(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 942 100 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
15.09.1999 Bulletin 1999/37

(51) Int Cl.[6]: **E01B 26/00**

(21) Application number: **99500023.9**

(22) Date of filing: **12.02.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **12.03.1998 ES 9800537**

(71) Applicant: **PATENTES TALGO, S.A.**
28014 Madrid (ES)

(72) Inventors:
- **Lopez Gomez, José Luis**
  28014 Madrid (ES)
- **Archilla Aldeanueva, Faustino**
  28014 Madrid (ES)
- **Gomez Gomez, Carlos Javier**
  28014 Madrid (ES)

(74) Representative: **Elzaburu Marquez, Alberto et al**
Elzaburu S.A.,
Miguel Angel, 21
28010 Madrid (ES)

(54) Wheel translation control system for track gauge changers

(57) A wheel translation control system in track gauge changers comprising load cells (C1, C2, C3) fitted in elastic sensing devices (9), housed in unlocking guides (5, 6) and joined to transverse translation guides (7, 8), summing junction boxes connected to said load cells to receive the signals generated by the latter when the wheel sets pass, a signal conditioning unit connected to said junction boxes to condition the analogical signals transmitted from the latter, and a digital equipment to process and store the signals received from the load cells and other data referring to the vehicle and its wheel sets. The invention is useful to detect anomalous translation behaviour of one or more wheels on passing from one track gauge to another.

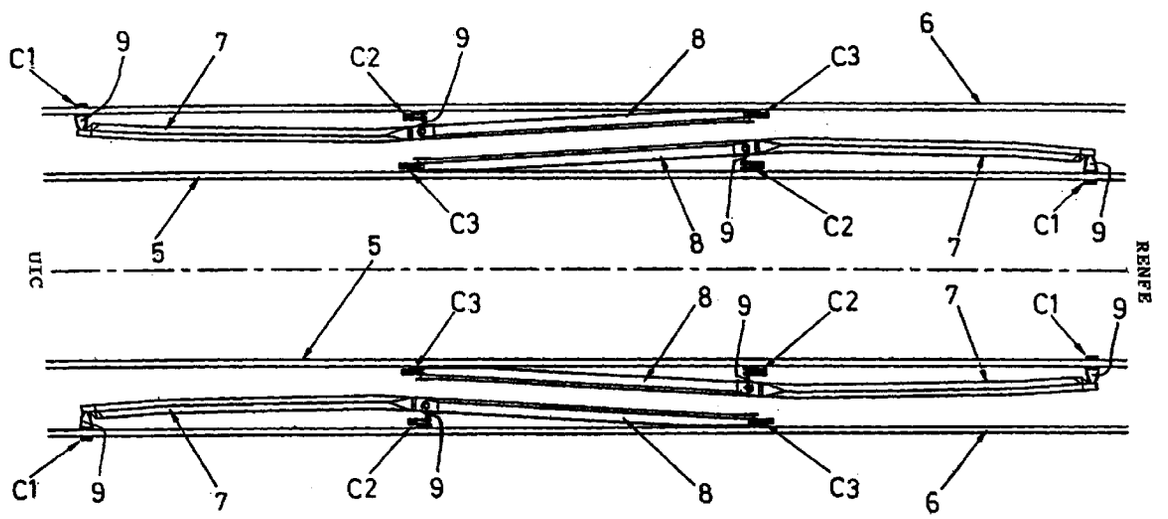

FIG.-2

EP 0 942 100 A2

Description

FIELD OF THE INVENTION

[0001] The present invention refers to a wheel translation control system in a track gauge changer, capable of measuring on the passage of a train, the necessary force to translate the wheel sets of the carriages from one gauge to another.

BACKGROUND OF THE INVENTION

[0002] Patent EP-A-O 611 847 describes a gauge changer intended to permit the automatic variation of the separation between the wheels of the wheel sets, the latter being adapted to each one of two conventional gauges. This changer comprises unlocking guides intended to release the wheel fastening latches in such a way that they may move transversally, passing from one gauge to another, as well as transverse translation guides, fitted between the unlocking guides and pushing and guiding the wheels when changing the gauge.

