

(19)



(11)

EP 2 664 514 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
20.11.2013 Bulletin 2013/47

(51) Int Cl.:
B61L 25/02 (2006.01)

(21) Application number: **09007824.7**

(22) Date of filing: **15.06.2009**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
 HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL
 PT RO SE SI SK TR**
 Designated Extension States:
AL BA RS

(72) Inventors:
 • **Matusa, Remus George
 jud. Dolj (RO)**
 • **Matusa, Tudor
 200431 judetul Dolj (RO)**
 • **Matusa, T. Tudor
 200432 judetul Dolj (RO)**

(71) Applicant: **S.C. Mighty Prod S.R.L.
200092 Judet Dolj (RO)**

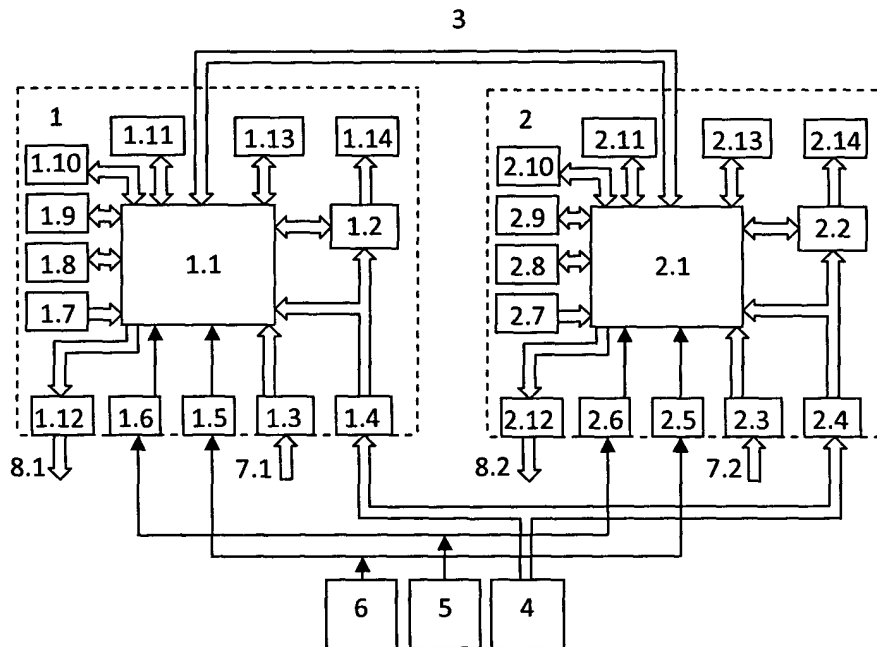
(54) System for measuring displaying, storing and controlling railway vehicle speed

(57) The present invention is related to a method for the production of two duplex structures on a triplex lamination equipment in one lamination step comprising the steps of:

- producing a double polymer film;

- laminating a first and a second lamination film on both sides of said double polymer film to obtain a laminated double polymer film;

- separating the laminated double polymer film in two single laminated polymer films.



Drawing 1.

EP 2 664 514 A1

Description

[0001] This invention is about a system for measuring, displaying, storing and controlling the speed of railway vehicles.

[0002] There are also other devices or systems for measuring, displaying, storing and controlling railway vehicle speed. One such device is the one patented by number RO 00118039, which uses a digital rotary transducer, mounted on the axle end. Storing is done on non-volatile memory, organised in a short-term and a long-term section. Displaying is done by means of an electro-mechanical system with a stepper motor. The disadvantages of this system are listed below:

- It measures the rotative speed of just one axle, so speed indication may be faulty in case of wheel sliding;
- The rotary transducer has moving parts which require regular maintenance;
- It requires synchronisation for the zero position of the indicator needle;
- Displaying errors may occur after a while because of mechanical wear;
- Data is only stored in one area of the railway vehicle, so damage in this area leads to loss of data necessary for reconstructing operation before an event;
- Limited storage capacity, meaning that the memory has to be organised into short-term and long-term sections;
- Data is entered with difficulty.

