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(54) **APPARATUS AND METHOD FOR THE REPAIR OF CARTS**

(57) The invention relates to apparatus and a method for performing a repair of first and second spaced apart members of a cart or trolley, said apparatus including a first portion for connection to said first bar member and a second portion for connection to said second bar member and an expansion assembly operable to linearly move the first and second portions apart and hence exert a repairing force to as to repair a portion, most typically a dent or bend in at least one of the bar members.

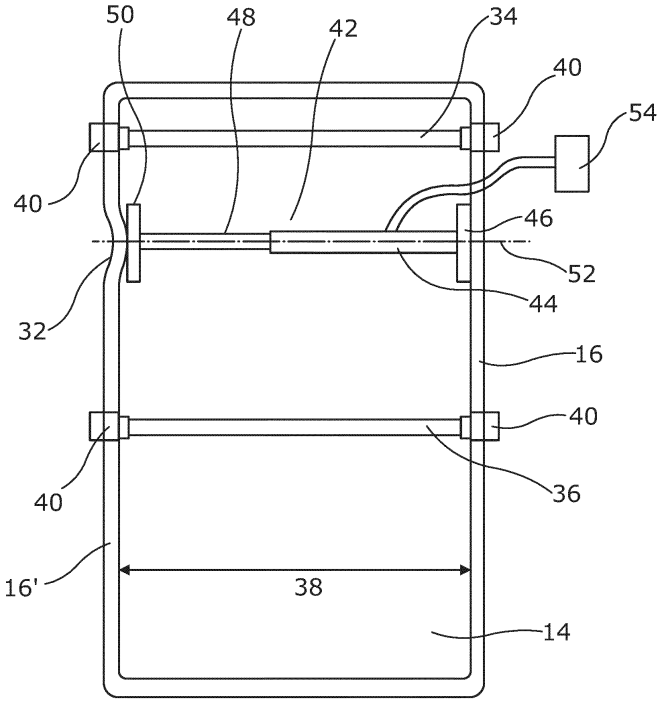

Figure 3

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Description

[0001] The invention to which this application relates is apparatus and method for the maintenance of trolleys typically known as warehouse carts, which comprise a series of side walls and a base and onto which are mounted a series of wheels or castors to allow the cart to be moved across a surface. The side walls and base define a cavity into which a plurality of items can be placed so as to be transported along with the cart between different locations.

[0002] The use of carts of the type described, is commonplace and especially in areas such as warehouses where goods are required to be moved between specific locations within the warehouse and also to and from entrances and exits to the warehouse to allow goods to be moved to and from transport vehicles.

[0003] The cart side walls are typically formed of a series of metal bars which are joined together so as to effectively form a cage of dimensions which ensures that the items to be held therein, do not pass through the gaps between the bars and are therefore retained within the cavity. During use, the carts can be moved and controlled in a relatively rough manner which can cause the frames, and in particular, the side or edge bars of the frames to be damaged as a result of impact with other carts and/or fixed articles within the warehouse or vehicle. As a result, the bars can become bowed or have indents which can, for example weaken the integrity and strength of the cage and/or prevent the opening and closing of panels or doors which allow access to the interior cavity for the placement and removal of items therefrom and/or to allow the cart to be moved between storage and in-use configurations. As a result, the dents or a series of dents may eventually mean that the cart cannot be used effectively.

[0004] At this point, conventionally, the cart is taken to an offsite location for repair and the cost of transporting the cart offsite, the time taken for repair and then transport back to the warehouse typically means that a number of damaged carts are collected on site and, once a group of damaged carts have been collected, the same will all be transported together to the location for repair. Typically, the number of carts which are collected may be equivalent to, for example the size of vehicle which is to be used to transport the damaged carts. This has a number of consequences, one of which is that the collection of the group of damaged carts on site takes up a considerable amount of space which could otherwise be used for the storage of items and so the carts create a problem in terms of storage of the same until they are removed for repair.

[0005] A further problem is that due to the time taken to transport, repair and transport back the carts, a considerable number of the carts are effectively out of action for a significant period of time. This therefore impacts on the normal operations of the warehouse and can mean that the productivity is reduced or the warehouse operator has to have a surplus of carts available so that when the damaged carts are removed, there are still a sufficient number of carts available. This adds significant expense and again, the storage of the surplus carts takes up space in the warehouse. A further problem is the expense of repair as typically the same is undertaken by a third party service and there are transport costs in transporting the damaged and repaired carts.