SUMMARY OF THE INVENTION

[0003] As from the above mentioned European patent, which serves as a preamble for claim 1, the present invention has developed a control system applicable to the gauge changer of said patent, by which the resistance offered by the wheel sets may be measured when translated from one gauge to another.

[0004] Therefore, an object of the present invention consists of providing a wheel translation control system in a track gauge changer with the purpose of always knowing if said translation is made without the necessary force for it exceeding a predetermined value. This value will vary according to the type of train (passenger train, goods train, mixed train), but in general should be less than 300 daN.

[0005] Another object of the invention consists in keeping an updated record of the resistance offered to the translation by each wheel set of a train, and hence being able to adopt the repair or reconditioning measures, necessary only for those wheel sets exceeding the above mentioned predetermined value in their translation from one track gauge to another.

[0006] These and other objects of the invention are achieved by means of the mentioned control system, applicable to a track gauge changer comprising unlocking guides, two for each side of the wheel set, running parallel to the track axis, and transverse translation guides, two for each side of the wheel sets, fitted between the unlocking guides of the corresponding side and each one of them consisting of an elastic part and a rigid part joined to each other in an articulated way at one of their ends, said control system being characterised in that it comprises, for each transverse translation guide, a plurality of load cells mounted in elastic sensing devices housed and fixed in the unlocking guides, as well as joined to the transverse translation guides; summing junction boxes connected to said load cells and intended to receive the signals generated by the latter on the passage of the wheel sets; a signal conditioning unit connected to said junction boxes and intended to condition the analogical signals transmitted from the latter; and a data collection and storage digital equipment to process the signals received from the load cells across the junction boxes and the conditioning unit, as well as other characteristic data referring to the vehicle and its wheel sets.

[0007] According to the invention, three load cells are used for each transverse translation guide, one arranged in the free end of the elastic part of said guide, another situated in the joining area of the elastic and rigid parts of said guide, and a third one located in the free end of the rigid part of said guide.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The above and other objects of the invention will be more clearly elucidated upon reading the following description of a preferred embodiment thereof referring to the attached drawings, wherein:

- Figure 1 shows a schematic plan view of a track gauge changer to which the invention may be applied,
- Figure 2 is a schematic plan view illustrating the control system developed by the invention and
- Figure 3 is a block diagram showing the connections between the different components of the control system of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0009] As shown in figure 1, a track gauge changer 1 is fitted between rolling rails 2 of UIC gauge and rolling rails 3 of RENFE gauge (RENFE is the acronym for the Spanish Railways). The installation comprises guide rails 4 intended for centering and sliding the carriages during the track gauge change operation; internal 5 and external 6 unlocking guides, intended to release the wheel fastening latches of the wheel sets and hence leaving the latter free to be transversally displaced, passing from one track gauge to another; and transverse translation guides arranged between the two sliding guides 5, 6 on each side of the track, each one of them consisting of an elastic part 7 and a rigid part 8.

[0010] The operation of the track gauge changer of figure 1, described in detail in the patent EP-A-O 611 847, consists, in short, of the following:

[0011] When a train enters in the changer 1, its vehicles become supported by the guide rails 4 and the bogie wheels subjected to the track gauge change operation are separated from the entrance rolling rails 2 or 3 depending on the train coming from the track of less

gauge or from the track of greater gauge. The unlocking guides 5, 6 release the wheel fastening latches and the wheels are then pressed by the transverse translation guides 7, 8 so that they pass from one track gauge to another. On reaching the height of the exit rolling rails 3 or 2, the wheels enter in contact with these and support the vehicle again, such that the latter is separated from the guide rails 4 and remains then ready to circulate along the new track gauge.

[0012] In the representation of figure 2, the rolling rails 2 and 3 as well as the guide rails 4 have been omitted, and only the unlocking guides 5, 6 and the transverse translation guides 7, 8 have been illustrated, these being the components of the changer 1 to which the present invention applies.

