAPER NUMBER
3993	

DATE MAILED: 02/24/2022

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

WABTEC EX1002

Notice of Allowability	Application No. 16/709,126	Applicant(s) Pirtle, Ross	
	Examiner Peter C English	Art Unit 3993	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the after-final amendment filed 09 February 2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are See Continuation Sheet . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

WABTEC EX1002

Continuation of 3. The allowed claim(s) is/are: 20-22,25-35 and 37-39

REASONS FOR ALLOWANCE

1. The after-final amendment filed on February 9, 2022 has been entered.

2. Claims 20-22, 25-35 and 37-39 are allowed.

3. The following is a listing of the prior art cited in this Office action together with the shorthand reference used for each document (listed alphabetically):

"Baines et al."	US Publication No. 2013/0166114 A1
"Rahn et al."	EP Publication No. 1 308 366 B1
"Seung"	KR Publication No. 10-1008160 B1
"Sheardown et al."	US Publication No. 2011/0006912 A1
"Tamaribuchi et al."	US Publication No. 2012/0176217 A1
"Wise"	WO Publication No. 2004/042663 A1

4. See the detailed discussion of the teachings of Rahn in item 33 (pp. 15-19) of the prior Office action mailed on May 26, 2021.

5. See the detailed discussion of the teachings of Tamaribuchi et al. in item 34 (pp. 20-21) of the prior Office action mailed on May 26, 2021.

6. See the detailed discussion of the teachings of Sheardown et al., Wise, Seung and Baines et al. in items 41-44 (pp. 23-25) of the prior Office action mailed on May 26, 2021.

7. The following is an examiner's statement of reasons for allowance:

8. The prior art of record, including the prior art listed above, fails to teach a computer-implemented railway control apparatus, as defined in claim 20, that performs the functions of (a) receiving a selection of a track section, (b) transmitting a block signal to an interlock associated

with the selected track section, (c) generating a secret code associated with the selected track section, and (d) transmitting the secret code to a remote user terminal, wherein the computer-implemented railway control apparatus:

- Provides centralized control of a centrally controllable railway network including plural railways and a plurality of railway interlocks dispersed in the plural railways.
- Comprises a processor for controlling a plurality of track sections in the railway network, wherein each track section is associated with a corresponding interlock and is disposed in any of the plural railways of the railway network that is managed by centralized control operation from the railway control apparatus, the processor controlling, by said centralized control operation, one or more interlocks amongst the plurality of railway interlocks dispersed in the plural railways, to block railway traffic to one or more specified track sections.

9. Claims 21, 22, 25-27 and 29-32 are allowed because of their dependency from claim 20.

10. The prior art of record, including the prior art listed above, fails to teach a computer-implemented railway control apparatus, as defined in claim 28, that performs the functions of (a) receiving a selection of a track section, (b) responsive to the selection, determining that the selected track section has an existing block, (c) receiving a signal from a corresponding interlock of the selected track section that a new block can be established, (d) responsive to receiving the signal that a new block can be established, transmitting a block signal to the corresponding interlock of the selected track section, (e) generating a secret code associated with the selected track section, and (f) transmitting the secret code to a remote user terminal.

11. The prior art of record, including the prior art listed above, fails to teach a computer-implemented method, as defined in claim 33, that performs the functions of (a) receiving a selection of a track section, (b) responsive to the selection, determining that the selected track section has an existing block, (c) receiving a signal from a corresponding interlock of the selected track section that a new block can be established, (d) responsive to receiving the signal that a new block can be established, transmitting a block signal to the corresponding interlock of

the selected track section, (e) generating a secret code associated with the selected track section, and (f) transmitting the secret code to a remote user terminal.

12. Claims 34, 35 and 37-39 are allowed because of their dependency from claim 33.

13. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter C English whose telephone number is (571)272-6671. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:00 pm EST). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gay A Spahn can be reached on (571)272-7731.

/PETER C ENGLISH/
Primary Examiner, Art Unit 3993

Conferees: /WCD/ and /GAS/

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/709,126	Pirtle, Ross
	Examiner	**Art Unit**
	Peter C English	3993

CPC						
Symbol					**Type**	**Version**
B61L	/	27	/	20	F	2022-01-01
B61L	/	25	/	06	I	2013-01-01
B61L	/	27	/	00	I	2013-01-01
B61L	/	23	/	06	I	2013-01-01
B61L	/	25	/	08	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	17	
/PETER C ENGLISH/ Primary Examiner, Art Unit 3993	15 February 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	20	12

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/709,126	Pirtle, Ross
	Examiner	**Art Unit**
	Peter C English	3993

INTERNATIONAL CLASSIFICATION				
CLAIMED				
B61L	/	23	/	06
B61L	/	25	/	06
B61L	/	27	/	00

NON-CLAIMED				
B61L	/	25	/	08

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	17	
/PETER C ENGLISH/ Primary Examiner, Art Unit 3993	15 February 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	20	12

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/709,126	Pirtle, Ross
	Examiner	**Art Unit**
	Peter C English	3993

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	10	19	19	30	28	34	37						
2	2	11	11	20	20	26	29	35	38						
3	3	12	12	21	21	27	30	36	39						
4	4	13	13	22	22	28	31								
5	5	14	14		23	29	32								
6	6	15	15		24	31	33								
7	7	16	16	23	25	32	34								
8	8	17	17	24	26	33	35								
9	9	18	18	25	27		36								

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	17	
/PETER C ENGLISH/ Primary Examiner, Art Unit 3993	15 February 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	20	12

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/709,126	Pirtle, Ross
	Examiner	Art Unit
	Peter C English	3993

CPC - Searched*		
Symbol	Date	Examiner
B61L 27/20, 27/0005, 27/02, 27/00, 23/00, 23/06, 23/10, 19/06, 2019/065, 25/06, 25/08	05/11/2021	/PE/

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Reviewed IFW for PAT 9,403,955, PAT RE47,835 and related PAT 9,517,782	05/11/2021	/PE/
See EAST search in parent 15/928,955 (PAT RE47,835)	05/11/2021	/PE/
PE2E Search (see printout)	05/21/2021	/PE/
Search updated	11/16/2021	/PE/
Search updated	02/15/2022	/PE/
PE2E SEARCH Interference Search (see printout)	02/15/2022	/PE/

WABTEC EX1002

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/709,126	Pirtle, Ross
	Examiner	Art Unit
	Peter C English	3993

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
B61L	23/06, 25/06, 25/08, 27/00, 27/20	02/15/2022	/PE/

WABTEC EX1002

United States Patent And Trademark Office	**Application No.** 16/709,126	**Art Unit** 3993
Reissue Terminal Disclaimer Review Form	**Examiner** PETER C ENGLISH	**AIA Status** Yes

Original Patent Number of Patent to be Reissued is: 9,403,545 B2	**The Maintenance fee status is:** ◉ up to date ○ not up to date (Consult with SPRS)

Is there a terminal disclaimer filed and accepted during the prosecution of (i) the current reissue application, (ii) the underlying patent, and/or (iii) reexamination proceeding(s) of the underlying patent?

○ NO
◉ YES (Complete the rest of the form)

The reissue patent is subject to Terminal Disclaimer(s) that was/were:

☑ filed and accepted (DISQ or DISQ.E.FILE) during the prosecution of the current reissue application. (Enter terminal disclaimer(s) filing date(s) below).

1. 09 October 2021 2. _____ 3. _____

The underlying patent of the current reissue application is subject to Terminal DIsclaimer(s) that was/were:

☐ accepted (DISQ or DISQ.E.FILE) and of record in the prosecution of the underlying patent and/or reexamination procceeding(s) of the underlying patent. (Enter application/control no(s) and terminal disclaimer(s) filing date(s) below).

