

(19)



(11)

EP 1 120 325 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
24.02.2010 Bulletin 2010/08

(51) Int Cl.:
B61F 7/00 (2006.01)

(21) Application number: **01500017.7**

(22) Date of filing: **16.01.2001**

(54) **Motive axle system with movable wheels for railway vehicles**

Antriebsachssystem mit verschiebbaren Rädern für Eisenbahnfahrzeuge

Système d'essieu moteur avec roues déplaçables pour véhicules ferroviaires

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

(30) Priority: **26.01.2000 ES 200000156**

(43) Date of publication of application:
01.08.2001 Bulletin 2001/31

(73) Proprietor: **Patentes Talgo, S.L.**
28290 Las Matas (Madrid) (ES)

(72) Inventors:
• **Lopez Gomez, José Luis**
28230 Las Rozas Madrid (ES)

• **Borrajo Mora, José**
28230 Las Rozas Madrid (ES)
• **Frutos Aguado, Julio**
28230 Las Rozas Madrid (ES)

(74) Representative: **Elzaburu Marquez, Alberto et al**
Elzaburu S.L.P.
Miguel Angel 21, 2°
28010 Madrid (ES)

(56) References cited:
EP-A- 0 857 636 EP-A- 0 873 929
FR-A- 1 248 694

EP 1 120 325 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

FIELD OF THE INVENTION

[0001] The invention refers to a new motive axle system with moveable independent wheels for railway vehicles, which can be used on tracks of different gauges.

BACKGROUND OF THE INVENTION

[0002] In the field of railways, wheel set systems are already known which have axially movable wheels which allow a railway vehicle to travel on tracks of different gauges. Particularly, the applicant has developed different systems of this type among which, for example, is that disclosed in patent FR-A-1 558 329, which refers to a single-axle bogie with variable separation between the wheels.

[0003] Moreover, in the art there are various traction arrangements for railway vehicles, of the type called "disseminated traction" or "distributed traction", according to which all or many of the axles of a train made up of several units are motive axles instead of only the axles corresponding to the tractor head or heads being the motive axle. An example of this technique is found in EP-A-O 825 085, which refers to a tractor bogie provided with a toothed extensible axle which is mounted between each pair of opposite wheels and to which the traction torque generated by a motor is transmitted to make the wheels turn.

[0004] A similar bogie is disclosed by EP-A-O 857 636.

[0005] The systems disclosed in the documents mentioned above have a particular application in the case of TALGO® type railway wheel sets in which, as is known, each wheel is attached on a short axle housed at its ends in inner and outer bearing. These wheel sets are incorporated in the connection between two railway vehicles.

SUMMARY OF THE INVENTION

[0006] The object of the system of the present invention is to provide a movable independent wheel axle of the type which forms part of a TALGO® wheel set or the like, which also incorporates the motive axle function of the type belonging to a railway system of disseminated or distributed traction.

[0007] Therefore, the system in accordance with the invention is basically comprised by: a short axle whose journal is assembled on a load supporting part with a first interposed bearing; a tubular part assembled on and joined to said axle, on one of whose ends a wheel is attached, said tubular part having an end area opposite to that on which the wheel is mounted, of greater diameter and with an outer straight-toothed gearing; a second bearing attached to the tubular part towards the middle of the total length of the latter, with axial bearings arranged on each side of the same; a bearing box which houses said second bearing and said axial bearings,

which is provided, on its front and rear walls, with protuberances which co-operate with the rods of a bolt which immobilises the wheel in positions corresponding to the different track gauges; and a hollow axle floating system which at one of its ends engages with said outer gearing of the first end of said tubular part and which is adapted to communicate to the latter the drive transmitted from a traction motor by means of a bevel gear assembly, whose crown is joined to the outer covering of said hollow axle floating system and whose pinion is mounted on the power shaft of the traction motor for actuating the wheel.

[0008] In accordance with a preferred embodiment of the invention, said load supporting part on which the journal of the axle is assembled and said box which houses said second bearing and said axial bearings form part of a load supporting frame which joins them together.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention is illustrated in the attached drawings, in which:

- Figure 1 shows an elevational view, in partial cross-section, of an axle system in accordance with a preferred embodiment of the invention,
- Figure 1A illustrates a cross-sectional view taken through the line A-A of Figure 1, and
- Figure 2 shows a plan view, in partial cross-section, of the system in accordance with the invention shown in Figure 1.

