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(54) Title: GONDOLA CAR CLEAN-OUT DOOR

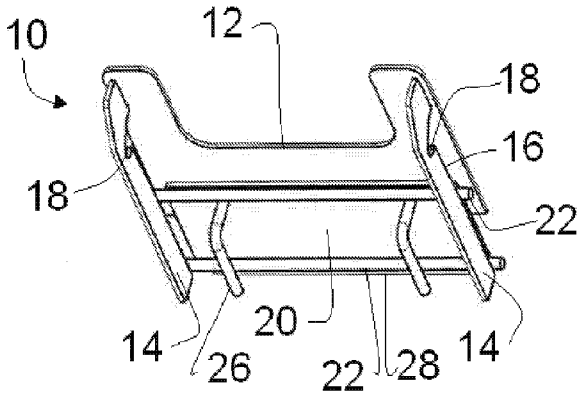

FIG. 1

(57) Abstract: A gondola railcar cleanout door is configured to be coupled to a side plate of a railcar adjacent a railcar floor wherein the side plate and floor each have an opening therein. The cleanout door includes a frame mountable to the railcar side plate structure, adjacent the side plate structure opening; and a door assembly coupled to the frame and moveable between an open position in which the openings in the floor and the side plate may be used to clean out the interior of the railcar, and a closed position substantially closing the openings in the side plate and the floor, wherein the door assembly includes a door side wall member configured to substantially close the opening in the side plate in the closed position and a door floor member configured to substantially close the opening in the floor in the closed position.

GONDOLA CAR CLEAN-OUT DOOR

RELATED APPLICATIONS

[0001] This application claims priority to United States patent application Ser. No. 61/977,753 filed April 10, 2014, entitled “Gondola Car Clean-Out Door” which application is incorporated herein by reference in its entirety.

BACKGROUND INFORMATION

[0002] 1. Field of the invention

[0003] The present invention relates to a railcar cleanout door, particularly a gondola railcar cleanout door.

[0004] 2. Background Information

[0005] In the railroad art, rolling stock comprises all vehicles that move on a railway. A gondola railcar, or simply gondola, is an open-top type of rolling stock used for carrying loose bulk materials. One explanation for the seemingly oddly named railcar is that prior to the proliferation of rail transport in America a significant amount of coal was shipped via flat boats that were termed “gondolas,” generally in satirical reference to the famous Venetian rowing boats.

[0006] With the advancement of rail transport, the railroad cars first employed in the haulage of coal were thus named after these shallow-draft “gondola” boats and called "gondola cars". In the second half of the 20th century, coal haulage shifted from open hopper cars to high-sided gondolas. Using a gondola, the railroads are able to haul a larger amount of coal per car. Examples of gondola cars are illustrated in U.S. Patents 4,212,252; 4,361,097; 4,911,082; 5,253,593; 5,335,603; 5,488,912; 5,813,353; 6,148,735; 6,978,720; 8,132,515; 8,240,256, which patents are incorporated herein by reference establishing the general nature of the relevant art.

[0007] It is common for aggregate gondola cars to have multiple clean-out doors, also called access doors, built into the side structure for removing small amounts of residual material from the car and/or to wash out the railcar interior. The clean out/wash out can be particularly important if the car is changing from hauling one type of lading to another. Car maintenance is another reason for requiring a thorough removal of residual lading. Typically the cleanout doors are simply hatches

or doors that close against the floor of the gondola railcar, examples of which can be seen in U.S. Patents 2,681,470; 2,722,899; 7,434,519; 7,461,600; 7,559,284; 7,757,611; 7,878,125, which patents are also incorporated herein by reference.

[0008] Some of these prior art gondola railcar cleanout door constructions fail to provide sufficient access to the railcar interior, while others prove structure that is difficult to open or provides a structure that is insufficiently robust to withstand the harsh working environment and/or lifespan of components expected for gondola railcars.

[0009] It is an object of the present invention to address these deficiencies of the existing prior art and provide a cost effective cleanout door structure that simultaneously provides sufficient access to the railcar interior, and that is easy to open and that is sufficiently robust to withstand the working environment and long lifespan of components expected for gondola railcars.

SUMMARY OF THE INVENTION

[0010] This invention is directed to a cost effective, efficient, gondola railcar cleanout door that overcomes at least some of the drawbacks of the existing designs.