[0006] As a result of these problems, it is known that conventionally, attempts may be made to repair the carts on site by the use of hand implements such as a hammer. However this can cause significant problems, for example, the use of a hand implement to repair the frame in an unguided manner, can mean that further damage is actually caused to the cart or, if a repair is performed, the repair may be short lived and/or may in fact serve to weaken the integrity of the cart. Furthermore, this form of repair is typically undertaken by unskilled personnel and in an unsupervised manner and may therefore represent significant health and safety risks to the person undertaking the repair and other persons in the vicinity and therefore is not an acceptable solution.

[0007] The aim of the present invention is to provide apparatus which allows the repair of the frames of carts to be performed in a reliable and safe manner so as to ensure that the repair, once performed, returns the cart to a reliable, usable format. A further aim is to provide the said apparatus in a form so as to be usable at the same location or adjacent to the same location at which the cart is to be used and therefore avoid the need for the damaged carts to be collected and transported to a remote location for repair and therefore allow the carts to be made available for use relatively quickly after the damage has occurred and therefore avoid the extra storage and transport costs.

[0008] In a first aspect of the invention, there is provided apparatus for use in providing a repair function on a frame of a cart or trolley, said apparatus including an expandable assembly to be attached to extend between first and second, spaced apart bars of the frame, at least one of which includes a damaged portion wherein said expandable assembly includes a first member for engaging with a portion of said first bar and a second member to be engaged to the portion of the second bar which includes the said damage, and an expansion means operable to move said first and second members linearly apart and so exert a repairing force onto said damaged portion.

[0009] In one embodiment, the repairing force is such as to cause damage in the form of a dent or bend in said damaged portion of the frame to be straightened.

[0010] In one embodiment, the expansion means is a hydraulic means which when operated, causes the said second member to act as a hydraulic ram and create the repairing force to be exerted on said frame portion.

[0011] In one embodiment, engagement means are provided which allow one or both of said members of the expansion assembly to be attached and retained in position to the respective bars of the frame.

[0012] Typically the expansion assembly is portable.

[0013] In one embodiment, the apparatus further includes one or more brace assemblies.

[0014] In one embodiment the brace assembly extends between first and second bars of the frame so as to retain the said bars of the frame in a fixed configuration during the repair process.

[0015] In one embodiment, a first brace assembly is located on a first side of the expansion assembly and a second brace assembly is located on the opposing side of the expansion assembly.

[0016] In one embodiment, the length of said brace assemblies are adjustable so as to allow the same to be adjusted to the required distance between said first and second bars of the frame and so retain the bars at a fixed distance apart and therefore allow the repairing force to act on the damaged portion and straighten the same.

[0017] In one embodiment, a brace assembly is provided to be engaged between two castors or wheels of the cart.

[0018] Typically the bars of the frame which receive the expansion assembly are the bars at the opposing edges of a side wall frame.

[0019] In one embodiment the side walls are formed of a series of members joined in a mesh structure. In an alternative embodiment the frame is formed of a series of edge members and gaps between the same are filled with panels. In either embodiment the aim is to ensure that items held within the cavity of the structure cannot fall through the sidewall during use of the cart.

[0020] In a further aspect of the invention there is provided a method for repairing a cart or trolley, wherein said method includes the steps of placing one or more brace assemblies in position to locate between first and second bar members of the frame of the cart or trolley and/or between respective wheels of said cart or trolley and placing an expansion assembly in engagement with spaced apart first and second bar members of the frame by placing a first member of the expansion assembly in location with a portion of the first bar member and locating a second bar member of the expansion assembly with a portion of the second bar member which includes the damage to be repaired, operating an expansion means to move the respective first and second members linearly apart so as to exert a repairing force on said damaged portion of the frame and operating the expansion means to cause the movement apart of said first and second members until the repair has been completed to a desired extent.

[0021] Typically, once the repair has been completed to the desired extent, the repairing force can be removed and the first and second members and brace members detached from the cage trolley.

[0022] In one embodiment, the repairing force is applied using a hydraulic expansion means which causes the repairing force to be exerted via the second member which is moved away from the first member along the longitudinal axis of the same.

[0023] In one embodiment, the method is performed at the same location as that at which the carts are located in normal use.

[0024] In one embodiment, the desired extent of repair is such as to allow movement of respective frame bars without blockage and/or movement of the base with respect to the side walls and/or to allow the cart to be moved to a collapsed or nested condition.

