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(54) **MOVEMENT AND LOCKING SYSTEM FOR A WAGON COVER**

(57) The present disclosure refers to a wagon cover movement system (200) which comprises a motor (202) associated with an interaction element (204) configured to interact with a wagon (100) and move a cover (130). It

further refers to a wagon cover locking system (300) which comprises at least one shaft (304) and at least one locking element (302) associated with the shaft (304) and configured to fit within a wagon (100) cover (130).

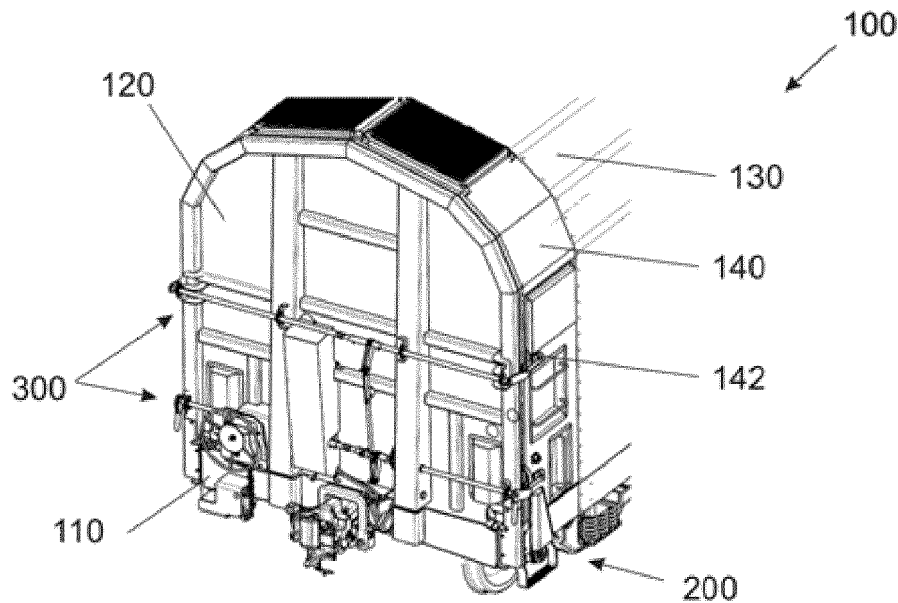


Fig. 1

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Description**TECHNICAL FIELD**

[0001] The present description refers to a movement system for wagon cover, a locking system for wagon cover and a wagon comprising the movement and/or locking systems.

BACKGROUND

[0002] Railway wagons are a means of transport developed for transporting cargo, animals, people, among others. In the state of the art, different types of freight wagons are described for the most diverse purposes. One type of freight wagon known to the state of the art is the pulp wagon (for example, an FTT wagon).

[0003] Said wagons comprise constructive characteristics which allow easy loading and unloading of pulp bales, such as a movable cover or sliding door which, when moved, promotes a wider opening of the platform of the wagon than the wagons which use other types of doors or openings.

[0004] Aiming at optimizing the opening and closing of wagons which comprise covers or sliding doors and increasing the efficiency in questions associated with the use of operators, there was observed the need to automate the movement of the covers or sliding doors of the known wagons.

[0005] One example of solution proposed by the state of the art is described in document EP1820713. Said document describes a covering system by means of a series of pneumatic jacks.

[0006] Another example of the state of the art is described in document GB635410, wherein there is proposed a system comprising a motor and transmission belts.

[0007] In both cases, the systems described have high constructive complexity, which makes the installation and use of the proposed automations more difficult. The possibility of alternating the movement of the doors between manual and automatic is not foreseen either.

[0008] Thus, there currently exists a technological gap in the market of wagons with covers or sliding doors related to the automation of the actions of opening and closing the cover by means of a simple and reliable system able to be installed in existing wagons. Neither is there known to the state of the art a system able to easily alternate the movement of the cover between automatic and manual, depending on the needs and capacities at the moment of loading/unloading.

[0009] These facts are described in order to illustrate the technical problem solved by the embodiments of the present document.

GENERAL DESCRIPTION

[0010] The present disclosure refers to a movement

system for wagon cover which comprises a motor associated with an interaction element configured to interact with a wagon, wherein the cover movement system is comprised within a cover of the wagon and the driving of the motor moves the cover in relation to the wagon by means of the interaction element. The cover movement system can further comprise a transmission system which transfers the rotation from the motor to the interaction element through a belt. The cover movement system can further comprise an uncoupling device, wherein the uncoupling device is configured to couple and uncouple the interaction element from the motor or from the transmission system. The wagon movement system can be comprised within at least one of the ends of the wagon cover. The interaction element can be a gear configured to associate with a wagon rack. The cover movement system can be comprised within a cover module which is associated with at least one of the ends of the cover.

[0011] In view of the problems described in the state of the art, the present invention has the purpose of providing a wagon with automatic movement of the cover or sliding door.

[0012] Another purpose of the present invention is to provide a wagon with automatic locking of the cover or sliding door.

[0013] Another purpose of the present invention is to provide a cover movement system and/or cover locking system able to be installed in existing wagons.

[0014] Yet another purpose of the present invention is to provide a wagon with automatic movement of the cover or sliding door able to alternate between automatic and manual.

[0015] Additionally, a purpose of the present invention is to provide a cover movement system and/or cover locking system controlled by means of an operation logic.

[0016] The present disclosure describes a wagon cover system characterized in that it comprises a motor associated/coupled to an interaction element configured to interact with the wagon, wherein the cover movement system is comprised within a cover of the wagon and the driving of the motor moves the cover in relation to the wagon by means of the interaction element.

[0017] In an embodiment, the movement system can further comprise a transmission system which transfers the rotation from the motor to the interaction element through a belt.

[0018] In an embodiment, the movement system can further comprise an uncoupling device, wherein the uncoupling device is configured to couple and uncouple the interaction element from the motor or from the transmission system.

[0019] In an embodiment, the movement system can be comprised within at least one of the ends of the wagon cover.

[0020] In an embodiment, the interaction element can be a gear configured to associate with a wagon rack.

[0021] In an embodiment, the cover movement system

can be comprised within a cover module which is associated with at least one of the ends of the cover.