[0013] As may be observed in figure 2, each transverse translation guide 7, 8 has three load cells C1, C2, C3, assigned, respectively corresponding to the free end of the elastic part 7 of the guide, to the joining area of the elastic and rigid parts 7, 8 of the guide and to the free end of the rigid part 8 of the guide. The load cells are installed on fixed supports of the unlocking guides 5, 6 and each one connected to an elastic sensing device 9 transmitting to said cells the forces coming from the wheel sets during their translation movement from one track gauge to another. The elastic sensing devices 9 are also joined to the corresponding transverse translation guides 7, 8.

[0014] As illustrated in the scheme of figure 3, the forces measured by the load cells C1, C2, C3 are transmitted to the summing junction boxes 10 and from these to a signal conditioning unit 11. The analogical signals conditioned in unit 11 are sent to a processing equipment 12 for their display and evaluation.

[0015] The operation of the control system of the invention is developed as follows:

[0016] When the wheels of the wheel sets of a railway vehicle enter in contact with the transverse translation guides 7, 8, the load cells C1, C2, C3 will start to measure the force imposed over said guides by the wheels during their movement of change of track gauge, the force imposed over each point of the translation guides 7, 8 being the sum of the forces measured by the load cells located on either side of this point.

[0017] It should be remarked that, for the purposes of the present invention, the entrance load imposed by the wheels over the elastic entrance part 7 of the transverse translation guides is not considered. That is, assuming that the train comes from the UIC side (left side of figure 2), the measurements in the load cells C1 and C2 of the external transverse translation guides will not be taken into account (the load cell C3 of these external guides would not work in this case, since the wheels would never be in contact with the rigid part 8 thereof). Specifically, the control of the translation force evolution of the wheel sets in a train coming from the UIC side will be made by measuring this parameter in the internal transverse translation guides (nearer to the track axis) by means of their three respective load cells C3, C2 and C1, which will measure the horizontal reaction forces at the end of the rigid part 8 of said guides remote from its elastic part 7 (load cell C3), at the end of said rigid part 8 close to its articulation with said elastic part 7 (load cell C2) and at the end of this elastic part 7 remote from its articulation with the rigid part 8 (load cell C1). A similar consideration applies to the case in which the train arrives to the changer 1 along the RENFE side, except that then the force measurements would be taken from the load cells situated on the external transverse translation guides (further remote from the track axis).

[0018] The force measurement signals generated by the cells C1, C2, C3 are sent to the summing junction boxes 10, where the signals corresponding to each point of the transverse translation guides 7, 8 are added together to obtain the total force applied on the corresponding point. These sum signals are transmitted to the conditioning unit 11, where they are prepared for their transmission as analogical signals to the processing equipment 12. In the latter, the analogical signals are digitized, displayed on a screen and evaluated.

[0019] The processing equipment 12 should be capable of supplying, among other, the following informations:

- Date on which the vehicle passed by and its identification.
- Identification of the direction in which the passage was made and identification of the number assigned to each one of the wheel sets and the position of their wheels. Also the time on which the passage of each axle was produced should be controlled to indirectly determine the passage speed.
- List of the wheels in which the translation force had exceeded a value of 300 daN, indicating the specific value of said translation force. The software of the processing equipment 12 may modify, without great complications, the level of the maximum value of 300 daN mentioned above.
- Retention in memory of the evolution in time of the necessary force to translate those wheels whose maximum had exceeded the value of 300 daN or that fixed by default.
- Retention in memory of the maximum translation force, whatever its value, provided that previously the wheel had exceeded the maximum force of 300 daN, and list of the evolution of the maximum translation force of one wheel as from the date on which said maximum value of 300 daN was exceeded.
- Attainment in a PC of the histogram for the translation force evaluation when the maximum value had exceeded 300 daN.

[0020] In the light of the information supplied by the processing equipment 12, it will be possible to be aware of the wheels for whose translation a force greater than the pre-established maximum value was required (300

daN in this embodiment example), and to order the transfer of said wheels to the workshop for their revision and possible repair of the defect that obliged the translation force required to rise above the pre-established admissible maximum value.