[0003] The technical issue tackled by this invention consists of a system for measuring, displaying, storing and controlling railway vehicle speed, that will eliminate false data generated by wheel sliding. Reliability will be increased by means of fully electronical units, without any moving parts.

[0004] The system for measuring, displaying, storing and controlling railway vehicle speed solves the above-mentioned technical issue in that it consists of two identical units installed in the two driver cabs. Storing is done in these units and the data is displayed on an alphanumeric touchscreen display. The system also includes a GPS-module which gives universal time and for speed measurement the data sources are the signals generated by the rotary transducers installed on all driving axles, a radar for real speed measurement and the speed data coming from the GPS-module.

[0005] The advantages of the system for measuring, displaying, storing and controlling railway vehicle speed are the following:

- Higher data-downloading speed; no special downloading modules are necessary, because there is a USB port;
- Clock synchronisation by means of a GPS module;
- Higher resolution and higher quantity of stored data by means of a high-capacity memory unit;
- Data are stored simultaneously on both dashboard computers, so the loss risk is very small;
- The engine driver is identified through a proximity system without the use of a keyboard;
- Data can be entered on each dashboard computer;
- Speed data are processed on two parallel and independent routes and displayed graphically and alpha-numerically;
- Because data are processed in parallel on several routes, it is possible to identify system errors;
- The use of several data sources for speed (rotary transducer, radar, GPS) means that real speed can still be shown even if one of the sources is damaged;
- The engine driver has easier access to the system by means of the touchscreen display, because virtual keys are easily operated;
- The high-resolution graphical display increases reliability because there is no mechanical wear, there is lower risk of reading errors (the dial and the indicator needle are coplanar) and no additional lighting is necessary.

[0006] Below is an example of the way the invention has been put into practice. Picture I is the diagram of a system for measuring, displaying, storing and controlling railway vehicle speed.

[0007] This system is made up of two identical units **1** and **2**, installed in the two driver cabs, which communicate bidirectionally by line **3** and at the same time receive data from rotary transducers **4**, from a GPS module **5** and from a radar for measuring real speed **6**.

[0008] Unit 1 is made up of a main microcontroller **1.1.**, which communicates bidirectionally with a secondary microcontroller **1.2** and both receive data from the axle rotative speed adapter **1.4**. Microcontroller **1.1** receives signals **7.1.** through the module for numerical entries **1.3**. It also receives information from the radar signal adapter **1.5**, the GPS adapter **1.6**, the proximity detector **1.7**, the Wi-Fi module **1.8** and the bluetooth module **1.9**.

[0009] Data are stored in the high-capacity memory unit **1.11**.

[0010] On the basis of the information it receives, the

main microcontroller 1.1. controls the graphic touch-screen display 1.13 and sends instructions 8.1. to the railway vehicle by means of the numerical output unit 1.12.

[0011] Secondary microcontroller 1.2. controls the alphanumeric display 1.14 on the basis of the information it receives from the rotative speed adapter 1.4 and from the main microcontroller 1.1.

[0012] The stored data is downloaded through a high-speed USB serial port 1.10, by means of the Wi-Fi module 1.8 or of the bluetooth module 1.9.

[0013] Unit 2 is made up of a main microcontroller 2.1 which communicates bidirectionally with a secondary microcontroller 2.2 and both receive data from the axle rotative speed adapter 2.4. Microcontroller 2.1 receives signals 7.2 by means of the numerical entry unit 2.3. It also receives data from the radar signal adapter 2.5, from the GPS adapter 2.6, the proximity detector module 2.7, the Wi-Fi module 2.8 and the bluetooth module 2.9.

[0014] Data are stored in the high-capacity memory unit 2.11.

[0015] On the basis of the data it receives, main microcontroller 2.1 controls the graphical touchscreen display 2.13 and sends instructions 8.2 to the railway vehicle by means of the alphanumeric output unit 2.12.