[0022] The present disclosure further describes a wagon, characterized in that it comprises: a cover associated with the wagon; and a cover movement system comprised in the cover, wherein the cover movement system interacts with the wagon to move the cover.

[0023] In an embodiment, the wagon can comprise the cover movement system that comprises a motor and an interaction element, wherein the motor associates with the interaction element and the interaction element associates with the wagon, wherein the motor drive moves the interaction element and the interaction element moves the cover in relation to the wagon.

[0024] In an embodiment, the interaction element can associate with the wagon by means of a longitudinal rack and with the motor by means of a belt drive system.

[0025] In an embodiment, the cover (130) can be at least one of a tarpaulin and/or a sliding door.

[0026] In an embodiment, the wagon cover locking system can comprise: at least one shaft; at least one locking element associated with the shaft and configured to fit into a wagon cover; and a driver associated with the shaft, wherein the driving of the driver moves the locking element through the shaft to lock the wagon cover.

[0027] In an embodiment, the driver can be a pneumatic driver that comprises a rack or a motor comprising a motor gear.

[0028] In an embodiment, the shaft can comprise a shaft gear configured to interact with the driver.

[0029] In an embodiment, the locking system can comprise two shafts and four locking elements, whereby each locking element is arranged at an end of each shaft, wherein the shafts associate with each other by means of a connecting element.

[0030] In an embodiment, the locking system can comprise manual drivers.

[0031] In an embodiment, the wagon can comprise: the cover movement system (200) as defined in any of claims 1 to 6 and the cover locking system.

[0032] In an embodiment, the wagon can further comprise a logic driver configured for driving the motor of the cover movement system and the driver of the cover locking system.

[0033] These facts are described in order to illustrate the technical problem addressed by the present invention.

BRIEF DESCRIPTION OF THE FIGURES

[0034] For an easier understanding, figures are herein attached, which represent preferred embodiments that are not intended to limit the object of the present description.

Figure 1 - Representation of a perspective view of an embodiment of the wagon of the present embodiment with locking system in the locked position.

Figure 2 - Representation of a perspective view of an embodiment of the wagon of the present disclosure with locking system in the unlocked position.

Figure 3 - Representation of a perspective view of an embodiment of the movement system of the present disclosure in the inner part of the cover.

Figure 4 - Representation of a perspective view of an embodiment of the movement system of the present disclosure in the outer part of the cover.

Figure 5 - Representation of a bottom view of an embodiment of the uncoupling device of the present disclosure in the coupled position.

Figure 6 - Representation of a bottom view of an embodiment of the uncoupling device of the present invention in the uncoupled position.

Figure 7 - Representation of a perspective view of an embodiment of the locking system of the present disclosure in the locked position.

Figure 8 - Representation of a perspective view of an embodiment of the locking system of the present disclosure in the unlocked position.

Figure 9 - Representation of a side view of an embodiment of the wagon of the present disclosure.

Figure 10 - Representation of a back view of an embodiment of the wagon of the present disclosure.

Figure 11 - Representation of a top view of an embodiment of the wagon of the present disclosure.

DETAILED DESCRIPTION

[0035] The present disclosure refers to a wagon comprising: a cover associated with the wagon; and a cover movement system comprised in the cover, wherein the cover movement system interacts with the wagon to move the cover. The cover movement system can comprise a motor and an interaction element, wherein the motor associates with the interaction element and the interaction element associates with the wagon, wherein the motor drive moves the interaction element, and the interaction element moves the cover in relation to the wagon. The interaction element can associate with the wagon by means of a longitudinal rack and with the motor by means of a belt drive system. The cover can be at least one of a tarpaulin and/or sliding door.

[0036] The present disclosure refers to a wagon cover locking system comprising: at least one shaft; at least one locking element associated with the shaft and configured to fit into a wagon cover, and a driver associated with the shaft, wherein the driving of the driver moves the locking

element through the shaft to lock the wagon cover. The driver can be a pneumatic driver that comprises a rack or a motor comprising a motor gear. The shaft can comprise a gear configured to interact with the driver. The locking system can comprise two shafts and four locking elements, whereby each locking element is arranged at an end of each shaft, wherein the shafts associate with each other by means of a connecting element. The locking system can comprise manual drivers.

[0037] Figures 1 and 1 show an end view of an embodiment of wagon 100 of the present disclosure. In this embodiment, the wagon 100 of the present disclosure is an FTT type wagon which comprises a platform 110, two wagon bulkheads 120, a cover 130, a cover module 140, a cover movement system 200 and a cover locking system 300. In the Figures, only one of the bulkheads 120 is shown. Platform 110 and the bulkhead 120 form the fixed structure of this embodiment of the wagon 100. The cover module 140 in turn, associates with the cover 130 at one of the ends and associates with wagon 100 so as to move along the longitudinal axis on platform 110. Upon being moved along the platform 110 of the wagon 100, the cover module 140 opens and closes the cover 130 and, consequently, allows or prevents the access to platform 110 of wagon 100.

[0038] Although the embodiment of wagon 100 shown comprises the illustrated characteristics, other types of wagons can be used to implement the present invention. The same applies to the type of cover 130 described and shown. In the context of the present disclosure, the expression "cover" 130 must not be comprised in a restrictive manner, but as different constructive alternatives for closing a wagon 100, such as a tarpaulin with accordion structure, a rigid sliding door, a movable scuttle, a top access window, among other options with similar purposes.

[0039] Thus, although a cover module 140 is described, which interacts with a platform 110 and a bulkhead 120 to close the wagon 100 of the illustrated embodiment, the present disclosure can be used in other contexts, such as in a sliding door which interacts with a wagon wall, or other equivalent examples.

[0040] In the illustrated embodiment, the cover movement system 200 is comprised within the cover module 140 of the wagon 100. The cover movement system 200 can further be comprised within the cover 130 itself. The cover module 140 of the wagon 100 is a rigid structure associated with at least one of the ends of the cover 130 of the wagon 100 and, commonly, with both ends of the cover 130 of the wagon 100.

[0041] The cover movement system 200 provides an interaction between the cover 130 or the cover module 140 and the wagon 100 for the cover 130 and/or the module cover 140 to be moved in relation to the wagon 100.