[0025] Specific embodiments of the invention are now described with reference to the drawings wherein:

Figures 1a and b illustrates a cart with which the apparatus and method in accordance with the invention can be used.

Figure 2a-c illustrates a damaged portion of the cart frame which can be repaired in accordance with the invention; and

Figures 3 and 4a-c illustrates the apparatus and method of use of the invention in accordance with one embodiment.

[0026] Referring now to figures 1a and b, there is illustrated a cart 2 in one embodiment with which the invention can be used. The cart 2 comprises a base 4 and at the underside of the same, there are provided a series of wheels or castors 6. Depending upwardly from the base 4, there are provided a series of side walls 8, 10, 12, 14 and each of which is formed as a frame formed from a series of edge bars 16, typically formed of metal or a metal alloy. In this embodiment the space intermediate the edge members is spanned by a mesh structure formed of metal wires or bars. In another embodiment, shown in Figure 2c the space is filled by one or more panels 19. One or more of the side walls can be provided as a door 18 with hinges 20 and latch 22 and which can be selectively opened to allow access to the cavity 24 which is defined by the side walls and base.

[0027] Typically, the carts are used to transport items which are located in the cavity between different locations within a warehouse and/or to and from transport vehicles. Handles may also be provided to allow the same to be gripped by the user of the apparatus to control the movement of the same as the castors or wheels move along the surface.

[0028] Typically, the side walls and base can be moved to a nesting position so as to allow the cage trolley to be effectively moved to a collapsed position for storage purposes.

[0029] It is found that impacts of the cart 2 with other carts and/or other items within the environment can cause damage to the frame and particularly, when the edge bars 16 of the side walls, are damaged, the same are bent inwardly which can, in turn, prevent the free movement of the door 18 between open and closed positions and/or the movement of the base 4 between nested and in use positions. When this occurs, there is a need

to be able to repair the edge bars 16 and, as previously discussed, this is conventionally undertaken by moving the cage trolleys to a remote location which is time consuming and expensive.

[0030] In accordance with the invention, the repair can be undertaken safely on site.

[0031] Figures 2a and b illustrate, respectively, a portion 30 of one of the edge bars 16 of the frame in a normal condition, as shown in Figure 2a and, in figure 2b, there is shown the same portion 30' of the edge bar in a damaged condition in which it can be seen that there is provided a dent 32 and which has caused a bend to be created in the edge member. As shown in Figure 2c it can often be the case that a number of the side walls may include dents in the edge members and so a number of the side walls of the cart may need to be repaired in accordance with the invention.

[0032] In accordance with Figure 3 which shows the apparatus in position for use for repair and Figures 4a-c which illustrate the steps of the method for repair, there is provided a means for allowing on site repair of the cart using portable apparatus and which can be performed by one operator to allow the repair of the damaged portion.

[0033] The apparatus is shown in use on side wall 14 of the cart as shown in Figure 3 and part of the wall is shown in Figure 4a- c and the apparatus includes, in this embodiment shown in Figure 3, first and second brace assembles 34, 36, and these are located so as to extend between the opposing edge bars 16, 16' of the side wall 14 and the edge bar 16' has the damaged portion 30' with damage 32 thereon. The brace assemblies can be selectively moved to match the required distance 38 between the frame bars and thereby retain the same in a relatively rigid position via engagement means 40 which retain the brace members in position on the edge bars 16, 16'.

[0034] It should be appreciated that perhaps only one brace assembly may be provided in other embodiments, such as shown in Figures 4a-c. As shown in Figure 4a the assembly 34 has engagement means 40 at each end are U-shaped and fit on to the respective edge bars 16, 16'.

[0035] Intermediate the location of the brace members 34, 36 in Figure 3 and adjacent the brace assembly 34 in Figures 4a-c, there is then located the expansion assembly 42 which comprises a first member 44 with engagement means 46 to allow the same to be engaged with the edge frame member 16' and a second member 48 which is received within the first member 44 and is slidably movable with respect thereto along the longitudinal axis 52 .

[0036] The second member 48 has a repair plate 50 which engages on the damaged portion 32 of the edge bar 16' and the second member is moved towards the damaged portion 32 under the influence of a hydraulic repairing force created via a pump 54 which can be hand operated or may be powered. Thus, when the repair apparatus is in position, the hydraulic pump can be operated so as to cause movement of the second member and repair plate 50 as indicated by the arrow 56 and hence move the repair plate against the damaged portion 32 so as to straighten the same as indicated in Figure 3 and typically bring the distance between the edge bars 16,16' at this location to the required distance 38.