[0021] As a consequence of the use of the control system of the present invention, it is possible to have an exact knowledge of the state of each wheel set of a vehicle at all times, and to subject to revision and/or repair only those wheel sets really needing it. This means a more economical maintenance of railway vehicles since it will prevent the need for routine periodic revisions of all the wheel sets and would permit action only over those that had shown an inadmissible resistance to their translation from one track gauge to another.

[0022] The above specification has tried to highlight the essential features of the control system of the present invention. Nevertheless, it is obvious that it would be possible to introduce shape, detail and arrangement modifications of components in the control system described and represented, without going beyond the scope of the present invention. For this reason, it is intended that the scope of the latter is only limited by the contents of the attached claims.

Claims

1. A wheel translation control system in a track gauge changer (1), comprising unlocking guides (5, 6), two for each side of the wheel sets, running parallel to the track axis, and transverse translation guides (7, 8), two on each side of the wheel sets, which are installed between the unlocking guides (5, 6) of the corresponding side and each one of them consisting of an elastic part (7) and a rigid part (8) articulated to each other at one of its ends, characterised in that it comprises, for each transverse translation guide (7, 8), a plurality of load cells (C1, C2, C3) fitted in elastic sensing devices (9) housed and fixed in the unlocking guides (5, 6), as well as joined to the transverse translation guides (7, 8); summing junction boxes (10) connected to said load cells (C1, C2, C3) and intended to receive the signals generated by the latter on passage of the wheel sets; a signal conditioning unit (11) connected to said summing junction boxes (10) and intended to condition the analogical signals transmitted from the latter; and a digital equipment (12) for taking and storing data to process the signals received from the load cells (C1, C2, C3) by means of the summing junction boxes (10) and the conditioning unit (11), as well as other characteristic data referring to the vehicle and its wheel sets.

2. A system according to claim 1, characterised in that it comprises three load cells (C1, C2, C3) for each transverse translation guide (7, 8), one (C1) arranged at the free end of the elastic part (7) of said guide, another (C2) placed in the joining zone of the elastic (7) and rigid (8) parts of said guide and a third one (C3) located at the free end of the rigid part (8) of said guide.