[0011] One aspect of the present invention provides a gondola railcar cleanout door is configured to be coupled to a side plate of a gondola car adjacent a floor of the gondola car wherein the side plate has an opening therein and the floor has an opening therein. The gondola railcar cleanout door includes a frame mountable to the side plate structure of the gondola railcar, adjacent the opening in the side plate structure; and a door assembly coupled to the frame and moveable between an open position in which the opening in the floor and the opening in the side plate may be used to clean out the interior of the gondola rail car, and a closed position substantially closing the opening in the side plate and the opening in the floor, wherein the door assembly includes a door side wall member configured to substantially close the opening in the side plate in the closed position and a door floor member configured to substantially close the opening in the floor in the closed position.

[0012] One aspect of the present invention provides a gondola railcar comprising a railcar body including a side plate and a floor, wherein the side plate has at least one opening therein and the floor has at least one opening therein and one side plate

opening and one floor opening combine to form at least one clean out opening for the railcar; and at least one cleanout door configured to be coupled to the side plate of a gondola railcar body adjacent the floor of the gondola car at each clean out opening, wherein the gondola railcar cleanout door includes: i) a frame mountable to the side plate structure of the gondola railcar, adjacent the opening in the side plate structure; and ii) a door assembly coupled to the frame and moveable between an open position in which the opening in the floor and the opening in the side plate may be used to clean out the interior of the gondola rail car, and a closed position substantially closing the opening in the side plate and the opening in the floor, wherein the door assembly includes a door side wall member configured to substantially close the opening in the side plate in the closed position and a door floor member configured to substantially close the opening in the floor in the closed position.

[0013] One aspect of the present invention provides a method of retrofitting a gondola railcar with at least one clean out opening comprising the steps of: A) providing one opening in the sidewall and an associated opening in the floor for each clean out opening, wherein the side plate opening and floor opening combine to form the clean out opening for the railcar; and B) coupling one cleanout door to the side plate of a gondola railcar body adjacent the floor of the gondola car at each clean out opening, wherein the gondola railcar cleanout door includes: i) a frame mountable to the side plate structure of the gondola railcar, adjacent the opening in the side plate structure; and ii) a door assembly coupled to the frame and moveable between an open position in which the opening in the floor and the opening in the side plate may be used to clean out the interior of the gondola rail car, and a closed position substantially closing the opening in the side plate and the opening in the floor, wherein the door assembly includes a door side wall member configured to substantially close the opening in the side plate in the closed position and a door floor member configured to substantially close the opening in the floor in the closed position.

[0014] These and other aspects of the present invention will be clarified in the description of the preferred embodiment of the present invention described below in connection with the attached figures in which like reference numerals represent like elements throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Figure 1 is a perspective schematic view of a Gondola Railcar Cleanout Door according to one embodiment of the present invention;

[0016] Figure 2 is a end view of the Gondola Railcar Cleanout Door according to Figure 1;

[0017] Figure 3 is a side elevation view of the Gondola Railcar Cleanout Door according to Figure 1; and

[0018] Figure 4 is schematic end view of the Gondola Railcar Cleanout Door according to Figure 1 on a gondola car shown partially in section.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] This invention is directed to a cost effective, efficient, gondola railcar cleanout door 10 that overcomes at least some of the drawbacks of the existing door designs. The gondola cleanout door 10 of the present invention as described herein provides a cleanout door structure that simultaneously provides sufficient access to the railcar interior, and that is easy to open and that is sufficiently robust to withstand the working environment and long lifespan of components expected for gondola railcars.

[0020] One embodiment of the present invention is shown in figures 1-4 and provides a gondola railcar comprising a railcar body including a side plate 30 (also called a side wall), shown schematically in figure 4, and a floor 32. As shown the side plate 30 has at least one opening therein and the floor 32 has at least one opening therein and the side plate opening and the floor opening combine to form a clean out opening 34 for the gondola railcar.

[0021] The details of the construction of the gondola railcar and railcar body are well known in the art as represented in the above cited patents which are incorporated herein by reference. Additional reference is made to gondola car construction provided by the assignee of the present invention who, directly and through predecessors, has been building aluminum, steel, and stainless steel coal cars for over a century.

[0022] The present invention provides one cleanout door 10 configured to be coupled to the side plate 30 of a gondola railcar body adjacent the floor 32 of the gondola car at each clean out opening 34.