[0037] Once the repair has been completed to a desired extent, which typically is such as to allow the movement of other portions of the cage trolley with respect to the damaged portion, then the repair apparatus can be released and the brace member removed and the cart is brought back into service with the repair of the same having been safely done on site.

[0038] Thus, in accordance with the apparatus and method if the invention, the conventional problems of the repair task which conventionally would be performed off site, using expensive and fixed position apparatus and involving significant transport and storage costs are now overcome. In accordance with the present invention the repair task can be safely performed at the same site as the use of the cart and can be performed using apparatus which is portable and can be operated, if required by one person. Thus there is no transport requirement and the downtime of the carts whilst waiting for repair of the same is greatly reduced as the apparatus is available on site for immediate use as and when required.

Claims

1. Apparatus for use in providing a repair function on a frame of a cart or trolley, said apparatus including an expandable assembly to be attached to extend between first and second, spaced apart bars of the frame, at least one of which includes a damaged portion wherein said expandable assembly includes a first member for engaging with a portion of said first bar and a second member to be engaged to the portion of the second bar which includes the said damage, and an expansion means operable to move said first and second members linearly apart and so exert a repairing force onto said damaged portion.

2. Apparatus according to claim 1 wherein the repairing force is such to cause damage in the form of a dent or bend in said damaged portion of the frame to be straightened.

3. Apparatus according to claim 1 wherein the expansion means is a hydraulic means which, when operated, causes the said second member to act as a hydraulic ram and create the repairing force to be exerted on said frame portion.

4. Apparatus according to claim 1 wherein said engagement means are provided which allow one or both of said members of the expansion assembly to

be attached and retained in position to the respective bars of the frame.

5. Apparatus according to claim 1 wherein the expansion assembly is portable.

6. Apparatus according to claim 1 wherein the apparatus further includes one or more brace assemblies which extend between said first and second bars of the frame so as to retain the said bars of the frame in a substantially fixed configuration during the repair process.

7. Apparatus according to claim 6 wherein a first brace assembly is located on a first side of the expansion assembly and a second brace assembly is located on an opposing side of the expansion assembly.

8. Apparatus according to claim 6 wherein the length of said brace assemblies are adjustable so as to match the required distance between the said first and second bar members of the frame and so retain the bars at a fixed distance apart.

9. Apparatus according to claim 6 wherein a brace assembly is provided to be engaged between two castors or wheels of the cart.

10. Apparatus according to any of the preceding claims wherein the bars of the frame which receive the expansion assembly are the bars at the opposing edges of a side wall of the cart or trolley.

11. Apparatus according to any of the preceding claims wherein at least some of the side walls are formed as a mesh supported by a series of said frame members.

12. Apparatus according to any of the preceding claims wherein at least some of the side walls are formed by panels supported by a series of said frame members.

13. A method for repairing a cart or trolley, wherein said method includes the steps of placing one or more brace assemblies in position to locate between first and second bar members of the frame of the cart or trolley and/or between respective wheels of said cart or trolley and placing an expansion assembly in engagement with spaced apart first and second bar members of the frame by placing a first member of the expansion assembly in location with a portion of the first bar member and locating a second bar member of the expansion assembly with a portion of the second bar member which includes the damage to be repaired, operating an expansion means to move the respective first and second members linearly apart so as to exert a repairing force on said damaged portion of the frame and operating the expansion means to cause the movement apart of said first and second members until the repair has been completed to a desired extent.

14. A method according to claim 13 wherein once the repair has been completed to the desired extent, the repairing force can be removed and the first and second members and brace members detached from the cage trolley.

15. Apparatus according to any of the preceding claims wherein the repairing force is applied using a hydraulic expansion means which when operated causes the repairing force to be exerted via a second member which is moved away from the first member along the longitudinal axis of the same.