1. _____ _____ 2. _____ _____ 3. _____ _____

ENTER
/PCE/
2/15/2022

EXPEDITED PROCEDURE REQUESTED Dkt. 85663-Reissue-A
RESPONSE UNDER 37 C.F.R. § 1.116 TO FINAL REJECTION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Ross Pirtle

Applicant: RAILWARE, INC.

Reissue Application No.: 16/709,126 filed December 10, 2019 Art Unit: 3993

Original Patent No.: 9,403,545 granted on August 2, 2016 Examiner: Peter C. English

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

Confirmation No.: 1509

This correspondence is being filed electronically with the U.S. Patent and Trademark Office (USPTO).

February 9, 2022
Date

90 Park Avenue, 21st Floor
New York, New York 10016
Tel.: (212) 336-8195

Commissioner for Patents
Alexandria, VA 22313-1450

AMENDMENT IN RESPONSE UNDER 37 C.F.R. § 1.116 TO NOVEMBER 23, 2021 FINAL OFFICE ACTION IN REISSUE APPLICATION

Sir:

This Amendment is submitted in response to the final Office Action dated November 23, 2021, in connection with the subject reissue application.

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims begin on page 4 of this paper.

Remarks begin on page 10 of this paper.

PE2E SEARCH - Search History (Prior Art)

There are no Prior Art searches to show.

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N70	4815	(rail or railroad or railway or track) with interlock	(US-PGPUB; USPAT)	ADJ	ON	ON	2019/09/11 01:14 PM
N71	122987	(rail or railroad or railway or track) with block$3	(US-PGPUB; USPAT)	ADJ	ON	ON	2019/09/11 01:14 PM
N72	1127	(code or passcode or password) with interlock	(US-PGPUB; USPAT)	ADJ	ON	ON	2019/09/11 01:14 PM
N73	345703	(code or passcode or password) with block$3	(US-PGPUB; USPAT)	ADJ	ON	ON	2019/09/11 01:15 PM
N74	58	(N70 or N71) and N72	(US-PGPUB; USPAT)	ADJ	ON	ON	2019/09/11 01:15 PM
N75	17908	(N70 or N71) and N73	(US-PGPUB; USPAT)	ADJ	ON	ON	2019/09/11 01:15 PM
N76	278306	(remov$3 or releas$3 or lift$3) near5 block$3	(US-PGPUB; USPAT)	ADJ	ON	ON	2019/09/11 01:16 PM
N77	3751	N75 and N76	(US-PGPUB; USPAT)	ADJ	ON	ON	2019/09/11 01:16 PM
N82	273	B61L27/0005.cpc.	(US-PGPUB; USPAT)	ADJ	ON	ON	2019/09/11 01:23 PM
N83	0	N82 and (N72 or N74 or N77)	(US-PGPUB; USPAT)	ADJ	ON	ON	2019/09/11 01:24 PM
N84	958	(B61L23/06 OR B61L25/06 OR B61L25/08 OR B61L27/00 OR B61L27/20).cpc.	(US-PGPUB; USPAT)	ADJ	OFF	OFF	2022/02/15 01:16 PM
N85	10	N84 AND (N72 OR N74 OR N77)	(US-PGPUB; USPAT)	ADJ	OFF	OFF	2022/02/15 01:19 PM

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 1509

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
16/709,126	12/10/2019	246	3993	7552/85663-Reissue-A

APPLICANTS
RAILWARE, INC., Hauppauge, NY, Assignee (with 37 CFR 1.172 Interest);

INVENTORS
Ross Pirtle, Commack, NY;

**** CONTINUING DATA ***************************
This application is a REI of 14/519,727 10/21/2014 PAT 9403545
and is a CON of 15/928,955 03/22/2018 PAT RE47835
which is a REI of 14/519,727 10/21/2014 PAT 9403545
which claims benefit of 61/893,547 10/21/2013

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
12/16/2019

NOTE: More than one reissue application has been filed for PAT 9403545:
1) **15/928,955 (PAT RE47,835 E); and**
2) **16/709,126 (this application).**

Foreign Priority claimed	❑ Yes ☑ No	❑ Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
35 USC 119(a-d) conditions met	❑ Yes ☑ No					
Verified and Acknowledged	/PETER C ENGLISH/ Examiner's Signature	Initials	NY	11	20	2

ADDRESS
COOPER & DUNHAM LLP
90 PARK AVENUE, 21 ST. FLOOR
NEW YORK, NY 10016
UNITED STATES

TITLE
TOOLS FOR RAILWAY TRAFFIC CONTROL

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
3160	No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	❑ All Fees ❑ 1.16 Fees (Filing) ❑ 1.17 Fees (Processing Ext. of time) ❑ 1.18 Fees (Issue) ❑ Other _____ ❑ Credit

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: RAILWARE, INC.

Inventor: Ross Pirtle

Reissue Application No.: 16/709,126 filed December 10, 2019 Art Unit: 3993

Original Patent No.: 9,403,545 granted on August 2, 2016 Examiner: Peter C. English

For: TOOLS FOR RAILWAY TRAFFIC CONTROL

Confirmation No.: 1509

Issue Fee Due: May 24, 2022 Class-Subclass: 246-003000

Commissioner for Patents
Alexandria, VA 22313-1450

APPLICANT'S COMMENTS ON
EXAMINER'S STATEMENT OF REASONS FOR ALLOWANCE

Sir:

Applicant appreciates the Examiner's Statement of the Reasons for Allowance attached to the Notice of Allowability dated February 24, 2022 and submits that the allowed claims recite subject matter which further supports patentability for reasons in addition to those identified in the Reasons for Allowance.

Respectfully submitted,

/Paul Teng/

This correspondence is being filed electronically via the Electronic Filing System (EFS) with the U.S. Patent and Trademark Office (USPTO).

May 24, 2022

Date

Paul Teng, Reg. No. 40,837
Attorney for Applicant
Customer Number 23432
90 Park Avenue, 21st Fl.
New York, New York 10016
Tel.: (212) 336-8195

Electronic Patent Application Fee Transmittal

Application Number:	16709126
Filing Date:	10-Dec-2019
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross Pirtle
Filer:	Paul Teng/Esther Weiner
Attorney Docket Number:	7552/85663-Reissue-A

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
REISSUE ISSUE FEE	1511	1	1200	1200

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1200**

Electronic Acknowledgement Receipt

EFS ID:	45786308
Application Number:	16709126
International Application Number:	
Confirmation Number:	1509
Title of Invention:	TOOLS FOR RAILWAY TRAFFIC CONTROL
First Named Inventor/Applicant Name:	Ross Pirtle
Customer Number:	23432
Filer:	Paul Teng/Esther Weiner
Filer Authorized By:	Paul Teng
Attorney Docket Number:	7552/85663-Reissue-A
Receipt Date:	24-MAY-2022
Filing Date:	10-DEC-2019
Time Stamp:	10:21:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1200
RAM confirmation Number	E20225NA22054454
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

WABTEC EX1002

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IssueFeeTransmittal_85663-Reissue-A.pdf	83148 87e1e2e63dc916994520dd73501ebcb5283406e6	no	1
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	CommentsOnReasonsAllowance_85663-Reissue-A.pdf	152087 32286118f5677519e7662579cc8ce53121e8b73c	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	37533 ff852b274ecabe890b0c02b2c3ae7aa673dc15f2	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	272768		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23432 7590 02/24/2022

Gary J. Gershik; John P. White;
Christopher C. Dunham; Paul Teng
90 PARK AVENUE, 21st Fl
NEW YORK, NY 10016

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/709,126	12/10/2019	Ross Pirtle	7552/85663-Reissue-A	1509

TITLE OF INVENTION: TOOLS FOR RAILWAY TRAFFIC CONTROL

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/24/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
ENGLISH, PETER C	3993	246-003000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: RAILWARE, INC.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Hauppauge, New York

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ☒ Corporation or other private group entity ❑ Government

4a. Fees submitted: ☒ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Paul Teng/ Date May 24, 2022

Typed or printed name Paul Teng Registration No. 40837

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/709,126	06/28/2022	RE49115	7552/85663-Reissue-A	1509