[0023] The gondola railcar cleanout door 10 includes a frame 12 mountable to the side plate 30 structure of the gondola railcar, adjacent the opening in the side plate 30 that is forming part of the clean out opening 34. The frame 12 may be coupled to the side plate 30 with fasteners or welding or other conventional fastening methods.

[0024] The clean out door 10 includes a door assembly coupled to the frame 12, as discussed below. The door assembly is moveable between an open position in which the clean out opening 34, formed by the combination of the opening in the floor 32 and the opening in the side plate 30, may be used to clean out the interior of the gondola rail car, and a closed position substantially closing the clean out opening 34 by closing both the opening in the side plate 30 and the opening in the floor 32.

[0025] The frame 12 includes a pair of rail members 14 extending generally vertically and configured to guide the door assembly for movement between the open and closed position. A slot 16 extends in each rail member 14 for guiding the door assembly for movement between the open and closed position. Each rail member further includes a notch 18 configured to support the door assembly in the open position.

[0026] The door assembly includes a door side wall member 20 configured to substantially close the opening in the side plate 30 with the door assembly in the closed position. The door assembly includes a pair of spaced bars 22 coupled to the door side wall member 20 and the bars 22 are received in each rail member slot 16 guiding the door assembly for movement between the open and closed position.

[0027] The upper bar 22 may be positioned in the notch 18 with the door assembly in the open position to support the door assembly in the open position. The door assembly includes a pair of handle members 26 coupled to the door assembly to allow easy manual movement of the door assembly. The guide bars 22 and handle members 26 may be welded to the door side wall member 20.

[0028] The door assembly includes a door floor member 28 configured to substantially close the opening in the floor 30 with the door assembly in the closed position. The door floor member 28 may be welded to the door side wall member 20. The gondola railcar cleanout door 10 preferably provides that the door floor member 28 is substantially aligned with the floor 32 when the door assembly is in the closed position as shown in figure 4.

[0029] The gondola railcar cleanout door 10 according to embodiment shown provides that the door floor member 28 extends inwardly of the door side wall member 20 toward the interior of the railcar. Further as shown, the door side wall member 20 is substantially parallel with the side plate 30.

[0030] The size of the opening 34 can be altered easily via altering the size of the opening in the floor 32 and providing an appropriately sized door floor member 28. Additionally the door floor member 28 may be provided with a drain hole for allowing liquid to seep out of the lading. If desired, sealing members (e.g. rubber gasket) can be provided around the edge of the door floor member 28 and the inward face of the door side wall member 20 to provide a tight seal in the closed position.

[0031] If desired a latching mechanism (and locking) may be provided to keep the door assembly in the closed position and to avoid tampering. However even without such additions, the formation of the door assembly will serve to maintain the door assembly properly closed when lading is present as the weight of the lading on the door floor 28 will act to hold it closed.

[0032] The provision of a latch or locking mechanism better accommodates a redesign of the opening and closing that may minimize the size of the frame. Namely elimination of the interference with the lower end of the guide members 14 and the lower guide bar 22 and a pivoting movement to the open position for the door is easily accommodated with a latch, as the latch will act to assist in holding the door 10 in the closed position. In one such alternative arrangement the slot 16 is only sized to allow the door floor 28 to be raised far enough to pivot outwardly, with the guide member 14 shortened to provide clearance for the lower guide bar 22 which is then pivoted to an open position above the upper guide bar 22 inverting the door side wall member. A receiving notch in the upper part of the frame can be added to hold the inverted lower guide bar 22, while the original upper guide bar 22 is in the notch 18. The pivoting arrangement is noted as an alternative but the sliding arrangement shown is preferred as simpler and easier manipulation because the handles 26 remain in an ergonomic position throughout the movement.

[0033] The formation of the cleanout opening 34 in the side wall structure (plate 30) and the floor 32 allows for a greater access of tools into the interior than is provided with similer sized wall only openings. The formation of the cleanout opening 34 as shown also provides increased visibility for inspecting the cleanout operation than

with prior clean out opening construction, all without substantially increasing the size. The height of the cleanout opening will typically be less than 6" along the side plate 30.