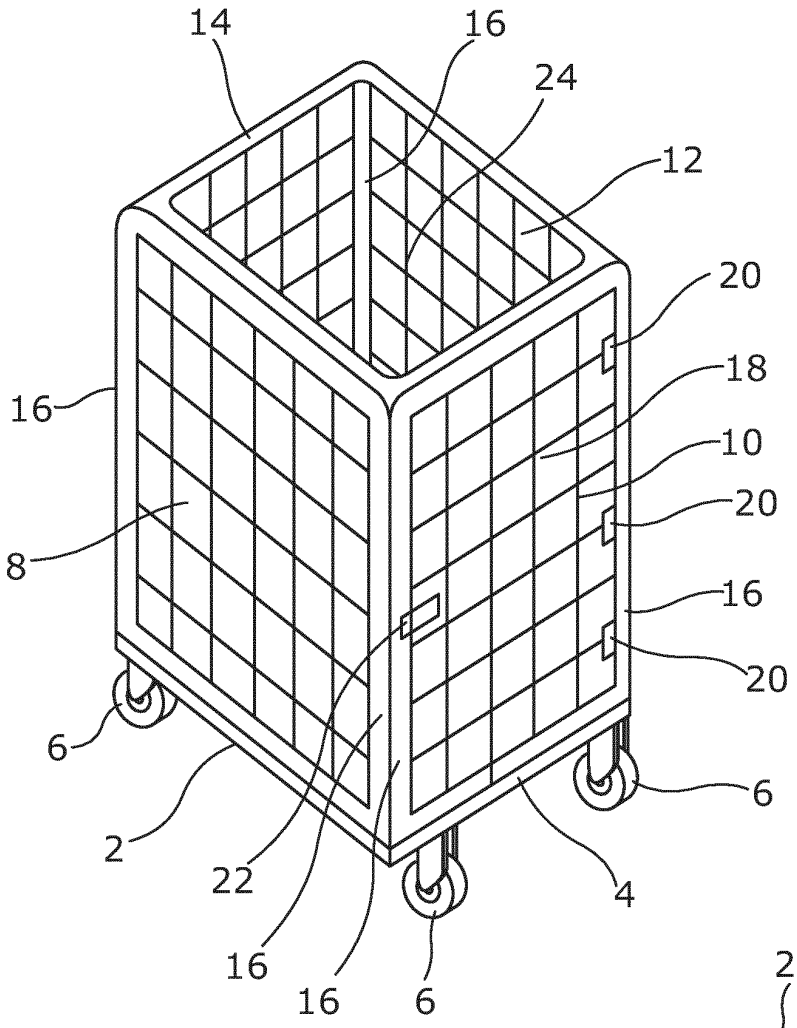

Figure 1a

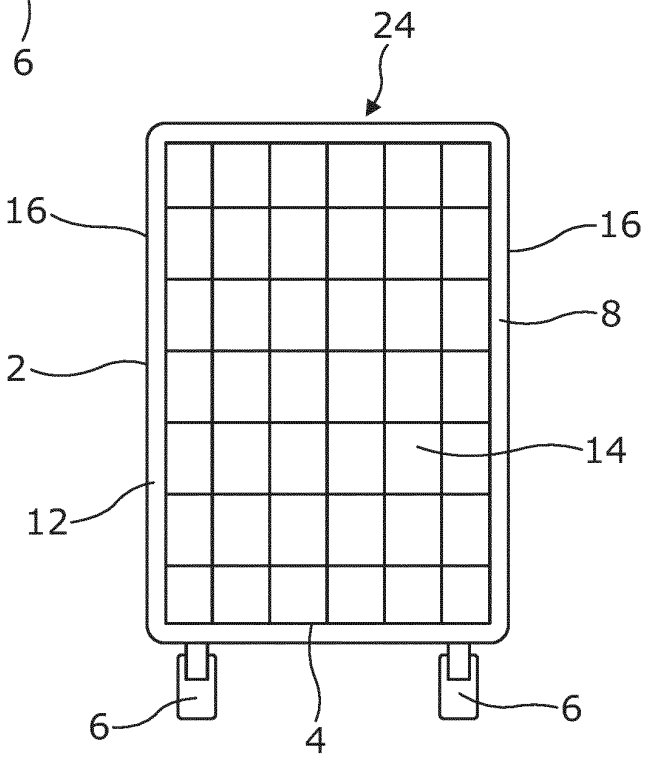

Figure 1b

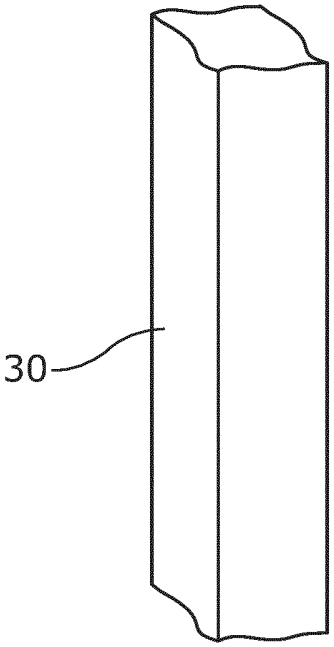

Figure 2a

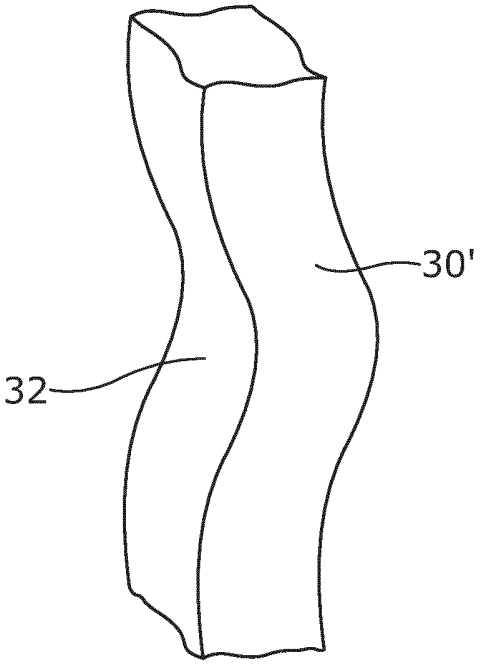