23432 7590 06/08/2022

Gary J. Gershik; John P. White;
Christopher C. Dunham; Paul Teng
90 PARK AVENUE, 21st Fl
NEW YORK, NY 10016

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

Ross Pirtle, Commack, NY;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

RAILWARE, INC., Hauppauge, NY, Assignee (with 37 CFR 1.172 Interest);

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

WABTEC EX1002

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Southern District of New York on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
1:22-cv-5013	6/15/2022	Southern District of New York

PLAINTIFF	DEFENDANT
Railware, Inc.	National Railroad Passenger Corporation d/b/a Amtrak

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US Pat. 9,517,782	12/13/2016	Pirtle (Inventor); Railware, Inc. (Assignee)
2	US Pat. RE47,835	2/4/2020	Pirtle (Inventor); Railware, Inc. (Assignee)
3			
4			
5			

In the above---entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY
6/30/2022	☑ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US Pat. RE49,115	6/28/2022	Pirtle (Inventor); Railware, Inc. (Assignee)
2			
3			
4			
5			

In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
Ruby J. Krajick	/s/ J. Gonzalez	6/30/2022

Copy 1---Upon initiation of action, mail this copy to Director Copy 3---Upon termination of action, mail this copy to Director
Copy 2---Upon filing document adding patent(s), mail this copy to Director Copy 4---Case file copy

WABTEC EX1002

Trials@uspto.gov
571-272-1152

Paper No. 8
Date: January 22, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NATIONAL RAILROAD PASSENGER CORPORATION D/B/A AMTRAK,
Petitioner,

v.

RAILWARE, INC.,
Patent Owner.

IPR2023-01181
Patent RE49,115 E

Before JAMES A. TARTAL, CYNTHIA L. MURPHY, and BRENT M. DOUGAL, *Administrative Patent Judges*.

MURPHY, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

National Railroad Passenger Corporation d/b/a Amtrak ("Petitioner")[1] filed a Petition pursuant to 35 U.S.C. §§ 311–319 requesting an *inter partes* review of claims 20–36 ("Challenged Claims") of U.S. Patent No. RE49,115 E (Ex. 1001, "the '115 patent"). Paper 2 ("Pet."). Railware, Inc. ("Patent Owner")[2] filed a Patent Owner Preliminary Response. Paper 7 ("Prelim. Resp.").

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314(b) (2018); 37 C.F.R. § 42.4(a) (2023). An *inter partes* review may not be instituted "unless . . . the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a). Upon consideration of the Petition, the Preliminary Response, and the evidence of record, we conclude that the information does not demonstrate a reasonable likelihood that Petitioner would prevail in showing the unpatentability of at least one of the Challenged Claims. Accordingly, we do not institute an *inter partes* review.

II. BACKGROUND

A. The '115 Patent

The '115 patent, titled "Tools for Railway Traffic Control," issued on June 28, 2022, from U.S. Application No. 16/709,126, filed December 10, 2019. Ex. 1001, codes (21), (22), (45), (54). The '115 patent is directed "to railway traffic control, and more specifically, a system, apparatus, and method for railway traffic control to address concerns for safety of railway

[1] Petitioner identifies no additional real parties in interest. Pet. 2.
[2] Patent Owner identifies no additional real parties in interest. Paper 5, 1.

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workers working on or near railroad tracks." *Id.* at 1:29–32. The '115 patent describes prior safety features present in a railway system and notes that despite these preexisting safety features, numerous "roadway worker accidents" resulted in the death of workers "while attending to tasks . . . on or near track." *Id.* at 2:40–49. The '115 patent identifies "a need for further safety measures to protect the lives of railway workers." *Id.* at 2:51–52.

As further background, according to the '115 patent, in a standard railway system, "[i]nterlocking signals govern movement within a sector controlled by an interlock." Ex. 1001 1:41–42. "[A] track may be divided into sections," and an "interlocking signal" is exhibited at the entrance to each track section. *Id.* at 1:41–46. "[T]he interlocking signal displays a color system which instructs the conductor of the train, or the train operating by automated response, how to move through the upcoming section of track." *Id.* at 1:46–51.

The '115 patent further explains that a centralized traffic control system may be used "to place a block on one or more specified track sections to permit a railway field worker to enter the track sections while blocking railway traffic." Ex. 1001 2:62–66. "[O]nce a block is placed, no train can traverse the blocked section of rail," and "maintenance workers and railway personnel can travel, inspect and work on the rails without the danger of oncoming train traffic." *Id.* at 5:59, 5:63–65; *see also id.* at 5:61–63 (stating that an interlock can "output a STOP signal, therefore, stopping any train traffic within the rails controlled by that interlock"), 5:65–6:2 (stating that "[t]rains that are scheduled to traverse said blocked tracks either come to a complete stop, electronically or mechanically, before passing the interlock or are rerouted using tracks that are not in a blocked state"). When "the block is removed," the result is that

"train traffic to that section of rail is then allowed." *Id.* at 7:39–41. Thus, an errant (e.g., premature) removal or release of the block could endanger a railway field worker still present in the specified track section. *See id.* at 2:40–50.

"[A]ll of the interlocks" within a railway system may be controlled electronically through "a centralized traffic control (CTC)." *Id.* at 1:56–57. "The CTC is controlled by a single person known as a train dispatcher." *Id.* at 1:60–61. "In order for the train dispatcher to make appropriate train control decisions regarding how the train should be operated," information is displayed to the train dispatcher "on a control console," and "[t]hrough the control console, the dispatcher has control of each interlock signal." *Id.* at 1:62–2:2. Thus, the train dispatcher (i.e., a single person) is responsible for both blocking a specified rail section (e.g., so that railway field workers can safely attend to tasks on this track section) and for removing/releasing this block (e.g., once railway field workers have presumably completed tasks and vacated this track section). *See id.* at 1:54–61, 2:60–66, 5:58–65, 7:39–41. And, as indicated above, an errant removal/release of the block would endanger a railway field worker still present in the specified section of track. *See id.* at 2:40–50.

The '115 patent identifies as an essential purpose the provision of a system and method that assures "the railway worker has more control over the traffic through the rail block in which the worker is working, and fatal on-track accidents can be reduced." Ex. 1001 11:37–39. To accomplish this purpose, the '115 patent requires "generating a removal code and transmitting the removal code to the electronic contact address of the railway field worker, and permitting the block to the track sections to be

removed only upon entry of the removal code in the centralized railway control system."[3] *Id.* at 2:66–3:3.

The '115 patent describes the process in further detail, explaining that, first, the dispatcher places a block on a specified rail section by inputting corresponding information into the control console. *See id.* Ex. 1001 7:61–8:3. "Once the block is put into place," the railway traffic control terminal (i.e., a computer) generates a release code, saves this code to an internal storage, and "sends the code to the maintenance worker designated for track work." *Id.* 8:4–9, *see also id.* at 7:21–22 (stating "the railway traffic control apparatus . . . may then generate a release code and save it to an internal storage"). Information corresponding to the now-blocked rail section is displayed to the dispatcher on the user interface, but this displayed information does not include the computer-generated code. *See id.* Fig. 6. The '115 patent states that "where there are multiple maintenance workers assigned to a certain track section, there may be provided one release code to one, multiple or all of maintenance workers assigned." *Id.* at 8:54–57; *see also id.* at 8:57–61 (stating that the "train traffic controller may input that the release code be specified to one maintenance worker, preferably a supervisor or foreman, to multiple maintenance workers or to all of the maintenance workers assigned to work on a given track section"), 8:63–67 (stating "where there are multiple workers assigned for a certain track section, there

[3] The '115 patent refers to the code as the "removal code" (*see*, *e.g.*, Ex. 1001, 2:66), the "release code" (*see*, *e.g.*, *id.* at 7:22), the "random secret code" (*see*, *e.g.*, *id.* at 9:57), the "secret code" (*see, e.g., id.* at 10:25), and the "secret removal code" (*see*, *e.g.*, *id.* at 10:29). In each instance, the '115 patent is referring to the code used to remove the block and the Parties direct us to no material difference between these terms in regard to any matter at issue in this Decision.

may be provided multiple unique release codes which would then all be required to be input into the train traffic control terminal . . . by the train traffic controller in order to be able to remove blocks on certain track sections"). Thus, the '115 patent only describes circumstances where the code is transmitted to workers performing work on the track in the field.