[0034] The present invention is also easily retrofitted to existing gondola railcars, both those that have existing clean out doors and those that do not. The method of retrofitting a gondola railcar with at least one clean out opening 34 comprises the steps of: providing one opening in the sidewall and an associated opening in the floor for each clean out opening 34, wherein the side plate opening and floor opening combine to form the clean out opening 34 for the railcar. For railcars having a cleanout opening in the side this step is merely forming the floor opening. The second step is coupling one cleanout door 10 to the side plate 30 of a gondola railcar body adjacent the floor 32 of the gondola car at each clean out opening.

[0035] It is apparent that many variations to the present invention may be made without departing from the spirit and scope of the invention. The present invention is defined by the appended claims and equivalents thereto.

What is claimed is:

1. A gondola railcar cleanout door configured to be coupled to a side plate of a gondola car adjacent a floor of the gondola car wherein the side plate has an opening therein and the floor has an opening therein, wherein the gondola railcar cleanout door comprises:

A) A frame mountable to the side plate structure of the gondola railcar, adjacent the opening in the side plate structure;

B) A door assembly coupled to the frame and moveable between an open position in which the opening in the floor and the opening in the side plate may be used to clean out the interior of the gondola rail car, and a closed position substantially closing the opening in the side plate and the opening in the floor, wherein the door assembly includes a door side wall member configured to substantially close the opening in the side plate in the closed position and a door floor member configured to substantially close the opening in the floor in the closed position.

2. The gondola railcar cleanout door according to claim 1 wherein the frame includes a pair of rail members configured to guide the door assembly for movement between the open and closed position.

3. The gondola railcar cleanout door according to claim 2 further including a slot extending in each rail member and wherein the door assembly includes at least one bar coupled to the door side wall member and received in each rail member slot.

4. The gondola railcar cleanout door according to claim 3 wherein each rail member includes a notch configured to receive at least one bar and support the door assembly in the open position.

5. The gondola railcar cleanout door according to claim 3 wherein two spaced bars are coupled to the door side wall member.

6. The gondola railcar cleanout door according to claim 3 further including at least one handle member coupled to the door assembly.

7. The gondola railcar cleanout door according to claim 3 wherein the door floor member is substantially aligned with the floor when the door is in the closed position.

8. The gondola railcar cleanout door according to claim 3 wherein the door side wall member is substantially parallel with the side plate.

9. The gondola railcar cleanout door according to claim 3 wherein the door floor member extends inwardly of the door side wall member toward the interior of the railcar.

10. A gondola railcar comprising

A) A railcar body including a side plate and a floor, wherein the side plate has at least one opening therein and the floor has at least one opening therein and one side plate opening and one floor opening combine to form at least one clean out opening for the railcar; and
B) At least one cleanout door configured to be coupled to the side plate of a gondola railcar body adjacent the floor of the gondola car at each clean out opening, wherein the gondola railcar cleanout door includes:
    i. A frame mountable to the side plate structure of the gondola railcar, adjacent the opening in the side plate structure; and
    ii. a door assembly coupled to the frame and moveable between an open position in which the opening in the floor and the opening in the side plate may be used to clean out the interior of the gondola rail car, and a closed position substantially closing the opening in the side plate and the opening in the floor, wherein the door assembly includes a door side wall member configured to substantially close the opening in the

side plate in the closed position and a door floor member configured to substantially close the opening in the floor in the closed position.

11. The gondola railcar according to claim 10 wherein the frame of each clean out door includes a pair of rail members configured to guide the door assembly for movement between the open and closed position.

12. The gondola railcar according to claim 11 wherein each clean out door further includes a slot extending in each rail member and wherein the door assembly includes at least one bar coupled to the door side wall member and received in each rail member slot.

13. The gondola railcar according to claim 12 wherein each rail member of each clean out door includes a notch configured to receive at least one bar and support the door assembly in the open position.

14. The gondola railcar according to claim 12 wherein each clean out door includes two spaced bars coupled to the door side wall member.

15. The gondola railcar according to claim 12 wherein each clean out door further includes at least one handle member coupled to the door assembly.

16. The gondola railcar according to claim 12 wherein each clean out door is configured wherein the door floor member is substantially aligned with the floor when the door assembly is in the closed position.

17. The gondola railcar according to claim 12 wherein the door side wall member of each clean out door is substantially parallel with the side plate.

18. The gondola railcar according to claim 12 wherein the door floor member of each clean out door extends inwardly of the door side wall member toward the interior of the railcar.