DESCRIPTION OF THE INVENTION

[0010] With reference first to Figure 1 of the drawings, the journal of a short axle E is indicated by 1, attached to a bearing 2 which supports the vertical load transmitted through the frame 3. This bearing is housed in the outer bearing box, which is also provided with a sliding piece 13 whose function will be explained below.

[0011] Assembled and joined to the axle E, there is a tubular part 4 to which, at the end which is next to the outer bearing box, a wheel R is attached which is joined to the said tubular part 4. The opposite end of the tubular part 4, indicated by 5 in Figure 1, has an area of enlarged diameter provided, on its outer surface, with a straight-toothed gearing 5', intended to engage with an inner gearing 6' provided in the inner side of the end of a section 6 of a hollow axle floating system generally designated by H.

[0012] Attached to said tubular part 4, between the wheel R and the end 5 of greater diameter of the same, there is a central roller bearing 7, on each side of which are arranged axial bearings 8. Said bearings 7, 8 are housed in a bearing box 9 which has on its front and rear sides, according to the direction of travel, protuberances 10 (see Figure 1A) which will move axially in guide channels made for this purpose in the supporting housing 16 of the load supporting frame 3.

[0013] The arrangement of the part 4, the wheel R and the bearings 7, 8 is such that the whole assembly can slide axially jointly with the axle E while the teeth of gears 5', 6' remain constantly in a meshing condition.

[0014] The section 6 of the hollow axle floating system H is made to rotate by the conical group made up of the pinion 11, joined to the power shaft of a traction motor (not shown), and the crown 12, attached to the outer covering HE of said hollow axle floating system H.

[0015] Figure 1A shows a cross-section view taken through the line A-A of Figure 1, representing in greater detail the assembly of the bearing box 9, which encloses the bearings 7, 8, by sliding into the housing 16 made for this purpose in the supporting frame 3. By means of said protuberances 10, said bearing box 9 co-operates with a locking bolt 14 on which a part 15 will act, which is provided in the track in order to achieve the change of track gauge of the railway vehicle.

[0016] The process whereby the wheels pass from one track gauge to another will be carried out in co-operation with any of the currently existing changers for this type of wheel set and, as is already known in the art, includes the following operations:

- unloading of the wheels R, each frame 3 being supported on its sliding pieces 13 against parts provided on the track for this purpose;
- lowering of each bolt 14 by means of which the axial unblocking of the bearing box 9 is achieved and, therefore, of the whole unit made up of said bearing box 9 with its bearings 7, 8, the tubular part 4 and the wheel R;
- axial movement of said whole assembly 4, 7, 8, 9 and R to bring it nearer to or separate it from the outer bearing box in which the journal 1 is housed, according to whether one respectively wishes to increase or reduce the track gauge;
- axial blockage of said assembly 4, 7, 8, 9 and R due to the raising of the bolts, which are applied against the protuberances 10 in the new axial position of the bearing box 9 with respect to the housing 16 of the supporting frame 3, when the sliding pieces 13 leave said parts provided on the track; and
- supporting of the wheels R on the rails of the track of new gauge.

[0017] In the light of the sequence of operations which has just been described, it will be obvious that the axial movement of the assembly 4, 7, 8, 9 and R is carried out without the straight toothed gearing 5' of the tubular part 4 being disengaged from the corresponding inner gearing 6' of section 6 of the hollow axle floating system H at any time, so that at all times the traction motor of the axle in accordance with the invention will continue to make the wheel R rotate due to the arrangement which has just been described.

[0018] Persons skilled in the art will understand that in the foregoing description of the currently preferred em-

bodiment of the invention, given solely by way of illustration, modifications may be carried out which will not go beyond the scope of the present invention, as it is defined by the content of the attached claims.