[0016] Secondary microcontroller 2.2. controls the alphanumeric display 2.14 on the basis of the data it receives from the rotative speed adapter 2.4 and the main microcontroller 2.1.

[0017] Downloading stored data is done through a high-speed USB serial port 2.10, by means of the Wi-Fi unit 2.8 or of the bluetooth 2.9.

[0018] Microcontrollers 1.1 and 2.1 receive universal time data from GPS module 5, make the time zone correction, the result being a clock of the system used to show time on the touchscreen graphical display 1.13 and 2.13, respectively. The same information is used for dating the recordings saved in the high-capacity memory unit 1.11 and 2.11, respectively.

[0019] GPS 5 unit is another way of determining vehicle speed, but it also has the highest error rate, which is why it is only used under extreme circumstances.

[0020] Speed calculation is performed in parallel by microcontrollers 1.1, 1.2, 2.1, 2.2 on the basis of the data received from rotary transducers 4, by means of adapter units 1.3 and 2.3. The closing or faulty operation of one of the microcontrollers can thus be rapidly detected. The microcontroller will then be automatically isolated and the engine driver is informed that the equipment needs repairing.

[0021] The high-capacity memory units 1.11 and 2.11 allow the exact reconstruction of the railway route on distances of thousands of kilometres and thus it is no longer necessary to organise the route into long- and short-distance sections. The memory is rapidly downloaded by means of state-of-the-art interface units, such as the Wi-Fi unit 2.8, the bluetooth unit 2.9 and the high-speed USB serial port 2.10. The high storage capacity makes it pos-

sible to store data in text-format (uncompressed) and to easily visualise them with the help of any text editors at our disposal.

[0022] Data are entered through the graphical touch-screen display 1.13 and 2.13, respectively. In this type of systems the user-device interface is a natural one.

[0023] Secondary microcontrollers 1.2 and 2.2 process the rotative speed information independently and show speed by means of alphanumeric displays 1.14 and 1.15. They fulfil the redundancy condition in case graphical touchscreen displays 1.13 and 2.13 are out of order.

[0024] The structure of the two units 1 and 2 installed in the driver cabs makes it possible to enter data from both driver cabs. Data can also be downloaded from both driver cabs. The same information is stored in both high-capacity memory unit 1.11 and in high-capacity memory unit 2.11.

[0025] Engine driver data can be entered using the touchscreen graphical display 1.13 and 2.13, respectively, or a card uniquely assigned to each engine driver, by means of the proximity detector 1.7 and 2.7, respectively.

Bibliography

[0026]

1. Patent RO 00118039

2. Popovici G, Barbos I, Chirila V, Dispozitive de siguranta, vigilenta si control al vitezei trenurilor (eng: Devices for Train Speed Safety, Vigilance and Control), Centrul de documentare si publicatii tehnice M.T.Tc (eng: The Center for Research and Technical Publications), 1972

Claims

1. System for measuring, displaying, storing and controlling railway vehicle speed **defined by the fact that** in order to measure, display, store and control railway vehicle speed, it is made up of two units (1, 2) installed in the two driver cabs, which communicate bidirectionally through a line (3), a unit of alphanumeric entries (4), a GPS module (5) and a radar for real speed measurement (6).

2. A system as claimed in claim 1, wherein each unit (1, 2) includes a main microcontroller (1.1, 2.1) which receives data from an axle rotative speed adapter (1.3, 2.3). It also receives signals (7.1, 7.2) by means of a numerical entry unit (1.4, 2.4) and information from the radar signal adapter (1.5, 2.5) and from a proximity detector (1.7, 2.7). The main microcontroller sends instructions (8.1, 8.2) to the railway vehicle by means of a numerical output unit (1.12, 2.12) and interconnects bidirectionally with a Wi-Fi unit (1.8, 2.8), a bluetooth unit (1.9, 2.9), a high-speed USB

serial port (1.10, 2.10), a high-capacity memory unit (1.11, 2.11), a touchscreen graphical display (1.13, 2.13) and a secondary microcontroller (1.2, 2.2). The secondary microcontroller controls an alphanumeric display (1.14, 2.14).