19. A method of retrofitting a gondola railcar with at least one clean out opening comprising the steps of:

providing one opening in the sidewall and an associated opening in the floor for each clean out opening, wherein the side plate opening and floor opening combine to form the clean out opening for the railcar; and

coupling one cleanout door to the side plate of a gondola railcar body adjacent the floor of the gondola car at each clean out opening, wherein the gondola railcar cleanout door includes:

i. A frame mountable to the side plate structure of the gondola railcar, adjacent the opening in the side plate structure; and

ii. a door assembly coupled to the frame and moveable between an open position in which the opening in the floor and the opening in the side plate may be used to clean out the interior of the gondola rail car, and a closed position substantially closing the opening in the side plate and the opening in the floor, wherein the door assembly includes a door side wall member configured to substantially close the opening in the side plate in the closed position and a door floor member configured to substantially close the opening in the floor in the closed position.

20. The method according to claim 19 wherein the door floor member of each clean out door extends inwardly of the door side wall member toward the interior of the railcar.

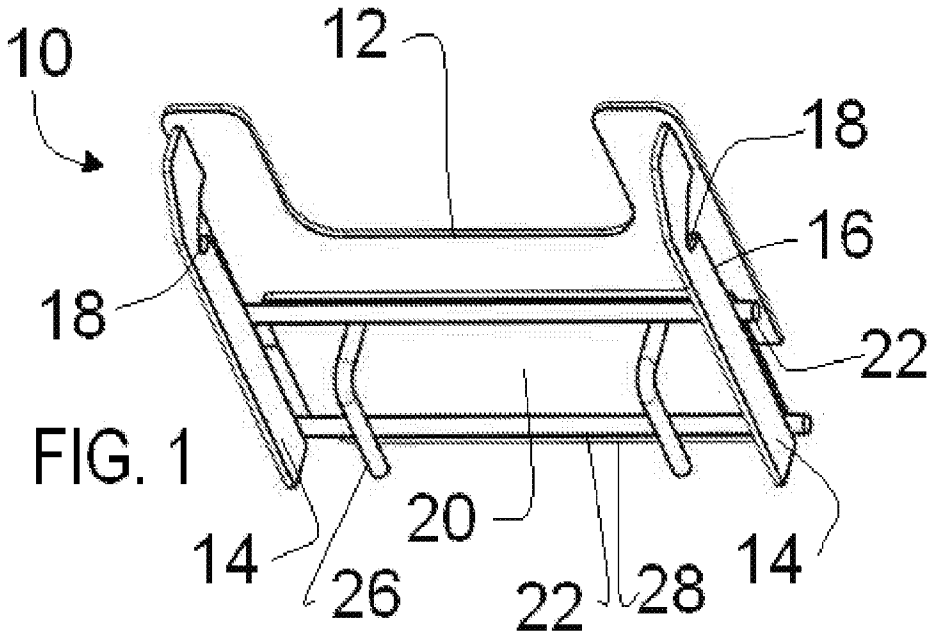
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FIG. 1

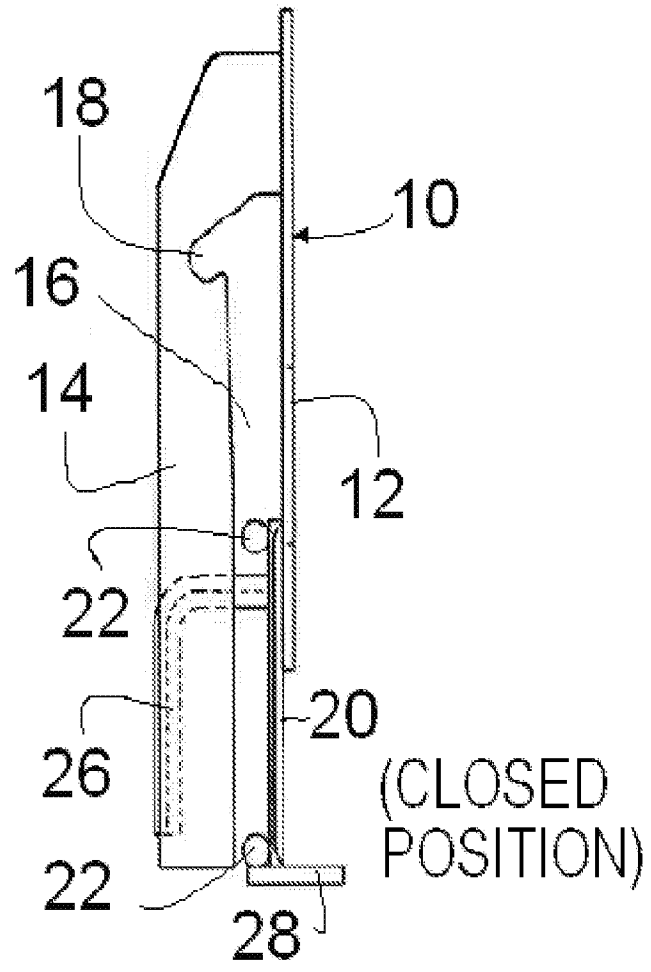
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FIG. 2