Claims

1. A motive axle system with movable wheels for railway vehicles, **characterised in that** it comprises a short axle (E) whose journal (1) is assembled on a load supporting part with a first interposed bearing (2); a tubular part (4) assembled on and joined to said axle (E), on one of whose ends a wheel (R) is attached, said tubular part (4) having an end area (5), opposite to that on which the wheel (R) is mounted, of greater diameter and with an outer straight-toothed gearing (5'); a second bearing (7) attached to the tubular part (4), towards the middle of the total length of the latter, with axial bearings (8) arranged on each side of the same; a bearing box (9) which houses said second bearing (7) and said axial bearings (8), which is provided, on its front and rear walls, with protuberances (10) which co-operate with the rods of a bolt which immobilises the wheel (R) in positions corresponding to the different track gauges; and a hollow axle floating system (H) which, at one of its ends, engages with said outer gearing (5') of the first end of said tubular part (4) and which is adapted to communicate to the latter the drive transmitted from a traction motor by means of a bevel gear assembly (11, 12), whose crown (12) is joined to the outer covering (HE) of said hollow axle floating system (H) and whose pinion (11) is mounted on the power shaft of the traction motor for actuating the wheel (R).
2. A motive axle system in accordance with claim 1, **characterised in that** said load supporting part upon which the journal (1) of the short axle (E) is assembled and said bearing box (9) which houses said second bearing (7) and said axial bearings (8), form part of a load supporting frame (3) which joins them together.

Patentansprüche

1. Antriebsachsensystem mit verstellbaren Rädern für Schienenfahrzeuge, **dadurch gekennzeichnet, dass** es eine kurze Achse (E), deren Lagerzapfen (1) an einem lasttragenden Teil mit einem ersten dazwischen angeordneten Lager (2) montiert ist; einen rohrförmigen Teil (4), der an der Achse (E) an einem jener Enden, an denen ein Rad (R) angebracht ist, montiert und verbunden ist, wobei der rohrförmige Teil (4) einen Endbereich (5) entgegengesetzt zu demjenigen, an dem das Rad (R) befestigt ist, mit

einem größeren Durchmesser und mit einer gerad-
verzahnten Außenverzahnung (5') aufweist; ein
zweites Lager (7), das an dem rohrförmigen Teil (4)
in Richtung der Mitte der Gesamtlänge des letzteren
angeordnet ist, wobei Axiallager (8) auf jeder Seite
desselben angeordnet sind; einen Lagerkasten (9),
der das zweite Lager (7) und die Axiallager (8) be-
herbergt, welcher an seinen vorderen und hinteren
Wänden mit Vorsprüngen (10) versehen ist, die mit
den Stangen eines Bolzens zusammenwirken, wel-
cher das Rad (R) in Positionen unbeweglich macht,
die unterschiedlichen Spurbreiten entsprechen; und
ein Hohlachsen-Schwebesystem (H) umfasst, das
an einem seiner Enden mit der Außenverzahnung
(5') des ersten Endes des rohrförmigen Teils (4) in
Eingriff steht, und das ausgebildet ist, auf das letz-
tere den Antrieb zu übermitteln, der von einem Fahr-
motor mittels einer Kegelradbaugruppe (11, 12), de-
ren Kronenrad (12) mit der äußeren Abdeckung (HE)
des Hohlachsen-Schwebesystems (H) verbunden
ist, und deren Ritzel (11) an der Triebachse des Trak-
tionsmotors zum Betätigen des Rades (R) befestigt
ist, übertragen wird.

(4) et qui est adapté pour communiquer à ce dernier l'entraînement transmis par un moteur de traction au moyen d'un ensemble de roues coniques (11, 12), dont la couronne (12) est liée au capot extérieur (HE) dudit système flottant à essieu creux (H) et dont le pignon (11) est monté sur l'arbre moteur du moteur de traction pour actionner la roue (R).

2. Antriebsachsensystem nach Anspruch 1, **dadurch gekennzeichnet, dass** der lasttragende Teil, auf dem der Lagerzapfen (1) der kurzen Achse (E) montiert ist, und der Lagerkasten (9), der das zweite Lager (7) und die Axiallager (8) beherbergt, einen Teil eines lasttragenden Rahmens (3) bilden, der diese miteinander verbindet.

Revendications

1. Système d'essieu moteur à roues mobiles pour véhicules ferroviaires, **caractérisé en ce qu'il** comprend un essieu court (E) dont le tourillon (1) est assemblé sur une partie de support de charge avec un premier roulement intercalé (2) ; une partie tubulaire (4) assemblée sur et liée audit essieu (E), une roue (R) étant attachée à l'une de ses extrémités, ladite partie tubulaire (4) comportant une zone arrière (5), à l'opposé de celle sur laquelle est montée la roue (R), de plus grand diamètre et avec un engrenage extérieur à dents droites (5') ; un deuxième roulement (7) fixé à la partie tubulaire (4), vers le milieu de la longueur totale de cette dernière, avec des paliers de butée (8) placés de chaque côté de celui-ci ; un palier (9) qui contient ledit deuxième roulement (7) et lesdits paliers de butée (8), qui est pourvu, sur ses parois avant et arrière, de protubérances (10) qui coopèrent avec les tiges d'un boulon qui immobilise la roue (R) dans des positions correspondant aux différents écartements de voie ; et un système flottant à essieu creux (H) qui, à l'une de ses extrémités, se met en prise avec ledit engrenage extérieur (5') de la première extrémité de ladite partie tubulaire