[0042] Figures 3 and 4 illustrate an embodiment of the cover movement system 200.

[0043] In one embodiment, the cover movement sys-

tem 200 comprises a motor 202, an interaction element 204 and a transmission system 206. In this embodiment, the motor 202 is associated with the interaction element 204 through the transmission system 206, whereby the interaction element 204 is configured to interact with the wagon 100 and to provide a movement of the cover 130 in relation to the wagon 100.

[0044] The motor 202 is the component responsible for moving the cover movement system 200. When activated, the motor 202 moves the transmission system 206 and the interaction element 204, which in turn moves the cover 130. In one embodiment, the motor 202 is an electric motor. The power of the motor 202 is derived from batteries, solar panel and/or other means available in a wagon 100.

[0045] In the illustrated embodiment, the cover movement system 200 comprises the transmission system 206, which is associated with the motor 202 and with the interaction element 204. In this embodiment, the motor 202 is associated with the interaction element 204 by means of the transmission system 206, as illustrated. The transmission system 206 is the component of the system responsible for transmitting the rotation of the motor 202 to the interaction element 204.

[0046] To be able to transmit the rotation of the motor 202, the transmission system 206 comprises a driving gear 208 and a driven gear 210 connected by a belt 212. The driving gear 208 is the gear which associates with the motor 202 and the driven gear 210 is the gear which associates with the interaction element 204. With the rotation of the driving gear 208 by the motor 202, the belt 212 moves and transfers the rotation to the driven gear 210 and, consequently, to the interaction element 204.

[0047] In the illustrated embodiment, the driving gear 208 comprises a smaller diameter than the diameter of the driven gear 210. Thus, the transmission system 206 increases the torque transferred from the motor 202 to the interaction element 204, reducing the necessary power of the motor 202 to move the cover 130 and facilitating the movement thereof.

[0048] Despite the sizes of the driving and driven gears illustrated, other sizes can be used depending on the needs of the project.

[0049] The interaction element 204 is the component responsible for receiving the rotation derived from the motor 202 and transmitting to a component of wagon 100 aiming at moving the cover 130 in relation to the wagon 100. In one embodiment, the interaction element 204 is a gear configured to interact with a rack 150 that is longitudinally present in wagon 100. Thus, the rotation of motor 202 moves the transmission system 206, which turns the gear. The turning of the gear which interacts with the rack 150 moves the cover 130 along the longitudinal axis of the wagon 100.

[0050] In one embodiment, the cover movement system 200 further comprises an uncoupling device 220. The uncoupling device 220 is a component of the system

which allows the coupling and uncoupling between the transmission system 206 and the interaction element 204. In this way, the cover movement system 200 of the present disclosure enables the change between an automatic movement of the cover 130, when the uncoupling device 220 is in the coupled mode, and manual, when the uncoupling device 220 is the uncoupled mode.

[0051] Said possibility is particularly advantageous in an automatic system, since the motor 202 when stopped blocks or makes difficult the movement of the cover 130 in a manual manner, limiting the use of the systems which do not allow the uncoupling between the cover movement system 200 and the cover 130.

[0052] The uncoupling device 220, illustrated in detail in Figures 5 and 6, comprises an extension sleeve 222 which performs the coupling between the shaft of motor 202 and the shaft of the transmission system 206 - in this case, the driven gear 210. The movement of the extension sleeve 222 is carried out by a key 224 which fits into an orifice present in the uncoupling device 220. The key 224 can be, for example, a key 224 already used in wagon 100 for other systems (for example, for activating the electric system), thus reducing the complexity and number of components of wagon 100.

[0053] When the key 224 of the uncoupling device 220 is in the coupling position (Figure 5), the extension sleeve 222 positions itself so as to interact both with the shaft 228 of the driven gear 210 as with the shaft 226 of the interaction element 204, thus performing the transmission of the rotation from one shaft to the other. When the key 224 of the uncoupling device 220 is in the uncoupling position (Figure 6), the extension sleeve 222 positions itself so as to interact only with the shaft 228 of the driven gear 210 but does not interact with the shaft 226 of the interaction element 204, uncoupling the shaft 226 of the interaction element 204 of the cover movement system 200.

[0054] In one embodiment, the cover movement system 200 may not comprise the transmission system 206. In this embodiment, the motor 202 associates directly with the interaction element 204 and the uncoupling device 220 promotes the coupling/uncoupling between the shaft of the motor 202 and the shaft 226 of the interaction element 204.

[0055] Figures 7 and 8 illustrate an embodiment of the locking system of the cover 300 of the present embodiment in the locked and unlocked positions.

[0056] The locking system of the cover 300 comprises at least one locking element 302, at least one locking shaft 304 and an automatic driver 306. In the illustrated embodiment, the locking system of the cover 300 comprises four locking elements 302, two locking shafts, an automatic driver 306, a connecting element 308 and a manual driver 314.

[0057] The locking element 302 is the component responsible for associating with a locking handle 142 of the cover 130 or of the cover module 140. In this manner, by interacting with the locking handle 142, the locking ele-

ment 302 prevents the opening of the cover 130 of the wagon 100.

[0058] The interaction of the locking element 302 with the locking handle 142 for locking the cover 130 can occur in different ways. In the illustrated embodiment, the locking element 302 comprises a hook shape. In this case, when the hook interacts with the locking handle 142 the movement of cover 130 is mechanically prevented from being carried out. Although a hook shape is shown, other shapes can be used to obtain the same technical effect.

[0059] In the illustrated embodiment, the locking element 302 is arranged at the end of the locking shaft 304, or further, the locking elements 302 are arranged at each of the ends of the locking shafts. Thus, from the rotation of the locking shafts, the locking elements 302 move to lock or unlock the cover 130.

[0060] The locking shafts are configured to transmit the movement of the automatic driver 306 to the locking elements 302. To this end, at least one of the locking shafts comprises a shaft gear 312 which interacts with a component of the automatic driver 306, as will be described ahead.