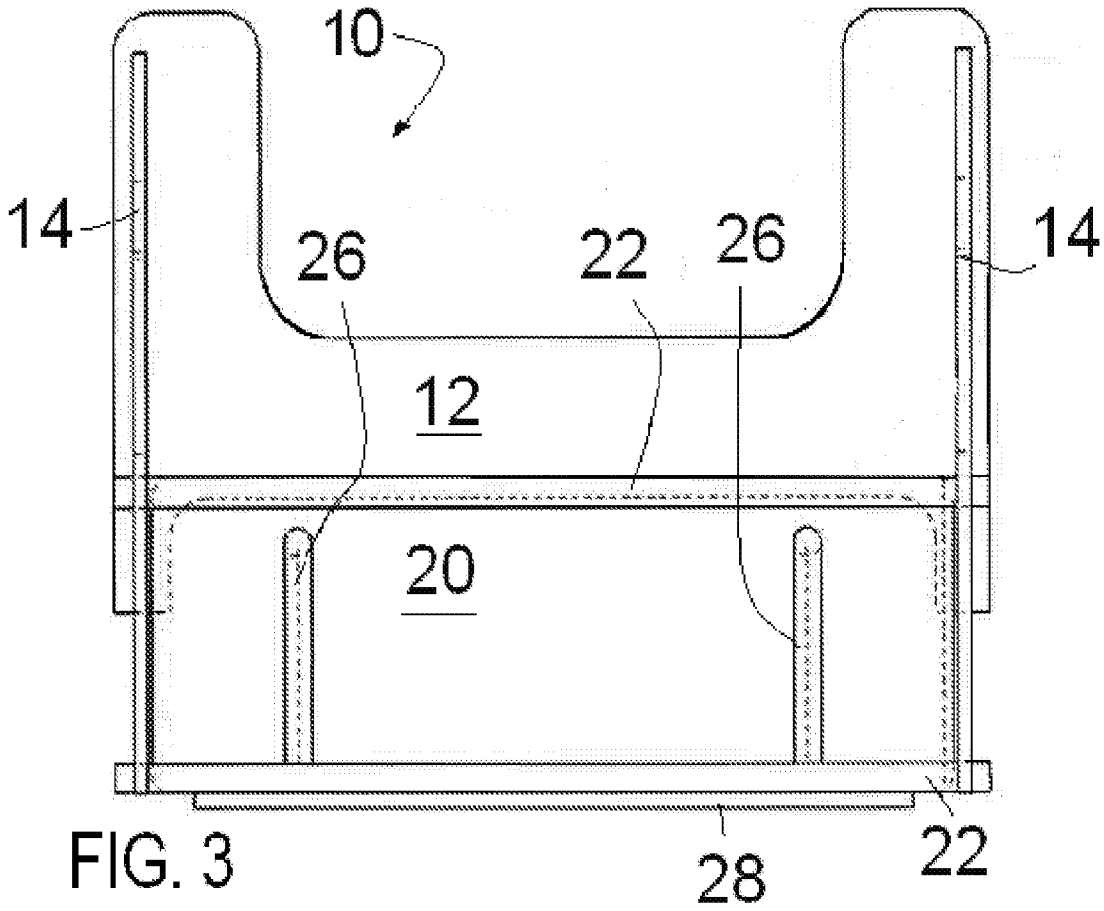
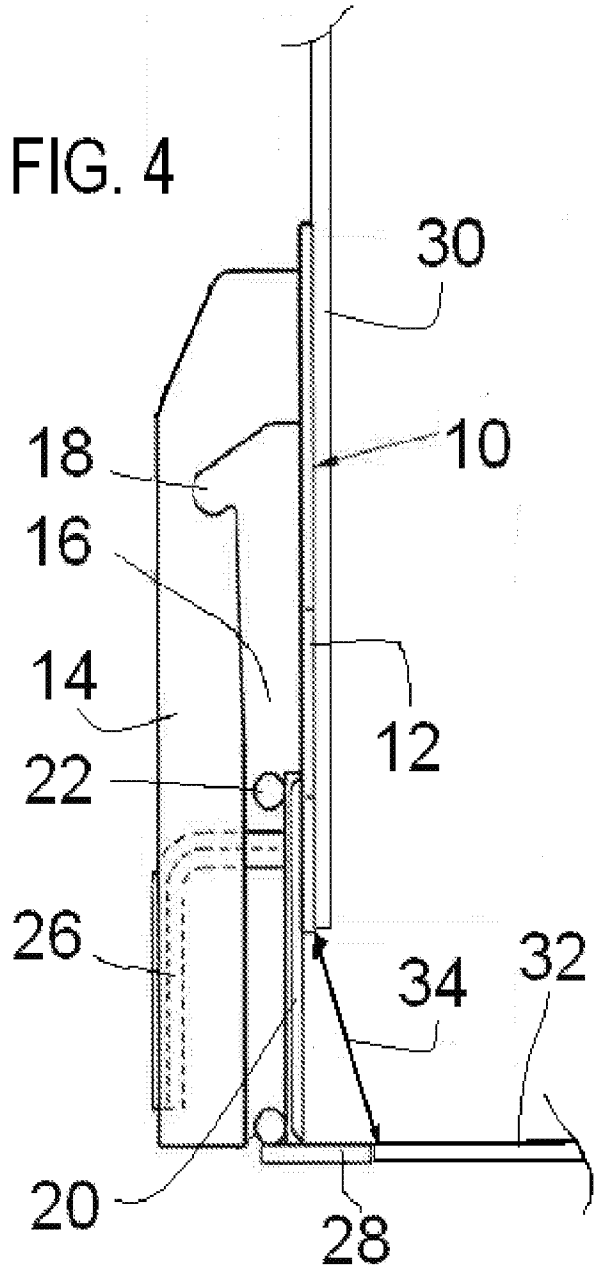