2. Système d'essieu moteur selon la revendication 1, **caractérisé en ce que** ladite partie de support de charge sur laquelle est monté le tourillon (1) de l'essieu court (E) et ledit palier (9) qui contient ledit deuxième roulement (7) et lesdits paliers de butée (8), font partie d'un cadre de support de charge (3) qui les relie.

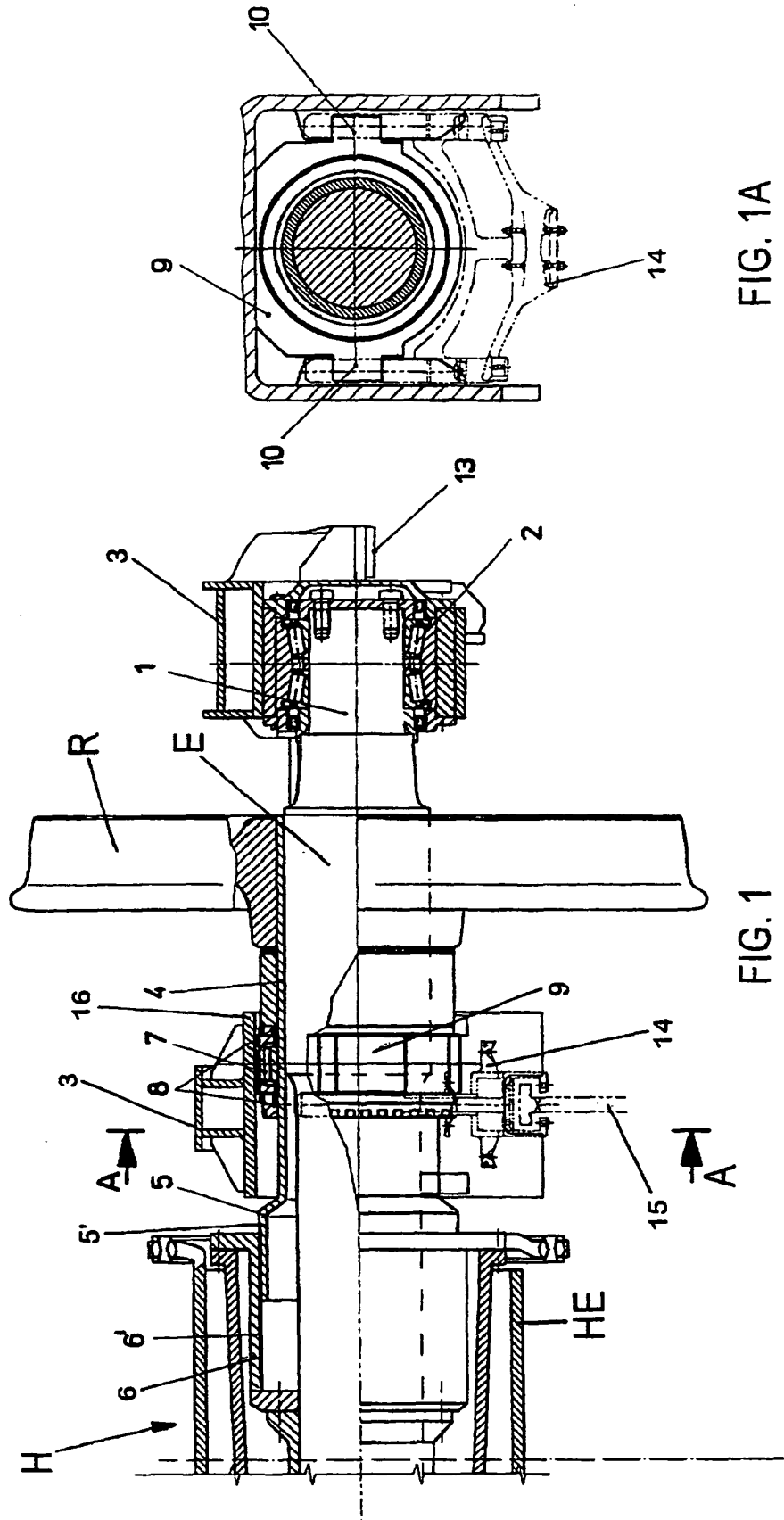
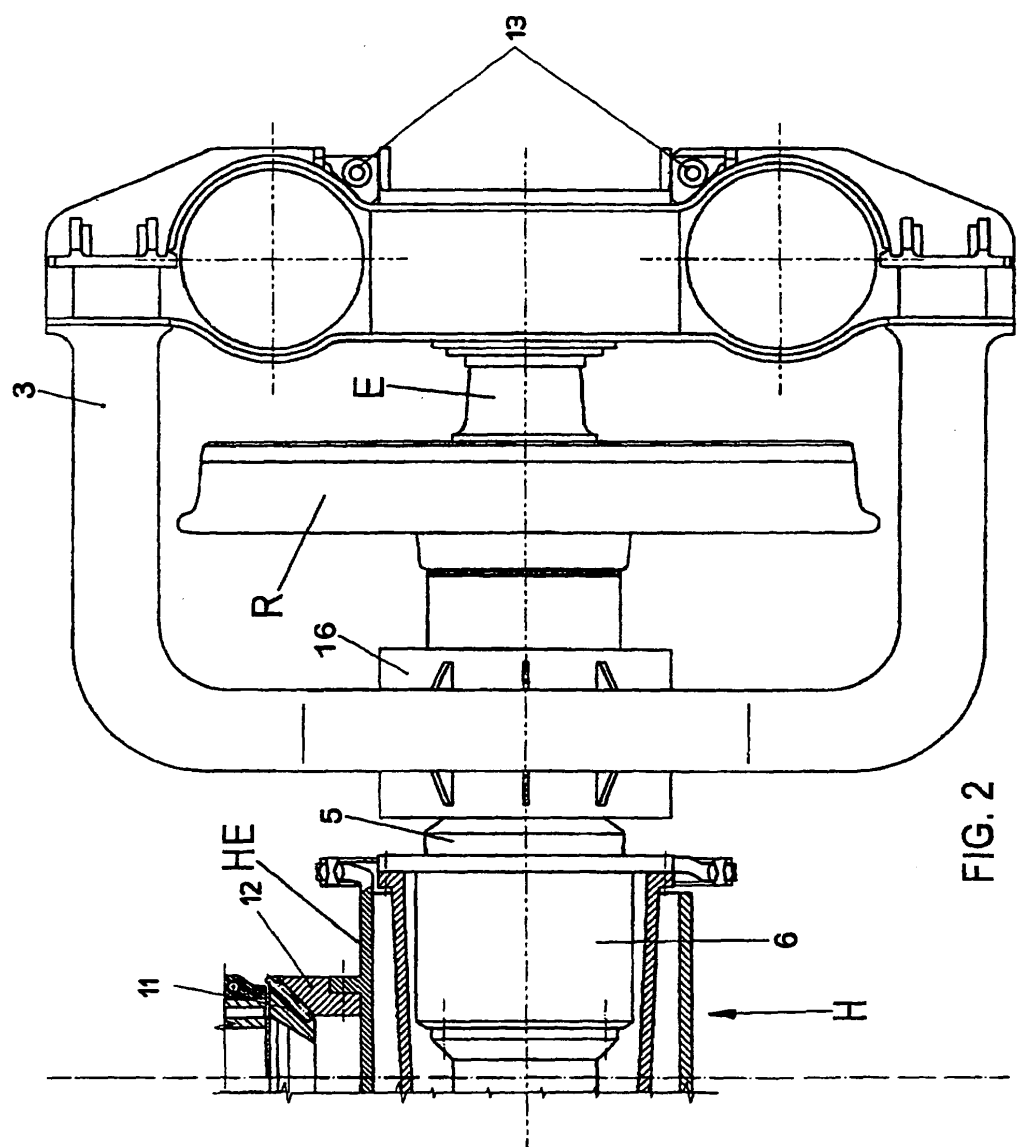


FIG. 1A

FIG. 1



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

- FR 1558329 A [0002]
- EP 0825085 A [0003]
- EP 0857636 A [0004]