[0061] In the embodiment with two or more locking shafts, the association between them is made by means of the connecting element 308. In this way, only one of the shafts needs be associated with the automatic driver 306, which simplifies the configuration of the system. In this embodiment, the connecting element 308 is a pin connected to the sleeve extensions, configured to transform the linear movement of the pin into a circular movement of the locking shafts.

[0062] The automatic driver 306 is the component responsible for moving the system. Upon being activated, the automatic driver 306 moves the locking shafts and, consequently, the locking elements 302 to lock or unlock the cover 130 of the wagon 100.

[0063] The automatic driver 306 of the illustrated embodiment is a pneumatic driver. However, other types of drivers can be used, such as a hydraulic driver or step motor. The automatic driver 306 comprises a rack 310, or similar element, configured to interact with the locking shaft 304 by means of the shaft gear 312. The interaction of the rack 310 of the automatic driver 306 with the shaft gear 312 transforms the linear movement of the automatic driver 306 into shaft rotation. Consequently, the driving of the automatic driver 306 promotes the movement of the locking elements 302 and, in this way, the locking or unlocking of the cover 130 of the wagon 100.

[0064] In the illustrated embodiment, the cover locking system 300 further comprises the manual driver 314. The manual driver 314 is the component of the system which allows the locking or unlocking of the cover 130 to be made in a manual way. In this way, the locking system of the cover 300 of the present invention reaches the advantageous technical effect of enabling the locking or unlocking of the cover 130 to be performed in an automatic way through the automatic driver 306, or in a

manual way, through the manual driver 314.

[0065] In this embodiment the manual driver 314 shown is a clasp comprised at the ends of the locking shafts. The clasp is configured to be manually handled by an operator and enables the movement of the system in an independent manner from the automatic driver 306. Thus, the use of the system of the present invention is not limited to automatic means.

[0066] Figures 9, 10 and 11 illustrate different views of the wagon 100 of the present embodiment to facilitate visualizing some of the characteristics and the general understanding of the wagon 100 comprising the systems described.

[0067] In one embodiment of wagon 100, wagon 100 of the present disclosure further comprises a logic driver which controls the cover movement system 200 and the cover locking system 300 in an integrated manner. In this case, the logic driver is a component responsible for driving motor 202 of the cover movement system 200 and the automatic driver 306 of the cover locking system 300 at specific moments according to a predefined operational sequence. Said operational sequence can be defined according to the needs of each project and the need for use, making it possible to define one or more sequences of interest.

[0068] In an illustrative embodiment, the logic driver comprises the following steps for the closing of cover 130 of wagon 100: driving the motor 202 of the cover movement system 200 until the cover module 140 interacts with the bulkhead 120 of wagon 100; and driving the automatic driver 306 of the cover locking system 300 until the interaction between the locking element 302 and the locking handle 142 locks the movement of the cover module 142 in relation to wagon 100.

[0069] In an illustrative embodiment, the logic driver comprises the following steps for the opening of cover 130 of wagon 100; driving the automatic driver 306 of the cover locking system 300 until there is no interaction between the locking element 302 and the locking handle 142 for unlocking the cover module 140; driving the motor 202 of the cover movement system 200 in the direction of the opening of cover 130 until the desired position is reached in the cover module 140.

[0070] These steps allow the automation of the opening and closing of wagon 100 with unlocking and locking of the cover 130 at the desired times. Allying this advantage with the advantages described for the remaining characteristics of the system, such as the possibility of the option of movement of cover 130 manually or automatically, wagon 100 and the systems of the present invention reach the different purposes and desired technical effects.

[0071] Having described examples of embodiments, it must be understood that the scope of the present disclosure covers other possible variations, being limited only by the contents of the attached claims, there being included therein the possible equivalents.

[0072] The present disclosure describes a movement

system for wagon cover 200 that comprises a motor 202 associated with an interaction element 204 configured to interact with a wagon 100 and move a cover 130. It further refers to a wagon cover locking system 300 that comprises at least one shaft 304 and at least one locking element 302 associated with the shaft 304 and configured to fit within a wagon 100 cover 130.

[0073] The term "comprises" whenever used herein is intended to indicate the presence of stated features, elements, integers, steps, components, but not to preclude the presence or addition of one or more other stated features, elements, integers, steps, components or groups thereof.

[0074] The disclosure is, of course, in no way restricted to the embodiments described in this document and a person with ordinary skill in the art will foresee many possibilities to modifications thereof.

[0075] The embodiments described above are combinable.

Claims

1. Movement system for a wagon cover (200), **characterized in that** it comprises:

a motor (202) coupled to an interaction element (204) to interact with the wagon (100); wherein the cover movement system (200) is comprised within a cover (130) of the wagon (100) and the driving of the motor (202) moves the cover (130) in relation to the wagon (100) by means of the interaction element (204).

2. Movement system, according to claim 1, further comprising a transmission system (206) which transfers the rotation from the motor (202) to the interaction element (204) by means of a belt (212).

3. Movement system, according to claim 1 or 2, further comprising an uncoupling device (220), wherein the uncoupling device (220) is configured to couple and uncouple the interaction element (204) from the motor (202) or from the transmission system (206).

4. Movement system, according to any of the preceding claims, wherein the cover movement system (200) is comprised in at least one of the ends of the cover (130) of the wagon (100).

5. Movement system, according to any of the preceding claims, wherein the interaction element (204) is a gear configured to associate with a rack (150) of the wagon (100).

6. Movement system, according to any of the preceding claims, wherein the cover movement system (200) is comprised within a cover module (140) which as-

sociates with at least one of the ends of the cover (130).

7. Wagon (100), **characterized in that** it comprises:

a cover (130) associated with the wagon (100);
and

a cover movement system (200) comprised within the cover (130), wherein the cover movement system (200) interacts with the wagon (100) to move the cover (130).

8. Wagon (100), according to claim 7, wherein the cover movement system (200) comprises a motor (202) and an interaction element (204), wherein the motor (202) associates with the interaction element (204) and the interaction element (204) associates with the wagon (100), wherein the driving of the motor (202) moves the interaction element (204) and the interaction element (204) moves the cover (130) in relation to the wagon (100).

9. Wagon (100), according to claim 8, wherein the interaction element (204) associates with the wagon (100) by means of a longitudinal rack (150) and with the motor (202) by means of a belt drive system (206).