Figure 2b

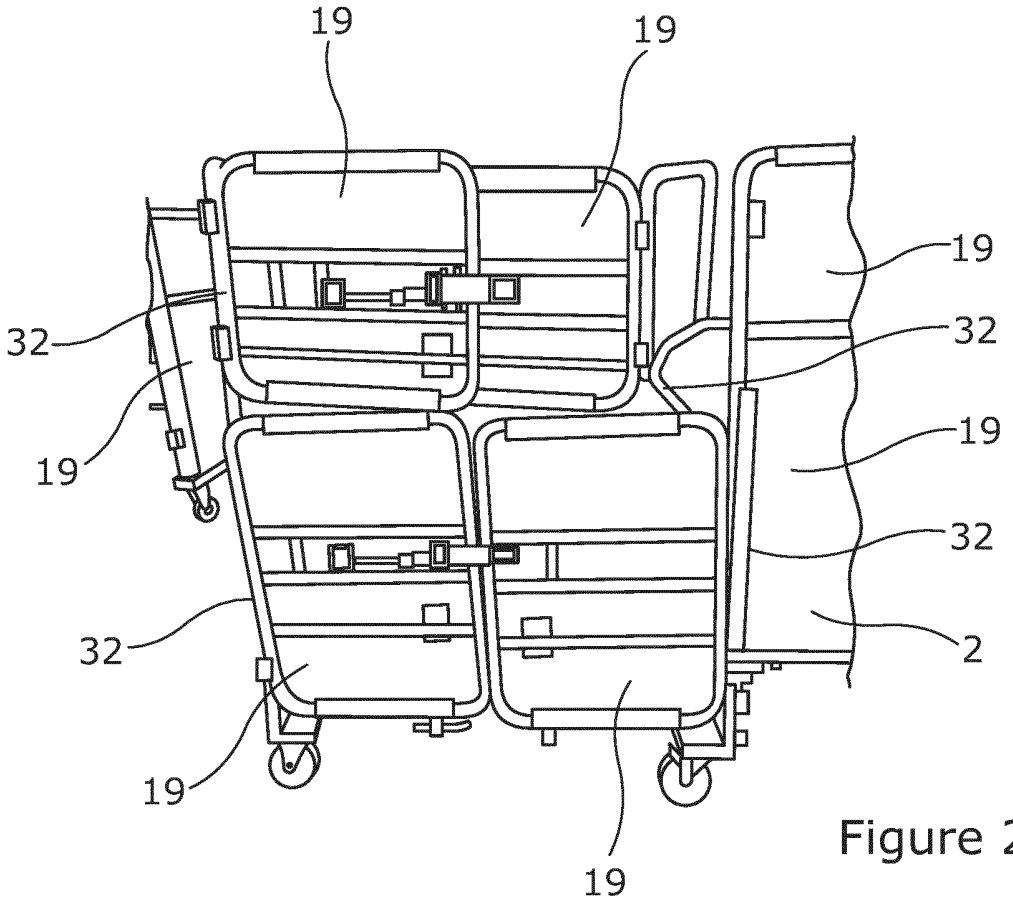

Figure 2c

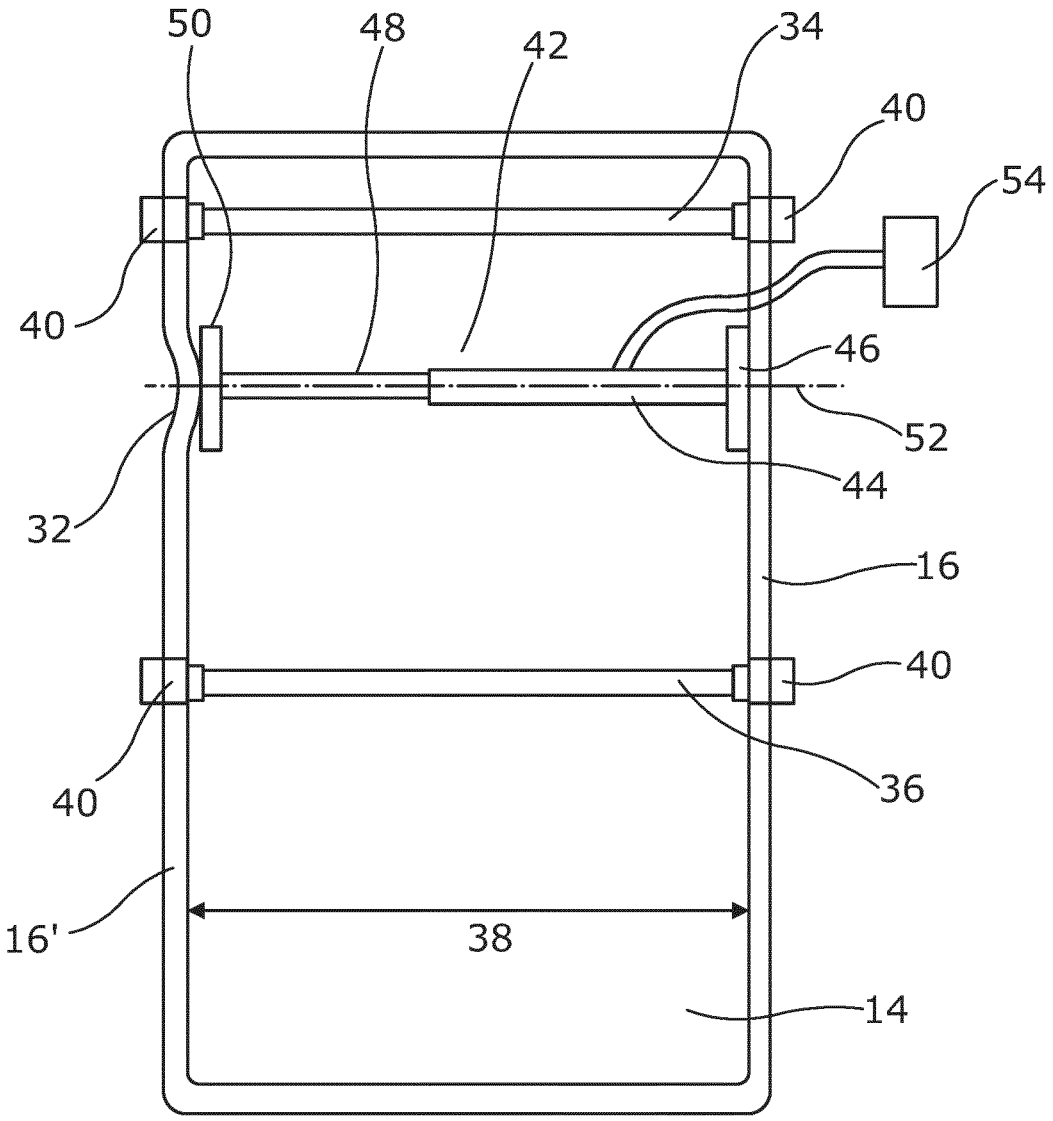

Figure 3

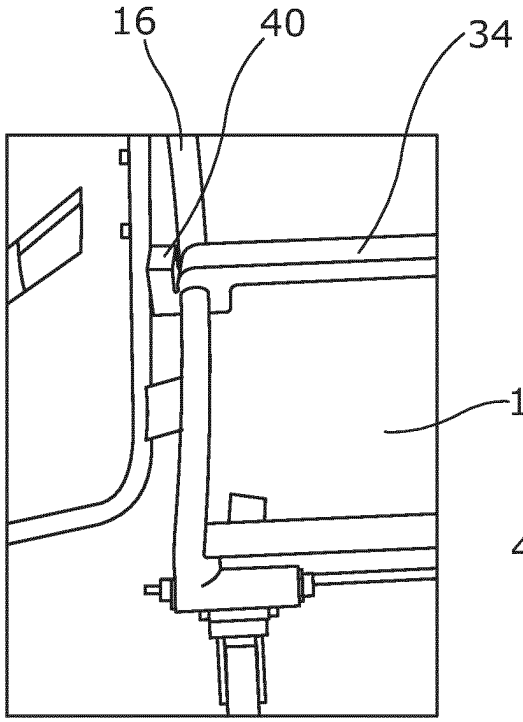

Figure 4a