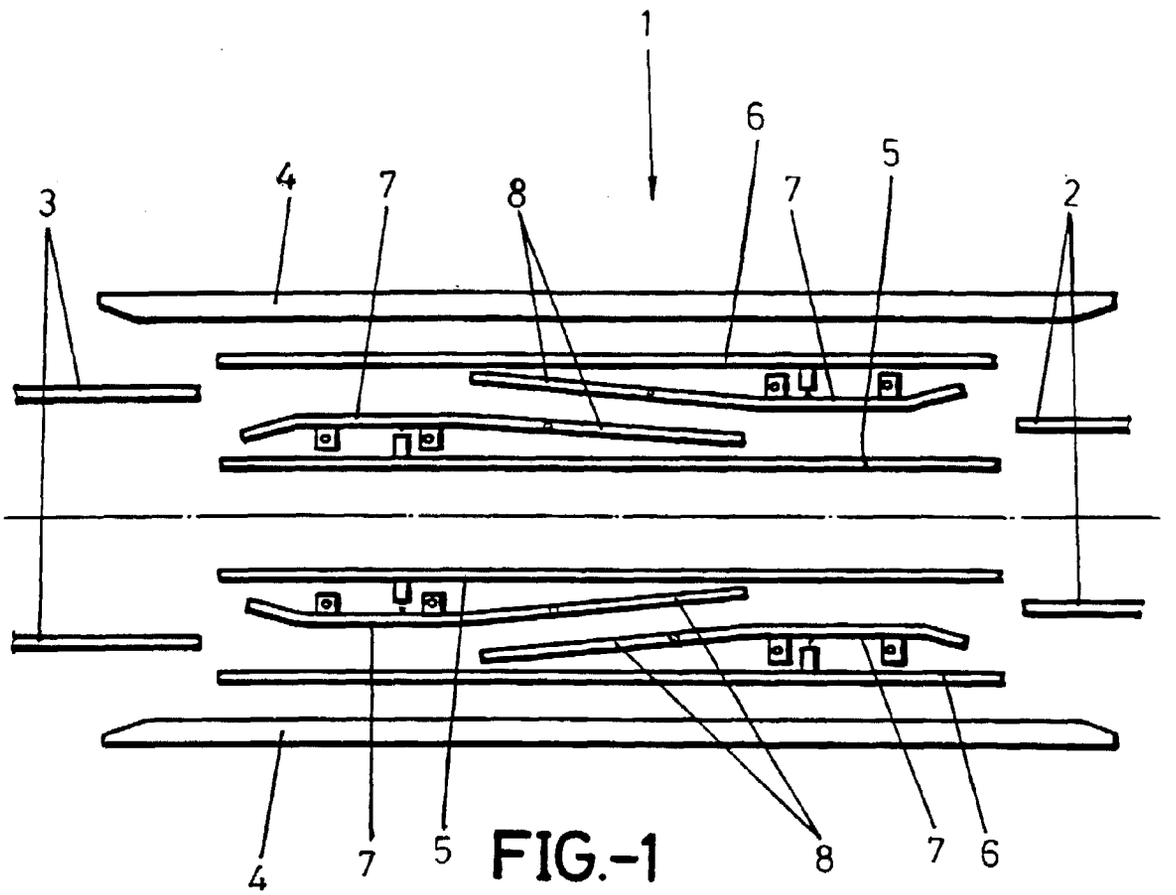

FIG.-1

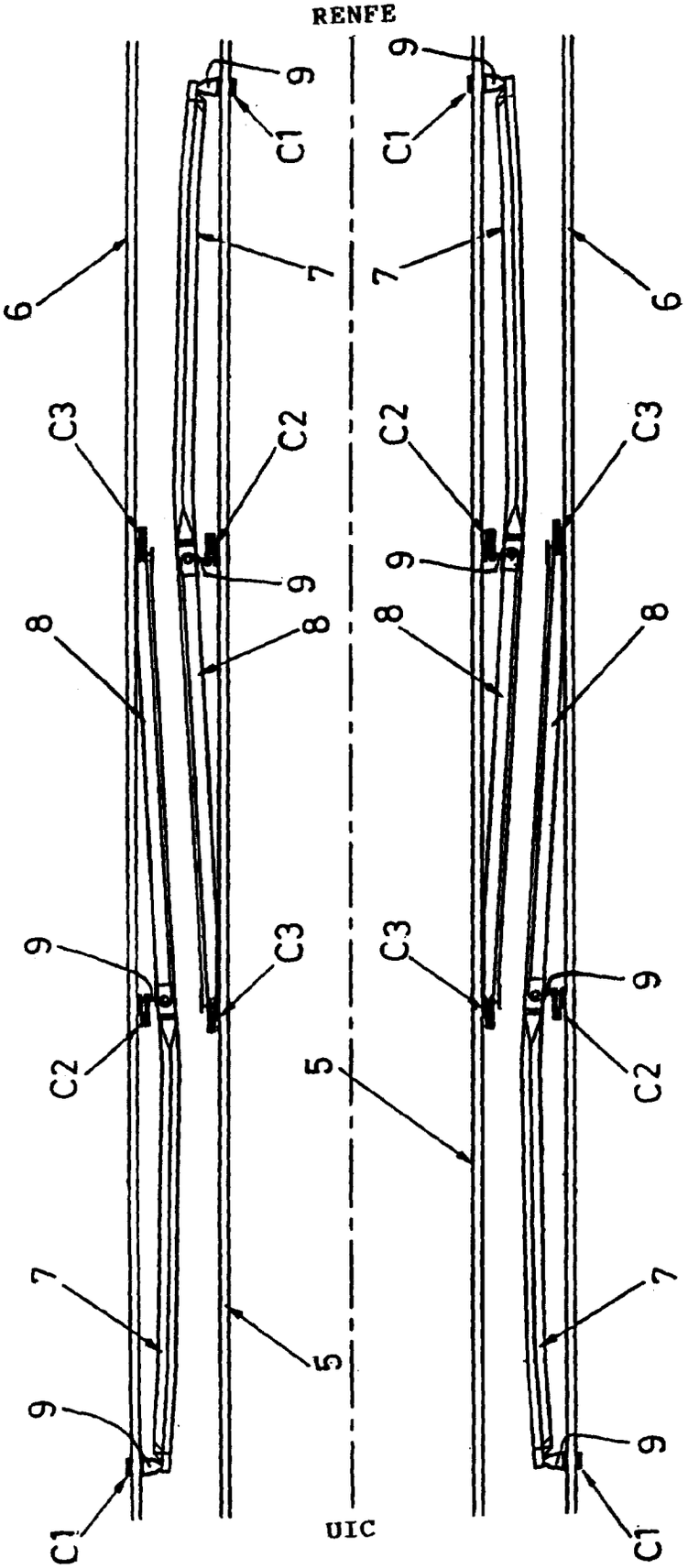