FIG. 3

FIG. 4



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 2015/025475

A. CLASSIFICATION OF SUBJECT MATTER

B61D 17/00 *(2006.01)*
B61D 3/00 *(2006.01)*

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)

B61D 3/00-3/06, 17/00-17/10, B65D 90/00, 90/10, 90/54, 88/00-88/12

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 practicable, search terms used)

CIPO, DEPATISNET, DWPI, EAPATIS, Espacenet, JOPAL, K-PION, KIPRIS, PAJ, PatSearch (RUPTO internal), RUPAT, Scopus, SIPO, USPTO, Patentscope, VINITI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 8025014 B2 (NATIONAL STEEL CAR LIMITED) 27.09.2011, col. 22, line 5- col. 23, line 46, fig. 1-6	1,10,19 2-9,11-18,20
Y A	RU 2271292 C2 (FGUP " PO URALVAGONZAVOD" IM. F.E. DZERZHINSKOGO) 10.03.2006, abstract, p. 4, lines 11-13, fig. 2	1,10,19 2-9,11-18,20
A	RU 2184667 C2 (GUP "PO URALVAGONZAVOD" IM. F.E. DZERZHINSKOGO) 10.07.2002, abstract, fig. 1-3	1-20
A	RU 2140866 C1 (GPO "URALVAGONZAVOD" IM. F.E. DZERZHINSKOGO) 10.11.1999, abstract, fig. 1-5	1-20

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

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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
24 June 2015 (24.06.2015)	13 August 2015 (13 08.2015)
Name and mailing address of the ISA/RU: Federal Institute of Industrial Property, Berezhkovskaya nab., 30-1, Moscow, G-59, GSP-3, Russia, 125993 Facsimile No: (8-495) 531-63-18, (8-499) 243-33-37	Authorized officer N. Nikitina Telephone No. 8(495)531-64-81

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