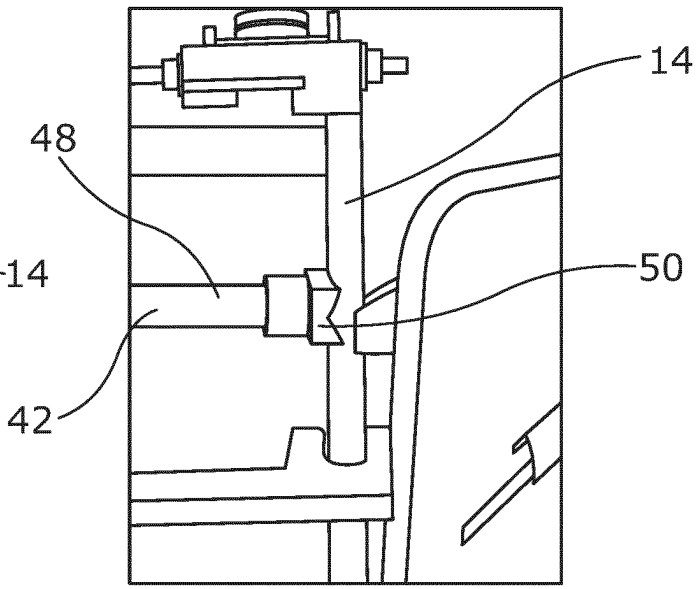

Figure 4b

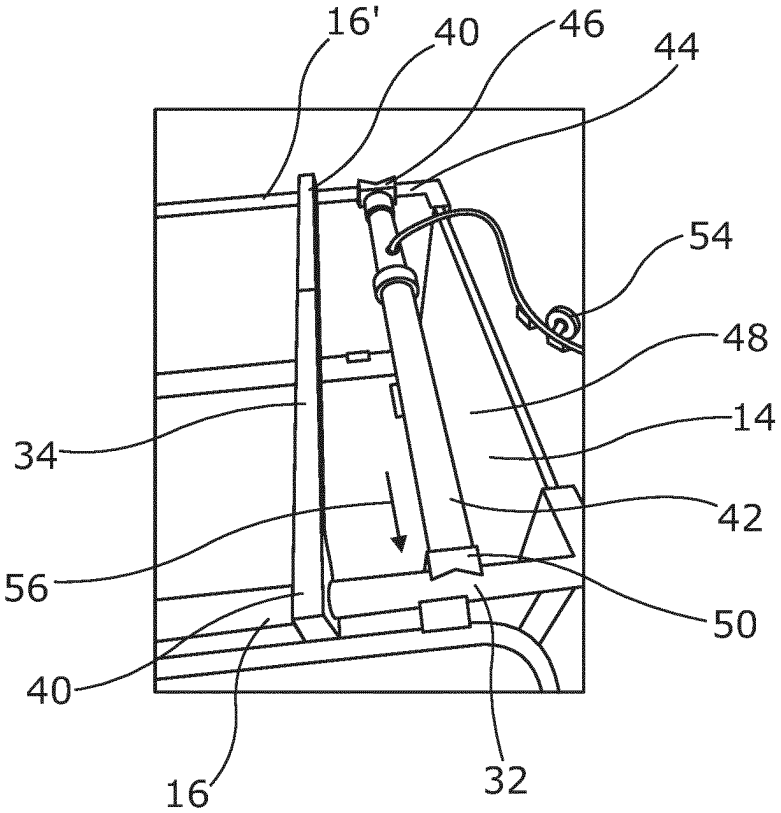

Figure 4c

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EUROPEAN SEARCH REPORT

Application Number
EP 23 27 5136

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 February 2024	Stanic, Franjo

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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