The dispatcher "may not remove" the block on the specified track section "without the input of the release code." Ex. 1001, 8:1112; *see also id.* at 11:26–28 ("Once a block has been placed, the interlock remains in a blocked state, until the maintenance worker supplies the release code" to the dispatcher). Thus, "[s]o long as the block is in place, [the] maintenance worker can perform on-track work, without interference of oncoming train traffic." *Id.* at 11:30–32. Then, "[a]fter the maintenance worker finishes the assigned work and is clear of the train tracks, he/she may then supply the interlock control system with the release code, and the interlock control system in turn can release the interlock over the block." *Id.* at 11:32–36. In short, the '115 patent makes clear that the train dispatcher typically does not have the code to lift the block until the code is provided by a maintenance worker.

The '115 patent also describes instances where the code may be "retrieved" by the dispatcher from the internal storage of the railway traffic control apparatus, rather than from the maintenance worker. Ex. 1001 10:30–46. The '115 patent explains in this regard that a block placed on a section of track may be removed by the dispatcher if an eligible maintenance worker transmits the code to the railway traffic control center, but that "[i]f there is no maintenance worker available to transmit the random secret code . . . the code can be retrieved from the train traffic control terminal . . . by the train traffic controller [i.e., the dispatcher]." *Id.* The '115 patent

does not describe any circumstance where the code is provided to the dispatcher when a maintenance worker is available to transmit the code. Similarly, concerning circumstances where the maintenance worker is unavailable, the '115 patent does not describe any circumstance where the code is transmitted to the dispatcher without the dispatcher proactively retrieving the code from storage in the control system. Thus, the operation of the system, even in the absence of an available maintenance worker, is consistent with the '115 patent's description of a system and method, as noted above, that assures "the railway worker has more control over the traffic through the rail block in which the worker is working, and fatal on-track accidents can be reduced." *Id.* at 11:37–39.

B. Illustrative Claim

Petitioner challenges the validity of claims 20–36 of the '115 patent. Pet. 1. Claims 20, 30, and 31 are independent. Claims 21–29 depend directly or ultimately from claim 20, and claims 32–36 depend directly or ultimately from claim 31. Claim 20 is illustrative of the claimed subject matter and is reproduced below (with indicators of changes made during reexam removed):

> 20. A railway control apparatus for centralized control of a centrally controllable railway network including plural railways and a plurality of railway interlocks dispersed in said plural railways, comprising:
>
> a processor for controlling a plurality of track sections in the railway network, wherein each track section is associated with a corresponding interlock and is disposed in any of said plural railways of said railway network that is managed by centralized control operation from the railway control apparatus, the processor controlling, by said centralized control operation, one or more interlocks amongst the plurality of railway interlocks dispersed in said plural railways of said railway network, to block

railway traffic to one or more specified track sections; and

a memory device storing computer-executable instructions, wherein execution of the computer-executable instructions by the processor causes the railway control apparatus to:

receive a selection of at least one track section amongst the plurality of track sections;

transmit a block signal to the corresponding interlock associated with the at least one selected track section, to place a block on the selected track section by said centralized control operation from the railway control apparatus;

generate a secret code associated with the at least one selected track section; and

transmit the secret code to a remote user terminal.

Ex. 1001, 14:60–15:22. Independent claim 30 likewise recites a railway apparatus that is caused to "generate a secret code associated with the at least one track section" and to "transmit the secret code to a remote use terminal." *Id.* at 16:14–37. Independent claim 31 recites a method comprising the steps of "generating, by [a] processor, a secret code associated with at least one selected track section" and "transmitting, by the processor, the secret code to a remote user terminal." *Id.* at 16:55–58.

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C. Asserted Grounds of Unpatentability

In the Petition, Petitioner lists three grounds under which it contends the Challenged Claims are unpatentable, as set forth in the following table:

Claims Challenged	35 U.S.C. §[4]	References/Basis
20–36	103(a)	Oriol,[5] Masquelier[6]
20–36	103(a)	Oriol, Masquelier, Wise[7]
20–36	103(a)	Oriol, Masquelier, Pachl[8]

Pet. 3. Petitioner further relies on the supporting Declaration of Dr. William R. Michalson, dated July 6, 2023. Ex. 1003.

D. Related Proceedings

The Parties identify the '115 patent as a subject of *Railware, Inc. v. National Railroad Passenger Corporation d/b/a Amtrak*, Case No.1-22-CV-05013-KPF (S.D.N.Y.). Pet. 2; Paper 5, 1. Petitioner also filed petitions challenging claims of two other related patents in *National Railroad*

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[4] The Leahy-Smith America Invents Act ("AIA") included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. We apply the post-AIA version of § 103 here, because the earliest provisional application identified in the '115 patent was filed after the effective date of the AIA. *See* Ex. 1001, code (60).

[5] Oriol, N., Sheridan, T. and Multer, J. (2004). *Supporting Railroad Roadway Worker Communications with a Wireless Handheld Computer: Volume 1: Usability for the Roadway Worker*, Report No. DOT/FRA/ORD-04/13.I. U.S. Department of Transportation, Federal Railroad Administration (Ex. 1004, "Oriol").

[6] Masquelier, T., Sheridan, T., and Multer, J. (2004). *Supporting Railroad Roadway Worker Communications with a Wireless Handheld Computer: Volume 2: Impact on Dispatcher Performance*. Report No. DOT/FRA/ORD-04/13.II U.S. Department of Transportation, Federal Railroad Administration (Ex. 1005, "Masquelier").

[7] WO 2004/042663 A1, published May 5, 2004 (Ex. 1006, "Wise").

[8] U.S. Patent No. 7,328,090 B2, issued February 5, 2008 (Ex. 1020, "Pachl").

Passenger Corporation d/b/a Amtrak v. Railware, Inc., IPR2023-01179 (U.S. Patent No. 9,517,782 B2) and *National Railroad Passenger Corporation d/b/a Amtrak v. Railware, Inc.*, IPR2023-01180 (U.S. Patent No. RE47,835 E).

III. ANALYSIS

A. Legal Standards for Obviousness

A patent claim is unpatentable for obviousness if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, "would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). In *Graham v. John Deere Co.*, 383 U.S. 1 (1966), the Supreme Court set out a framework for assessing obviousness that requires consideration of four factors: (1) the "level of ordinary skill in the pertinent art," (2) the "scope and content of the prior art," (3) the "differences between the prior art and the claims at issue," and (4) "secondary considerations" of nonobviousness such as "commercial success, long felt but unsolved needs, failure of others, etc." *Graham*, 383 U.S. at 17–18; *KSR*, 550 U.S. at 407.

"Whether an ordinarily skilled artisan would have been motivated to modify the teachings of a reference is a question of fact." *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1327 (Fed. Cir. 2016) (citations omitted). "[W]here a party argues a skilled artisan would have been motivated to combine references, it must show the artisan 'would have had a reasonable expectation of success from doing so.'" *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1360–61 (Fed. Cir. 2017) (quoting *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1068–69 (Fed. Cir. 2012)).

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B. Level of Ordinary Skill in the Art

The level of skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham*, 383 U.S. at 17–18; *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)). In determining the level of ordinary skill in the art, various factors may be considered, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted).