FIG.-2

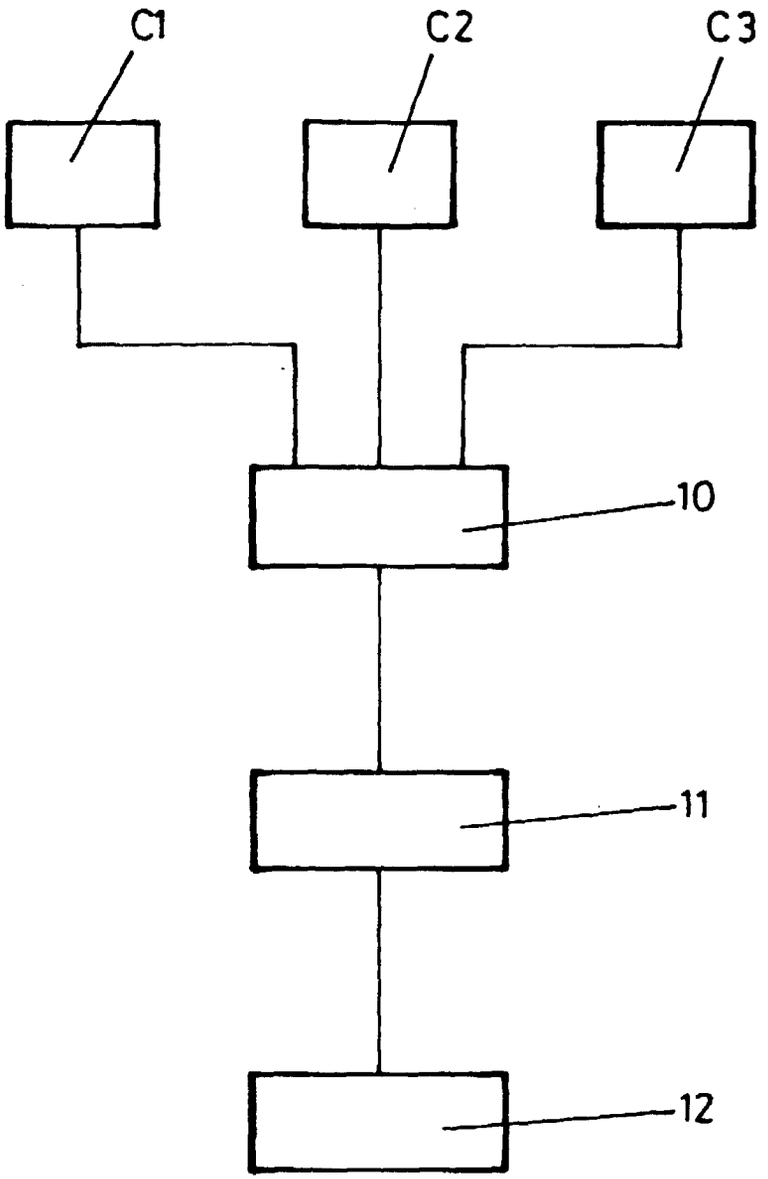

FIG.- 3