10. Wagon (100), according to any of claims 7 to 9, wherein the cover (130) is at least one of a tarpaulin and/or a sliding door.

11. Wagon cover locking system (300), **characterized in that** it comprises:

at least one shaft (304);
at least one locking element (302) associated with the shaft and configured to fit within a cover (130) of a wagon (100); and
a driver (306) associated with the shaft,
wherein the driving of the driver (306) moves the locking element (302) by means of the shaft for locking the wagon (100) cover (130).

12. Locking system according to claim 11, wherein the driver (306) is a pneumatic driver which comprises a rack (150) or a motor which comprises a motor gear.

13. Locking system according to claim 11 or 12, wherein the shaft (304) comprises a shaft gear (312) configured to interact with the driver (306), in particular the drivers are manual drivers (314).

14. Locking system according to any of claims 11 to 13, further comprising two shafts (304) and four locking elements (302), whereby each locking element (302) is arranged at one end of each shaft (304), wherein the shafts (304) associate with each other by means

of a connecting element (308).

15. Wagon (100), **characterized in that** it comprises: the cover movement system (200) as defined in any of claims 1 to 6 and the cover locking system (300) as defined in any of claims 11 to 14.

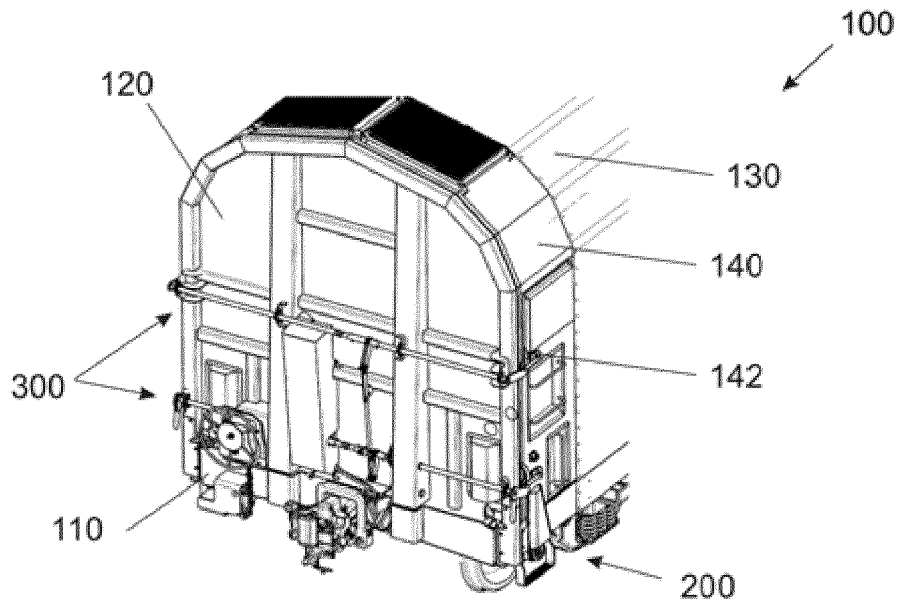


Fig. 1

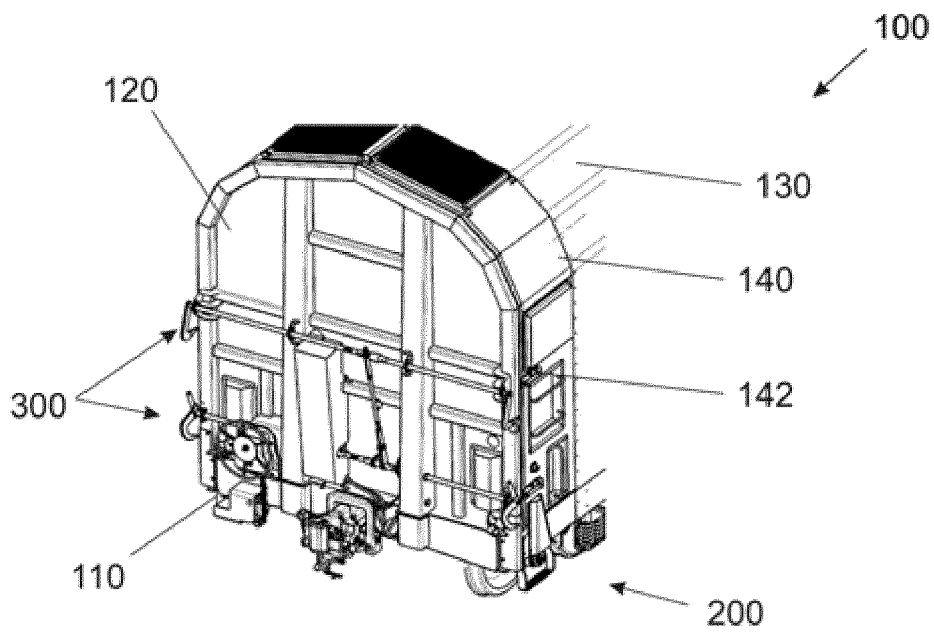


Fig. 2

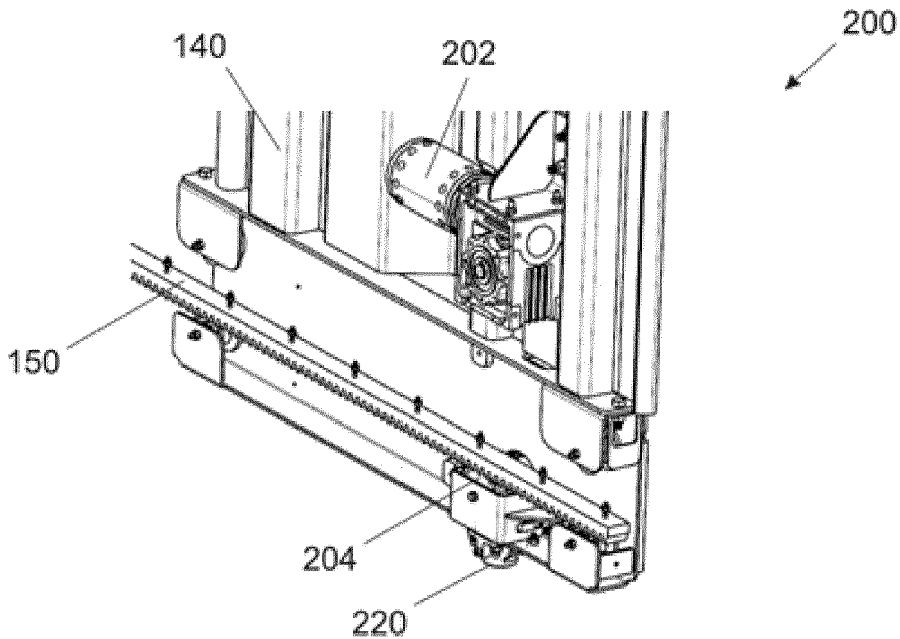


Fig. 3