Petitioner contends a person of ordinary skill in the art "would have had at least a bachelor's degree in electrical, mechanical, or related engineering, and also would have had at least two (2) years of experience in railway operations or railway control systems and would have programming experience," and that "[a] higher level of education or specific skill might make up for less experience, and vice-versa." Pet. 8 (citing Ex. 1003 ¶¶ 24–25). Patent Owner does not dispute the level of ordinary skill identified by Petitioner. *See* Prelim. Resp. 11. For purposes of this Decision, we apply Petitioner's proposed level of skill because, on the current record, it is undisputed and consistent with the level of skill at the time of the claimed invention reflected by the '115 patent and the cited prior art references. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

C. Claim Construction

We apply the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b). 37 C.F.R.

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§ 42.100(b). Under that standard, claim terms "are generally given their ordinary and customary meaning" as would have been understood by a person of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). In construing claims in accordance with their ordinary and customary meaning, we take into account the specification and prosecution history. *Phillips*, 415 F.3d at 1315–17. "In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). Extrinsic evidence is "less significant than the intrinsic record in determining 'the legally operative meaning of claim language.'" *Phillips*, 415 F.3d at 1317. If the specification "reveal[s] a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess[,] . . . the inventor's lexicography governs." *Phillips*, 415 F.3d at 1316 (citing *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002)).

Petitioner proposes no express construction for any claim term. Petitioner argues that "[b]ecause the prior art discloses the claim limitations, the claims require no express construction and should be given their plain and ordinary meaning." Pet. 9. As an initial matter, Patent Owner argues in opposition that "[w]hether or not claim construction is necessary does not depend on whether 'the prior art discloses the claim limitations,'" because "[c]laim construction is a ***prerequisite*** to the validity analysis." Prelim. Resp. 12 (citing *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1351 (Fed. Cir. 2001) ("A claim must be construed before determining

its validity just as it is first construed before deciding infringement.")). Patent Owner further proposes an express construction of the claim term "secret code."[9] *Id.* at 10–21. We address Patent Owner's arguments pertaining to this term below.

1. "secret code"

The claim term "secret code" appears in the challenged independent claims. Claims 20 and 30 recite "generate a secret code associated with the at least one selected track section" and "transmit the secret code to a remote user terminal." Claim 31 recites "generating, by the processor, a secret code associated with the selected at least one selected track section; [and] transmitting, by the processor, the secret code to a remote user terminal." We refer to these limitations as the "code limitations."

Petitioner purports to have applied the "plain and ordinary meaning" to all claim terms, including "secret code" in the Petition for the purposes of institution. Pet 9. Petitioner does not otherwise address in the Petition what it contends to be the plain and ordinary meaning of "secret code."

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[9] Patent Owner suggests that Petitioner fails to "satisfy its burden," because "one cannot determine whether the prior art discloses the claim elements until the claims have been properly construed." Prelim. Resp. 12. Although Patent Owner does not identify the "burden" it contends is placed on Petitioner, we recognize that a petitioner is required to identify in its petition "[h]ow the challenged claim is to be construed." 37 C.F.R. § 42.104 (b)(3). Petitioner's reliance here on the "plain and ordinary meaning" is not, alone, a sufficient basis to deny the Petition. Rather, for purposes of this Decision, we must determine whether Petitioner has made a sufficient showing to support institution of *inter partes* review by demonstrating a reasonable likelihood of prevailing in showing the unpatentability of at least one of the Challenged Claims. Accordingly, Patent Owner's reliance on *Amazon.com* under these circumstances is not decisive, because this Decision is not assessing the validity of any Challenged Claim.

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According to Petitioner, the '115 patent describes tools "to control traffic over a railway section" where "a block is placed" and "a release code is generated" such that the "block is removed from the track section when the release code is received by the system." Pet. 4 (citing Ex. 1001, Abstract). Petitioner also states that in the '115 patent "[t]he claim language does not describe 'the secret code' and what makes a code 'secret' including failing to detail any specific level of security." *Id.* at 39. Petitioner also implies that there are "no specifics" in the '115 patent. *Id.* (citing Ex. 1001, 6:6–9).

In arguing that Oriol and Masquelier teach a code as required by the '115 patent, Petitioner asserts that the Form D number disclosed by these references is a secret code "because the generated Form D number is sent to specified worker 'who requested it'" and "who only can cancel the same Form D number (or under his authority) to remove the track block." Pet. 39 (citing Ex. 1004 38, 57) *see also id.* at 40 (asserting that "the Form D number is a secret code given the worker can only access the Form D number 'under his/her authority' and given the secured communications.") In arguing that Wise teaches a "secret code," Petitioner asserts that a SCN (security check number) disclosed by Wiser would be considered a secret code because "without the code a worker cannot access the worksite and only that worker has access to the code." Pet. 65 (citing Ex. 1006 31:33–32:3). In arguing that Pachl teaches a "secret code," Petitioner argues that a "checking code" disclosed by Pachl is secret because "it is calculated and only the central control and receiving device can determine the code." Pet. 71 (citing Ex. 1020 2:50–60, 4:7–26, 4:50–59, claim 1, Figs. 1–2).

Thus, Petitioner's analysis suggests that a "secret code" encompasses a non-public code that is received by any railway personnel that may be used

to release a track block without further limitations on the accessibility of the code by, for example, a dispatcher prior to release of a track block. Petitioner has not supported its application of the alleged "plain and ordinary meaning" of "secret code" with any supporting analysis of the Specification of the '115 patent.

Patent Owner argues that the intrinsic evidence of the '115 patent supports a narrower construction of "secret code," which Petitioner fails to show was taught by the asserted art. Prelim. Resp. 13–23. According to Patent Owner, a person of ordinary skill in the art "would have understood 'secret code' to mean 'a code that is not readily available to the dispatcher.'" *Id.* at 13.

Our analysis starts with the claim language. *Phillips*, 415 F.3d at 1312–14. Patent Owner argues that the Challenged Claims "expressly" require that the code be "secret," making it "clear" to a person of ordinary skill in the art that "the 'secret code' is not readily available to the dispatcher." Prelim. Resp. 22 (citing Ex. 1001, Cls. 20, 30, 31). Patent Owner also argues that the Challenged Claims "specify that the 'secret code' is generated and transmitted 'to a remote user terminal.'" *Id.* Patent Owner explains that if "the dispatcher has ready access to the removal code, then code would not be 'secret' and the dispatcher could remove the block at any time and particular due to miscommunication or error. *Id.* at 23.

Patent Owner's arguments support a determination that Petitioner fails to sufficiently show how the language of the Challenged Claims shows that the claim term "secret code" encompasses a non-public code that is received by any railway personnel that may be used to release a track block without further limitations on the accessibility to the code by, for example, a dispatcher prior to a release of a track block.

Next, we turn to the Specification. "While we read claims in view of the specification . . . we do not read limitations from the embodiments in the specification into the claims. *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) (citation omitted). "We depart from the plain and ordinary meaning of claim terms based on the specification in only two instances: lexicography and disavowal." *Id.* In order for a patentee to act as its own lexicographer, the "patentee must 'clearly set forth a definition of the disputed claim term' other than its plain and ordinary meaning" and "must 'clearly express an intent' to redefine the term." *Bradium Techs LLC v. Iancu*, 923 F.3d 1032, 1044 (Fed. Cir. 2019)).

Patent Owner does not argue that it disavowed the full scope of the plain and ordinary meaning of any term in the Challenged Claims and directs us to no explicit definition of "secret code" in the Specification.

We recognize that in the absence of an explicit statement of redefinition, "the specification may define claim terms 'by implication' such that the meaning may be 'found in or ascertained by a reading of the patent documents.'" *AstraZeneca AB v. Mut. Pharm. Co., Inc.*, 384 F.3d 1333, 1339–1340 (Fed. Cir. 2004) (quoting *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1268 (Fed. Cir. 2001)); *see AstraZeneca LP v. Apotex, Inc.*, 633 F.3d 1042, 1051–52 (Fed. Cir. 2010) ("[W]hen a patentee uses a claim term throughout the entire patent specification, in a manner consistent with only a single meaning, he has defined that term 'by implication.'" (quoting *Bell Atl.*, 262 F.3d at 1271)).