5

3. A system as claimed in claims 1 and 2, wherein data are simultaneously stored in units (1) and (2), which are installed in each driver cab. This increases data storage security.

10

4. A system as claimed in claims 1 and 2, wherein it calculates speed by means of two main microcontrollers (1.1 and 2.1) and two secondary microcontrollers (1.2 and 2.2). The speed is displayed analogically on graphical displays (1.13, 2.13) and in digital format on alphanumeric displays (1.14, 2.14). The redundancy condition, which is typical of systems for railway speed measurement, is thus fulfilled.

15

20

25

30

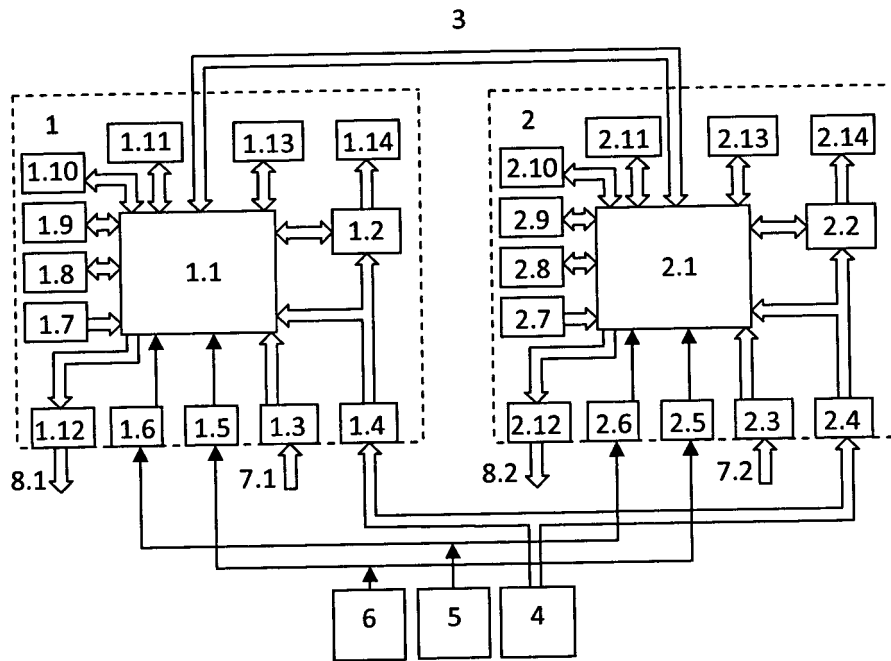
35

40

45

50

55



Drawing 1.



EUROPEAN SEARCH REPORT

Application Number
EP 09 00 7824

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 882 620 A1 (SIEMENS AG [DE]) 30 January 2008 (2008-01-30) * column 1, line 41 - column 2, line 41 * * column 3, line 1 - line 49 * * figures 1,2 * -----	1-4	INV. B61L25/02
X	EP 0 736 441 A1 (HONEYWELL AG [DE]) 9 October 1996 (1996-10-09) * paragraph [0003] - paragraph [0009] * * paragraph [0059] * * figure 1 * -----	1-4	
			TECHNICAL FIELDS SEARCHED (IPC)
			B61L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 October 2013	Examiner Janhsen, Axel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

1
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 00 7824

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

10-10-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
EP 1882620	A1	30-01-2008	DE 102006035597 A1	31-01-2008
			EP 1882620 A1	30-01-2008

EP 0736441	A1	09-10-1996	DE 19513244 A1	10-10-1996
			EP 0736441 A1	09-10-1996

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- RO 00118039 [0002] [0026]

Non-patent literature cited in the description

- eng: Devices for Train Speed Safety, Vigilance and Control. **POPOVICI G ; BARBOSI ; CHIRILA V.** Dispozitive de siguranta, vigilenta si control al vitezei trenurilor. The Center for Research and Technical Publications, 1972 [0026]