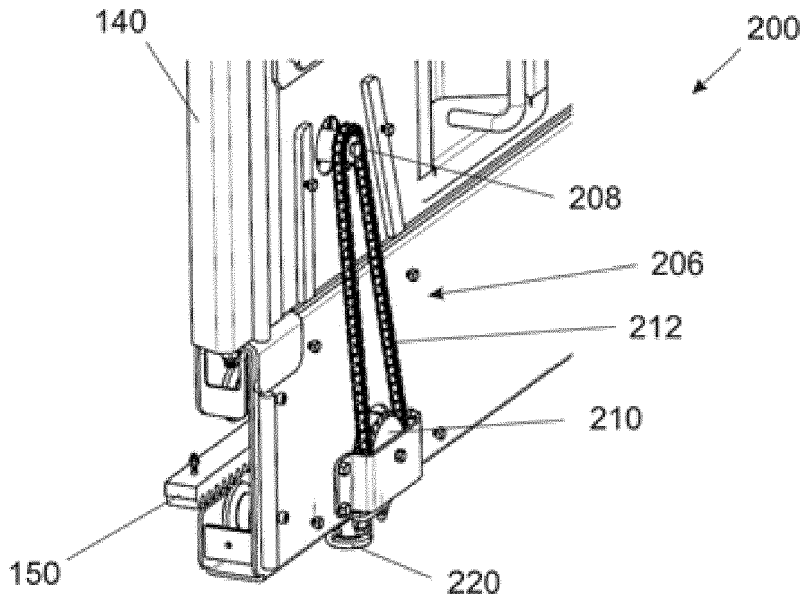


Fig. 4

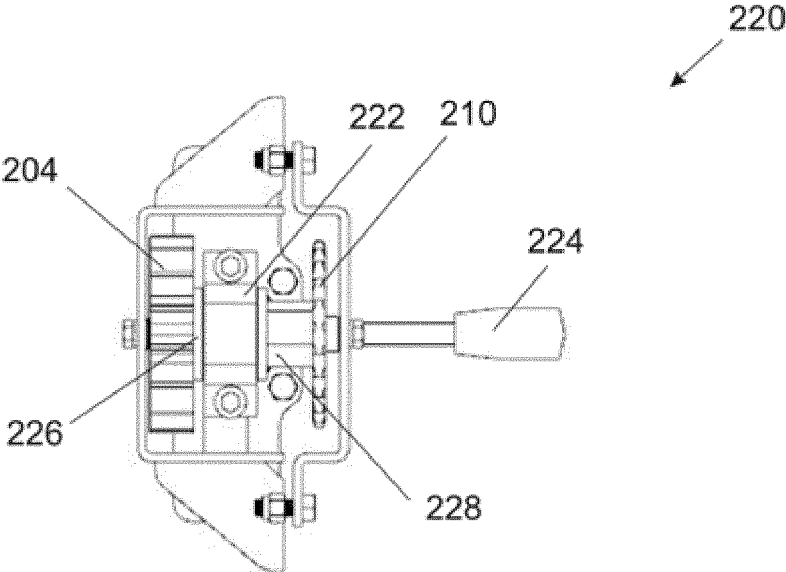


Fig. 5

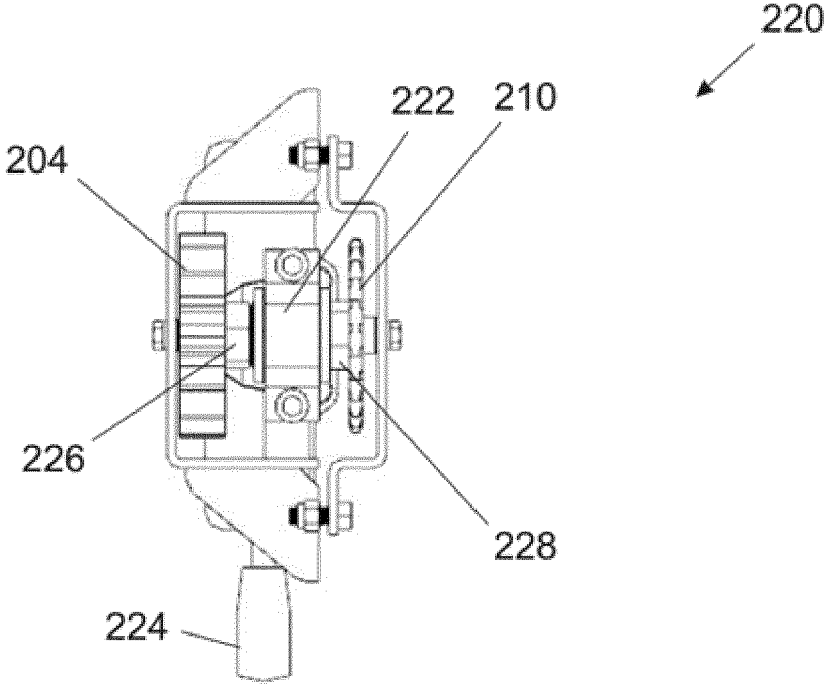


Fig. 6

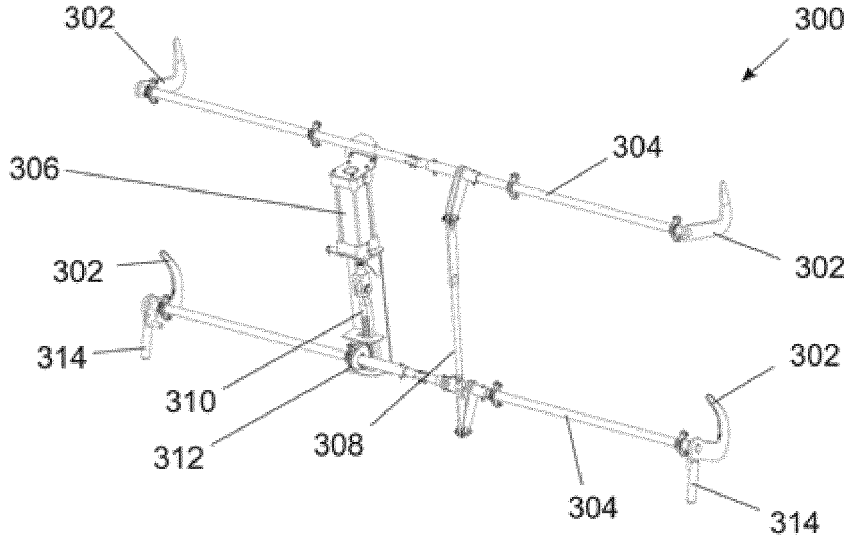


Fig. 7

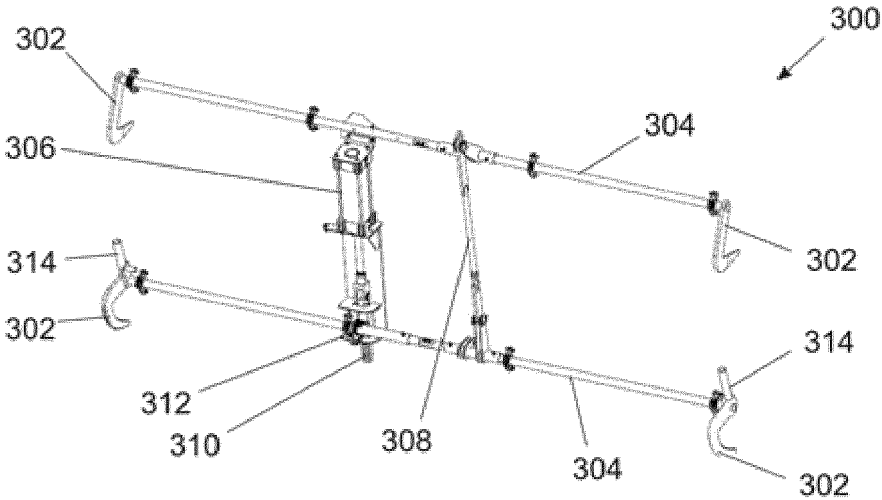


Fig. 8

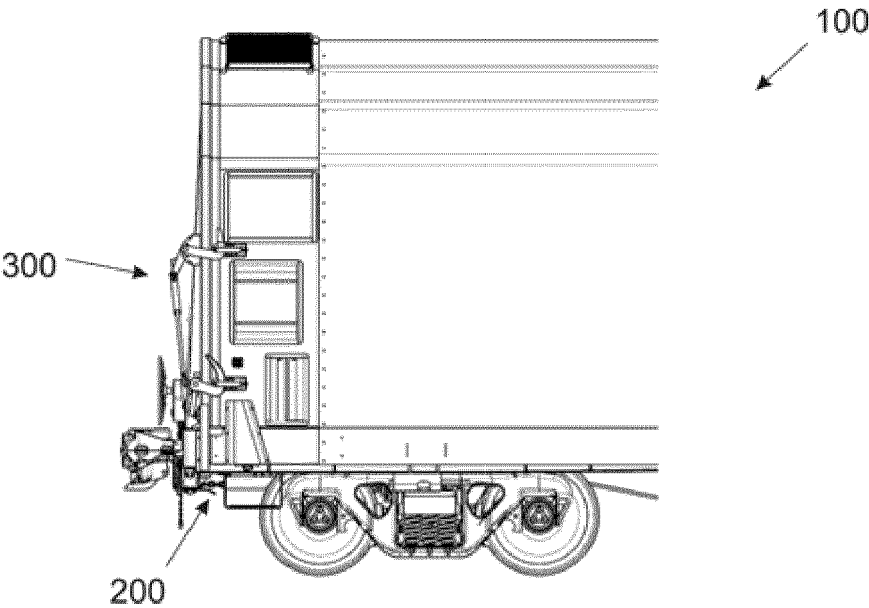


Fig. 9

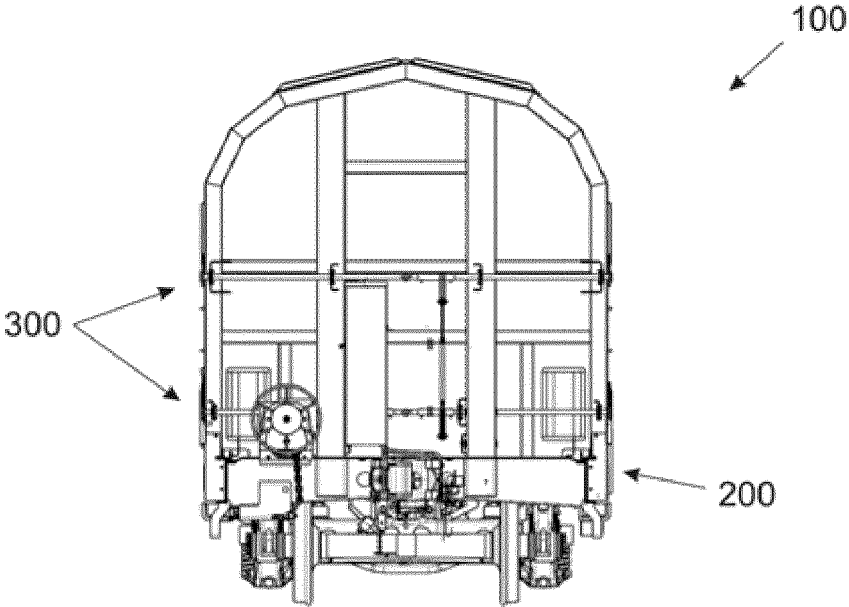


Fig. 10

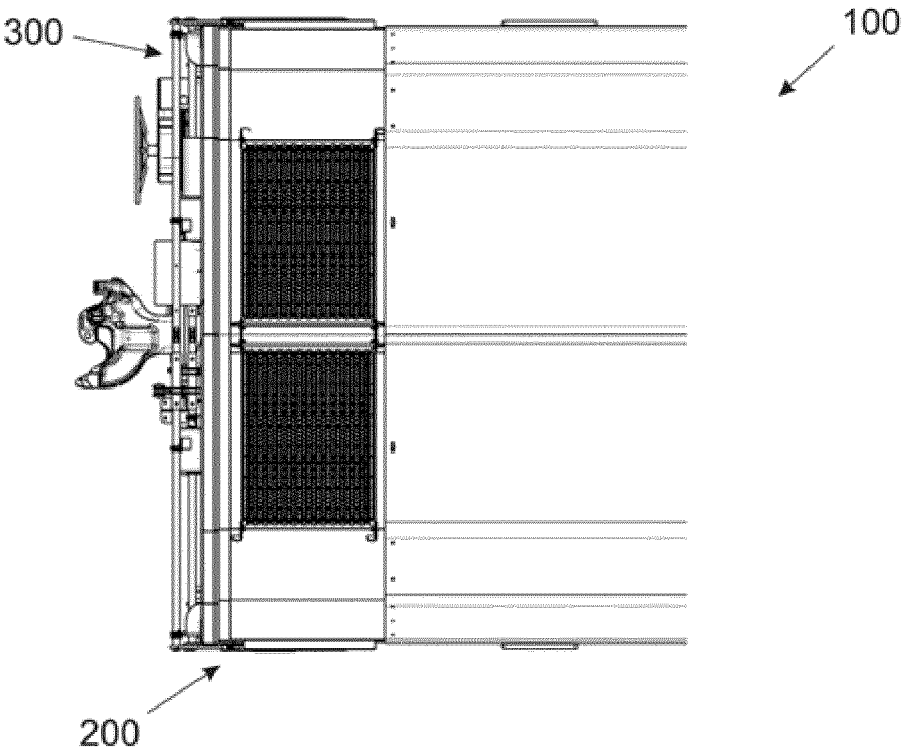


Fig. 11



EUROPEAN SEARCH REPORT

Application Number
EP 23 19 6113

5

DOCUMENTS CONSIDERED TO BE RELEVANT

10

15

20

25

30

35

40

45

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)	
X	US 2006/103139 A1 (FRONZ REINHARD [DE] ET AL) 18 May 2006 (2006-05-18) * paragraphs [0036], [0037]; figures * -----	1-15	INV. B61D39/00 B61D19/00	
X	DE 196 44 573 A1 (ABB HENSCHHELL AG [DE]) 30 April 1998 (1998-04-30) * column 2, line 53 - column 3, line 61; figures * -----	1-4, 6-10		
X	EP 1 529 671 A2 (LIPPOLIS AMBROGIO [IT]) 11 May 2005 (2005-05-11) * abstract; figures 1, 2, 9a, 9b, 10 * -----	1-10		
X	CN 209 813 984 U (CRCC HIGH TECH EQUIPMENT CO LTD) 20 December 2019 (2019-12-20) * abstract; figures * -----	1-10		
A	WO 2011/017859 A1 (QIQIHAR RAILWAY ROLLING STOCK [CN] ET AL.) 17 February 2011 (2011-02-17) * columns 56, 57; figure 7 * -----	3		TECHNICAL FIELDS SEARCHED (IPC)
A	CN 114 670 880 A (MEDIUM VEHICLE TAIYUAN LOCOMOTIVE VEHICLE LTD COMPANY) 28 June 2022 (2022-06-28) * abstract; figures * -----	3		B61D
X	DE 74 760 C (ALBERT OECHSLE) 24 April 1894 (1894-04-24) * figures * -----	7, 10		
A		1		