Patent Owner argues that "[t]he '115 patent repeatedly and consistently refers to the 'secret code' as 'secret.'" Prelim. Resp. 13 (citing Ex. 1001, 6:6–8 ("the code generator 101B is configured to produce [a] removal code []such as a cipher which is . . . *secret*"); 10:22–25 ("the

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railway traffic control terminal 105 . . . enables safety measures so that the block cannot be removed without the input of the *secret code* generated"); 10:34–35 ("The remove button is disabled without the input of the secret code"); 10:40–42 ("the maintenance worker transmits the random *secret code* to the railway traffic control center 105 (S1305)")). According to Patent Owner, "[b]y repeatedly and consistently describing the code as 'secret,' a [person of ordinary skill in the art] would understand from the '115 patent that the claimed 'secret code' is not readily available to the dispatcher." *Id.* at 14.

As further support that the Specification implicitly limits the cod to information not readily available to the dispatcher, Patent Owner argues that the '115 patent "describes the generation and transmission of the 'secret code' . . . as 'largely automated' such that the 'secret code' is 'automatically transmitted' by the railway control apparatus to the railway field worker." *Id.* at 14–15 (citing Ex. 1001, 3:4–9, 2:66–3:1, 6:6–13, 7:27–36, 7:53–8:9, 9:9–14, 10:25–29). According to Patent Owner, "these operations explicitly do not involve displaying the 'secret code' to the dispatcher." *Id.*

Patent Owner also directs our attention to Figures 7 and 10 of the '115 patent, and argues that Figure 7 illustrates a screen shot of a display of the railway control apparatus for the dispatcher that does not include a code as compared to Figure 10, which shows a screen shot of the railway field worker's terminal with a code displayed corresponding to a code as required by the '115 patent. *Id.* at 15–17 (citing Ex. 1001, Figs. 7, 10). Patent Owner further directs us to Figure 8 as showing that "only after the railway field worker transmits the 'secret code,' is the dispatcher able to enter the 'secret code' into the railway control apparatus and remove the block." *Id.* at 18 (citing, e.g., Ex. 1001, 8:50–51, Fig. 8).

Additionally, Patent Owner argues that a person of ordinary skill in the art would have readily understood "that the claimed [code] is not readily available to the dispatcher, given the problems addressed by the '115 patent." Prelim. Resp. 19. Patent Owner argues as follows:

> The '115 patent acknowledges that "railway transportation is run under strict operational guidelines or rules," such as the Form D number. [Ex. 1001] at 1:36–40. But Form D numbers, alone, are inherently unreliable because they are known to the dispatcher at all times. Indeed, the '115 patent notes that "one study reported that there were 39 roadway worker accidents that occurred between January 1997 and the end of 2011, in which 41 roadway workers perished." *Id.* at 2:41–44. Form D numbers were in operation during this entire span of time, yet accidents and fatalities persisted. Indeed, the '115 patent notes that "even with all of the[] safety features present in a railway system, railway accidents occur, with many of them being fatal . . . . There remains a need for further safety measures to protect the lives of railway workers." [*Id.*] at 2:40–52.
>
> . . .
>
> [T]he '115 patent provides "***supplemental*** measures directed to safety of railway workers." *Id.* at 2:56–59 (emphasis added). Specifically, the '115 patent states that, when embodiments of the invention are implemented, "the railway worker has more control over the traffic through the rail block in which the worker is working, and fatal on-track accidents can be reduced." [*Id.*] at 11:37–39.

Id. at 20–21.

Lastly, according to Patent Owner, the '115 patent states that "[i]f there is no maintenance worker available to transmit the random secret code, the code can be retrieved from the train traffic control terminal" by "the train traffic controller." *Id.* at 21–22 (citing Ex. 1001, 10:42–46). Patent Owner argues that "[b]y forcing the 'secret code' to be 'retrieved from the train traffic control apparatus' (as opposed to simply displaying the 'secret code'

in full view of the dispatcher, like the prior art), the '115 patent makes clear that the claimed 'secret code' is not 'readily' available to the dispatcher." *Id.* at 22.

Patent Owner's arguments support a determination that Petitioner fails to sufficiently show how the Specification of the '115 patent shows that the claim term "secret code" encompasses a non-public code that is received by any railway personnel that may be used to release a track block without further limitations on the accessibility to the code by, for example, a dispatcher prior to a release of a track block. *See also* Ex. 1001, 11:37–39 (identifying the need for limitations on the accessibility of the code to give the railway worker "more control over the traffic through the rail block in which the worker is working," so that "fatal on-track accidents can be reduced"). The '115 patent makes clear that the secret code is "only" received by the relevant railway field worker and an internal storage. *Id.* at 7:27–30, *see also id.* at 2:66–3:3 ("generating a removal code and transmitting the removal code to the electronic contact address of the *railway field worker*, and permitting the block to the track sections to be removed *only* upon entry of the removal code in the centralized railway control system") (emphases added); 8:44–49 (stating that the railway traffic controller may remove a block "with the input of the release code provided by the designated worker assigned for track work"). Although the '115 patent describes alternative means for retrieving the code from internal storage when the field worker is unavailable, accessibility to this code is limited and this alternative access is only provided where "no maintenance worker [is] available to transmit the random secret code." *See id.* at 10:42–44; *see also id.* at 6:8, 9:56, 10:25, 10:35 (consistently describing the code as "secret").

Our analysis in this Decision is limited to determining whether Petitioner has shown a reasonable likelihood of prevailing in showing the unpatentability of any Challenged Claim and we need not expressly construe "secret code" to make that determination.[10] Petitioner's application of a purported plain and ordinary meaning of "secret code" neglects to address how a person of ordinary skill in the art would have understood "secret code" in light of the Specification of the '115 patent. We further address Petitioner's arguments directed to the code limitations in the context of the asserted prior art below, informed by our determination that Petitioner fails to sufficiently show that the claim term "secret code" encompasses a non-public code received by any railway personnel that may be used to release a track block without further limitations on the accessibility to the code by, for example, a dispatcher prior to a release of a track block.

2. Additional Claim Terms

The Parties do not dispute the construction of any other claim terms and we find that no other claim terms require express construction for purposes of rendering this Decision. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("[C]laim terms need only be construed 'to the extent necessary to resolve the controversy.'" (quoting *Vivid Techs., Inc. v. American Science & Engineering, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 2011).

[10] Further, for purposes of this Decision we need not resolve whether Patent Owner's proposed express construction of "secret code" is the proper meaning of the term in light of the Specification, which we note does not appear to expressly address how a person of ordinary skill in the art would have distinguished a code that is "readily available" to the dispatcher from a code that was not "readily available."

D. Alleged Obviousness Over Oriol and Masquelier

Petitioner contends that claims 20–36 of the '115 patent would have been obvious over Oriol and Masquelier. *See* Pet. 19–62; *see also* Ex. 1003 ¶¶ 90–226 (Dr. Michalson providing testimony in support of Petitioner's contentions). Patent Owner disputes Petitioner's contentions. *See* Prelim. Resp. 23–38. Because we find it determinative, we focus our discussion on whether Petitioner has sufficiently shown for purposes of institution that the code limitations would have been obvious over Oriol and Masquelier. For the reasons that follow, and as further explained above what is not encompassed by the recited "secret code" (*see supra* Section III.C.1), we determine Petitioner has not shown a reasonable likelihood of prevailing.

Oriol and Masquelier are volumes one and two, respectively, of a Federal Railroad Administration's report on "Supporting Railroad Roadway Worker Communications with a Wireless Handheld Computer." Ex. 1004, i, Ex. 1005, i. Oriol "documents the design and evaluation of a digital communication device intended to improve roadway worker safety and productivity." Ex. 1004, iii. Masquelier "evaluate[s] the human factor implications of computer and communications technology in railroad operations." Ex. 1005, iii. Oriol states that "[a]ccording to the Amtrak operating rules (NORAC, 1999), the dispatcher issues Form Ds to restrict or authorize train movements." Ex. 1004, 8.