X	GB 2 199 549 A (DAVIS PHILIP PETER) 13 July 1988 (1988-07-13) * page 10, line 20 - page 11, line 5; figure 7 * -----	11-14		
		-/--		
The present search report has been drawn up for all claims				
Place of search Munich		Date of completion of the search 2 May 2024	Examiner Schultze, Yves	
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		

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EUROPEAN SEARCH REPORT

Application Number
EP 23 19 6113

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DOCUMENTS CONSIDERED TO BE RELEVANT

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 107 503 594 A (NINGBO SHENGJIU CABINETS LOCK CO LTD) 22 December 2017 (2017-12-22) * claim 1; figures * -----	11-14	
X	CN 101 797 925 A (CSR MEISHAN CO LTD) 11 August 2010 (2010-08-11) * abstract; figures * -----	11-14	
X	KR 2004 0009911 A (RS KOREA CO LTD) 31 January 2004 (2004-01-31) * abstract; figures * -----	11-14	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 2 May 2024	Examiner Schultze, Yves
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	

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

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Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

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No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

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LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

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see sheet B

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All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

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As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

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Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

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None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

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The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

EP 23 19 6113

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

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1. claims: 1-10

Movement system for a wagon

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2. claims: 11-15

Wagon cover locking system

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

EP 23 19 6113

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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
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02-05-2024

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006103139 A1	18-05-2006	NONE	
DE 19644573 A1	30-04-1998	NONE	
EP 1529671 A2	11-05-2005	NONE	
CN 209813984 U	20-12-2019	NONE	
WO 2011017859 A1	17-02-2011	AU 2009324264 A1	03-03-2011
		BR PI0925022 A2	02-02-2016
		CN 101618725 A	06-01-2010
		WO 2011017859 A1	17-02-2011
CN 114670880 A	28-06-2022	NONE	
DE 74760 C	24-04-1894	NONE	
GB 2199549 A	13-07-1988	NONE	
CN 107503594 A	22-12-2017	NONE	
CN 101797925 A	11-08-2010	NONE	
KR 20040009911 A	31-01-2004	NONE	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1820713 A [0005]
- GB 635410 A [0006]