According to Petitioner, "Oriol teaches that a railway worker operates a mobile device (PDA) to request work authorization over the Internet to a central control system" that is "operated by a dispatcher." Pet. 12. If the work authorization involves on-track equipment and/or will disturb the track, it is "denoted as Form D." *Id.* at 13 (citing Ex. 1004 7, 8, 29, Fig. 2, Fig. 4). If the dispatcher grants the Form D, appropriate information is sent

to the railway worker, and this information includes a "Form D number (automatically assigned by system)." *Id.* at 13 (citing Ex. 1004, 6, 38). "After completing the work, the railway worker from the PDA's interface selects 'Cancel/Fulfill' link to transmit the same Form D number to the dispatcher's central control system to unblock the track." Pet. 13–14 (citing Ex. 1004 36–37, Fig. A-1).

Patent Owner provides a further description of the Form D as follows:

> Other examples of inadequate safety precautions include NORAC's Operating Rules, including the "Form D" control system. *See, e.g.*, EX2002, EX2003. NORAC's Operating Rules have existed since the mid-1980's and "Form D" has been an integral part of NORAC's Operating Rules since at least the early 1990's. *See e.g.*, EX2003. A "Form D" contains "written authorization(s), restriction(s), or instruction(s) issued by the Dispatcher to specified individuals." EX2003 at 6. These instructions can include a "Form D Line 4," which is used when "removing a track from service for maintenance." *Id.* at 48. The Operating Rules require the dispatcher to determine that "controlled signals leading to the affected track are in Stop position" prior to issuing a "Form D Line 4." *Id.* Similarly, prior to releasing a "Form D," the dispatcher ostensibly must take certain actions, including "contact the addressee(s) and state his intent to cancel the Form D . . ., state the Form D number and, date, the cancellation time and date, and his initials, [and] ensure that all cancellation information is repeated [by the addressee] correctly." *Id.* at 62–63. Despite these protections, human errors and accidents continued to occur, such as those recognized in the FRA's Final Rule (EX2001) and in the '115 patent. *See* EX1001 at 2:18–39. Such errors included mistakes such as where "the train dispatchers did not maintain the required blocking devices." EX2001 at 75.

Prelim. Resp. 4–5. Patent Owner further describes Form D as follows:

> [A] Form D number is well-known in the railway industry. *See e.g.*, EX2002 at 61-67. Form D numbers were originally

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> designated using paper forms filled out by the dispatcher. *See, e.g.*, EX1004 at 55; EX2002 at 61.
>
> The Form D number is distributed broadly, to the dispatcher, locomotive engineers, railway field workers, and managers located outside the dispatcher's location. The form D number is not secret from anyone. Oriol states "[t]he device parameters should allow the PDA user to view all work permissions in effect for each track section on screens indicating the track that is out of service. ***It would also be beneficial to include work permissions under the authority of other roadway workers***." EX1004 at 27 (emphasis added). Fig. A-5 of Oriol shows the Dispatcher Interface, which shows that the Dispatcher is aware of the Form D number from the time that the railway worker requests Form D protection[.]

Id. at 24–25.

Petitioner asserts that "the Form D number is a secret code because the generated Form D number is sent to a specific registered worker 'who requested it' . . . and who only can cancel the same Form D number (or under his authority) to remove the track block." Pet. 39 (citing Ex. 1004, 36–38, 57, Fig. A-1; Ex. 1003 ¶ 138). Patent Owner argues that a Form D number is not a "secret code," as that term is used in the '115 patent. *See* Prelim. Resp. 28–33. Patent Owner argues that "[a] Form D number is not the same" as the claimed code because "a Form D number is simply an identifier for a given Form D" and "is known to the dispatcher." *Id.* at 29.

According to Patent Owner, "Oriol shows in Figure A-5, that from the time a Form D is requested, the dispatcher Interface displays the Form D numbers to the dispatcher," and that "Oriol's system utilizes the same generic, sequential numbering convention, generated by and known to the dispatcher, that was previously used on paper forms." *Id.* at 29–30. Patent Owner argues that "Form D's were subject to human error, including

prematurely released track blocks," and that "by keeping the 'secret code' secret from the dispatcher," as provided by the secret code of the '115 patent, "the dispatcher is unable to release the block, such as either by miscommunication or through error, until the railway worker provides the 'secret code.'" *Id.* at 31, citing Ex. 1001 11:37–39, Ex. 2001 75–76.

We agree with Patent Owner that Petitioner has not sufficiently shown for purposes of supporting institution that a Form D number as taught by Oriol/Masquelier corresponds to the recited "secret code." For the reasons detailed above (*see supra* Section III.C.1), Petitioner fails to sufficiently show how the claim term "secret code" encompasses a non-public code that is received by any railway personnel that may be used to release a track block without further limitations on the accessibility to the code by, for example, a dispatcher prior to a release of a track block. Petitioner shows only that a Form D number "is sent to the worker 'who requested it' . . . and who cancels the same Form D number (under his authority) to release the track block." Pet. 39. Petitioner fails to sufficiently show how a Form D number, which is displayed to the dispatcher before any block is to be removed (*see*, *e.g.*, Ex. 1004, A-5), is encompassed within the meaning of a "secret code," as required by the Challenged Claims. Thus, we find Petitioner's contentions insufficient to establish a reasonable likelihood of prevailing in showing any Challenged Claim would have been obvious over Oriol and Masquelier.

E. Alleged Obviousness Over Oriol, Masquelier, and Wise

Petitioner contends claims 20–36 of the '115 patent would have been obvious over Oriol, Masquelier, and Wise. Pet. 62–69. Although Petitioner provides a short description of Wise (*see* Pet. 16–17), the summary of Wise

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provided by Patent Owner more thoroughly explains the disclosure of Wise as follows:

> Wise (EX1006) is entitled "Safety Check" and generally discloses a safety system that can be used, for example, in a rail network. EX1006 at 1:1–7.
>
> According to Wise, a supervisor determines that railway work needs to be done at a work site. *Id.* at 10:28–31. A planner plans the work. *Id.* at 10:31–34. The planner may schedule blocking of railway lines at the work site. *Id.* at 11:6–13. Before any repair work begins, an assessor evaluates potential safety issues at the work site. *Id.* [at] 9:7–13; 16:3–5, Fig. 3.
>
> At the time the repair should start, a "Controller of Site Safety" or "COSS user" (who is one for the workers who will perform the repairs) conducts his own safety assessment of the work site. *Id.* at 7:6; 7:12–15. The COSS user then contacts a remote operator, who quizzes the COSS user. [*Id.* at] 3:11–13; 16:12–15 (. . .), 4:7–10 (. . .). The remote operator, but not the COSS user, has information supplied by the assessor (who evaluated the potential safety issues at the work site), but the operator will not help the COSS user pass the safety quiz. *Id.* at 26:23–27 ("When the COSS user calls the operator they do so in the full knowledge that no assistance will be given regarding possible answers. The COSS user must have calculated and/or established answers to all predicted questions.").
>
> If the COSS user passes the quiz, the operator verbally gives the COSS user a "Safety Check Number" (SCN), and the COSS user and the workers are permitted to enter the work site and complete the planned repairs. *Id.* at 26:12–19. Thus, because the operator verbally gives the COSS user the SCN, the operator (*e.g.*, the dispatcher) knows the SCN that is given to the COSS user. If the COSS user fails the quiz, he and the workers are not provided an SCN and are not allowed to enter the work site. *Id.* at 26:19–23.

Prelim. Resp. 34–35. Wise also states that "[a]s soon as a job is completed and workers are removed from a target location a qualified caller again calls the operator . . . and informs them that the team has withdrawn providing the

operator with the SCN number which has previously been allocated to the job." Ex. 1006, 25:4–9.

Petitioner summarizes how it proposes the teachings of Wise would have been applied to the system of Oriol. Pet. at 64–65. Petitioner argues that "[a]fter blocking the track, Oriol and Masquelier would also generate and transmit Wise's unique access code such as an SCN to the worker" and that "[t]his code would be considered a secret code because without the code a worker cannot access the worksite and only that worker has access to the code." *Id.* (citing Ex. 1006, 12:6–15, 31:33–32:3, Ex. 1003 ¶¶ 239–240).

According to Petitioner, a person of ordinary skill in the art "would have been motivated to modify Oriol and Masquelier with Wise's first blocking the track and thereafter generating a unique access code (*e.g.*, SCN),as the secret code" as "[t]his modification could enhance safety and security as the central control system would only generate the code once the block has been implemented as otherwise the dispatcher and/or third-party could unsafely or incorrectly use the code before the track is blocked." Pet. 63 (citing Ex. 1003 ¶¶ 229–231). Additionally, according to Petitioner, "Wise's code would be separate from the Form D number" and "could provide another layer of security over the Form D number because it acts as authority to enter the track for maintenance." *Id.* (citing, e.g., Ex. 1006, Abstract, 12:6–15, 24:19–26, 26:14–23, Fig. 5H).

Patent Owner argues that "the SCN [of Wise] is not involved in setting or releasing any block." Prelim. Resp. 35 (citing Ex. 1005, Fig. 5G). Patent Owner further argues that Wise's SCN is "not the claimed 'secret code' because it, like Oriol's Form D number, is known to the dispatcher at all times, and is therefore readily available to the dispatcher." Prelim. Resp. 42; s*ee also* Ex. 1006 at 24:19–26 ("an SCN is automatically

generated and displayed on the screen to an operator" and "[t]his number may then be verbally given to the caller").

We agree with Patent Owner that Petitioner has not sufficiently shown for purposes of supporting institution that the SCN of Wise corresponds to the recited "secret code." For the reasons detailed above (*see supra* Section III.C.1), Petitioner fails to sufficiently show how the claim term "secret code" encompasses a non-public code that is received by any railway personnel that may be used to release a track block without further limitations on the accessibility to the code by, for example, a dispatcher prior to a release of a track block. Petitioner shows only that the SCN of Wise is transmitted to a Petitioner, however, shows only that the SCN of Wise is transmitted to a worker and may "provide another layer of security," because the SCN "acts as authority to enter the track for maintenance." Pet. 63. Petitioner fails to sufficiently show how Wise's SCN, which is displayed to an operator before any block is to be removed (*see*, *e.g.*, Ex. 1006 at 24:19–26), is encompassed within the meaning of a "secret code," as required by the Challenged Claims. Thus, we find Petitioner's contentions insufficient to establish a reasonable likelihood of prevailing in showing any Challenged Claim would have been obvious over Oriol, Masquelier, and Wise.

F. Alleged Obviousness Over Oriol, Masquelier, and Pachl

Petitioner contends claims 20–36 of the '115 patent would have been obvious over Oriol, Masquelier, and Pachl. Pet. 69–74. Pachl's disclosure relates "to a method for controlling the sequence of trains during traffic control, whereby a telephone communication between a traffic controller in a traffic control centre and a driver is carried out." Ex. 1020, code (57).

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Pachl calls the communications between the dispatchers and the locomotive engineers "running messages." *Id.* at 1:14.

According to Petitioner, Pachl "teaches a control center with a computer interface and storage to first control the track safety measure and then generate a 'checking code,'" and further teaches that ""a train controller at the control center uses the interface to enter a code to release the track." Pet. 18 (citing, e.g., Ex. 1020, 1:11–20, 1:33–36, 1:54–58, 1:63–66, 2:47–60, 3:35–45, 4:9–19, 4:50–59; Fig. 2, Ex. 1003 ¶¶ 84–86. Patent Owner provides a more thorough explanation of the disclosure of Pachl as follows:

> The mechanism for improving the security of running messages envisioned by Pachl entails "checking codes." [Ex. 1001,] 1:37–42. ("The introduction of the checking code which is specific to the movement permission technically precludes the transmission of a movement permission for which the safety preconditions are not satisfied."). In Pachl, the dispatchers/train controllers and locomotive engineers communicate by telephone. *Id.* at 1:16–17. During these telephone calls, the dispatcher provides two pieces of information: a proposed movement permission for the train and a "checking code," which is a number that the dispatcher calculates on his computer based on the current state of the railway system and the proposed movement permission. *Id.* at 1:38–49. Specifically, Pachl teaches:
>
> > Once a train controller in the control center has received a movement request . . . the train controller enters an appropriate movement permission in a train computer. This uses the occupancy status of the requested track section to check the permissibility of the movement permission, and calculates a checking code which is specific for that movement permission. ***The movement permission is . . . quasi-granted, together with the checking code, on a train control computer screen display. This movement permission is transmitted by the***

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> ***train controller together with the checking code by telephone***.
>
> [*Id.*]at 4:8–20 (emphasis added).
>
> The locomotive engineer then enters the checking code and movement permission into a separate computer on the train. *Id.* at 2:2–5 ("The movement permission which is transmitted by telephone from the train controller to the locomotive engineer is entered in the vehicle appliance together with the checking code by the locomotive engineer."); 2:20–23 ("When the locomotive engineer enters the movement permission (which is being transmitted by telephone by the train controller). The locomotive engineer's computer uses the same algorithm that the train controller's computer used to generate his own version of the checking code. *Id.* at 2:24–26 ("The vehicle appliance uses the same algorithm as the train control computer to calculate the checking code for every movement permission that is entered")..
>
> If the version of the checking code computed by the locomotive's computer does not match the checking code the locomotive engineer received over the telephone, then he knows that the communication is in error. *Id.* at 2:28–31.

Prelim. Resp. 43–45.

Petitioner relies on the Form D number as the recited "secret code." See Pet. 71 (arguing that "Oriol and Masquelier could block the track and then generate the code (Form D number) as shown by Pachl first implementing a safety measure and then generating a code"). Petitioner also refers to the "checking code" of Pachl and argues that "[t]he Pachl code is secret because it is calculated and only the central control and receiving device can determine the code." *Id.* at 71 (citing Ex. 1020, 2:50–60, 4:7–26, 4:50–59, claim 1, Figs. 1, 2; Ex. 1003 ¶ 274)..

Petitioner fails to sufficiently show how a Form D number of Oriol, which is displayed to the dispatcher before any block is to be removed (*see*,

e.g., Ex. 1004, A-5), is encompassed within the meaning of "secret code," as required by the Challenged Claims. To the extent Petitioner's arguments may be interpreted as relying on Pachl's checking code as corresponding to the recited "secret code," Petitioner fails to sufficiently show how the checking code of Pachl, which is known to the dispatcher at all times (*see*, *e.g.* Ex. 1020, 4:8–20), is encompassed within the meaning of "secret code," as required by the Challenged Claims. Accordingly, we find Petitioner's contentions insufficient to establish a reasonable likelihood of prevailing in showing any Challenged Claim would have been obvious over Oriol, Masquelier, and Pachl.

IV. CONCLUSION

We deny institution of *inter partes* review of any of the Challenged Claims.

IV. ORDER

Upon consideration of the record before us, it is:

ORDERED that the Petition is denied and no *inter partes* review is instituted.

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FOR PETITIONER:

Frank M. Gasparo

William Hector
VENABLE LLP
FMGasparo@Venable.com
WAHector@Venable.com

FOR PATENT OWNER:

Bryan J. Vogel
Derrick J. Carman
ROBINS KAPLAN LLP
BVogel@RobinsKaplan.com
DCarman@RobinsKaplan.com
RK-RailwareAmtrak@robinskaplan.com