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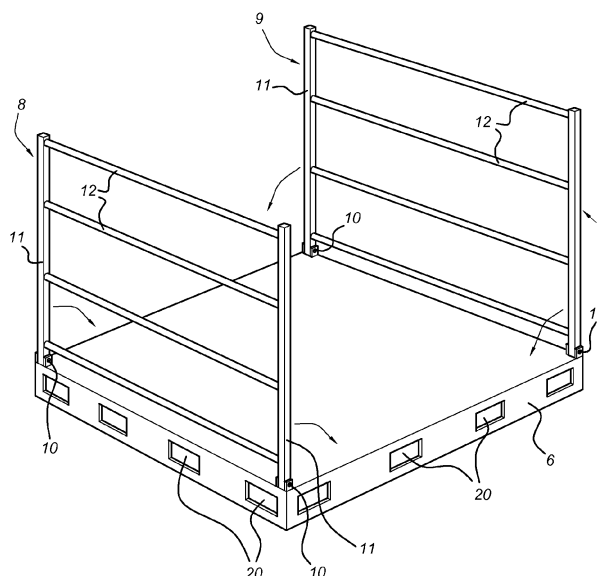
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(54) **Transport system and box therefor**

(57) A transport system for transport of empty containers, said system comprises at least one drop trailer (1) provided with a cargo hold (2) and boxes (4) having a base (6) with a transverse direction and a longitudinal direction and sides (8,9) at opposite ends of the base (6). The transverse dimension of the base (6) is slightly less

than the internal width of the cargo hold (2) and the height dimension of the sides is slightly less than the internal height of the cargo hold (2). The box comprises a cargo space for accommodating said containers. For the purpose of returning empty boxes (4), the sides (8,9) are transferrable between an upright position and a collapsed position.

*Fig 1*



## Description

**[0001]** The invention is related to the field transporting containers, in particular drums, for delivery to customers who fill the containers with specific goods. Such containers usually require a relatively large amount of transportation space, however the weight thereof is still limited as they are completely empty. It will be clear that the transportation of the empty containers adds to the cost thereof. It is therefore of the utmost importance that the transport process can be carried out as efficient as possible. In this connection it has already been proposed to supply the containers in boxes which can be handled by means of forklift trucks. The size of these boxes is tailored to the space which is usually available in transport vehicles. Each box may contain a certain number of containers. In the case of drums for instance, these are arranged in upright position and to a maximum number of three on top of each other.

**[0002]** Furthermore, several of these boxes can be arranged within the cargo hold of a drop trailer which is provided with extendable/collapsible legs. Such drop trailer can be placed on the chassis of a transport vehicle, e.g. a motorized truck and/or a truck trailer. Once delivered, the drop trailer may be offloaded from the vehicle and placed on its extended legs. The boxes are removed from the drop trailer. Subsequently, the drop trailer may be picked up again. In this way, an efficient transport of the empty containers is made possible.

**[0003]** The containers, once delivered, have to be stored at the premises of the receiving party. Generally, it is desirable for these parties to have a certain number of containers at their disposal so as to ascertain an uninterrupted delivery of the products in question. The boxes have the additional advantage that they may be parked at the premises of the receiving party so as to provide a temporary storage of the containers, whereby storage costs are mitigated.

**[0004]** However, the prior art boxes have the disadvantage that the transport thereof after delivering the containers which were contained therein, is cumbersome and costly. The boxes have a considerable size, which means that a transport volume is required which is the same as the transport volume of the boxes filled with containers. This goes of course at the expense of the cost savings which were obtained by the efficient transport of the containers as addressed before. In case the distance between the container production facility and the location of the receiving party is large, the cost disadvantage associated with the transport of empty boxes becomes prohibitive.

**[0005]** The object of the invention is therefore to provide a transport system of the type described before which eliminates the cost disadvantage associated with the transport of the empty boxes. This object is achieved by a transport system comprising at least one drop trailer provided with a cargo hold, at least one box having a base with a transverse direction and a longitudinal direc-

tion and sides at opposite ends of the base, wherein the transverse dimension of the base is slightly less than the internal width of the cargo hold and the height dimension of the sides is slightly less than the internal height of the cargo hold, said box comprising a cargo space for accommodating said containers, wherein the sides of the box are transferrable between an upright position and a collapsed position.

**[0006]** In the transport system according to the invention, containers are transported in the box and delivered at a desired location. After the box has been emptied however, the side walls thereof can be collapsed whereby a significant reduction of the total height of the box is obtained. As a result, the boxes can be stacked onto each other within the cargo hold of the drop trailer or another vehicle. Thus, the transport costs of returning the boxes is reduced whereby the total costs for the containers is sunk.

**[0007]** Preferably, the sides are hinged according to the longitudinal direction of the base and have a height dimension which is smaller than the transverse dimension of the base. Locking means may be provided for securing the upright position of the sides. The sides can be carried out in different ways, for instance in the form of closed panels. However, for reasons of weight the sides preferably comprise legs which are interconnected by transverse bars. The legs and bars form a frame which is strong and stiff enough to contain the containers or containers therein during handling such as by a forklift truck.

**[0008]** In this process of handling the boxes and containers therein, care should be taken that these containers are well protected against damages such as may occur as a result of these containers colliding onto each other, or due to rubbing etc. With the aim of protecting the containers within the box, strap means may be associated therewith for securing the containers, said strap means being connected to the sides and having a loop shape for encircling said containers.

**[0009]** The containers can be stabilized through the strap means, in such a way that they are prevented from colliding or rubbing. In a preferred embodiment, the strap means comprise a straight part extending between the sides as well as a fixation part connected to the straight part, said straight part and the fixation part forming a loop shape, in such a way that the length of the loop part generally corresponds to the inner circumference of the base. With the aim of simplifying the process of erecting and collapsing the box, the straight part may be permanently connected to one of the sides and may be releasably connected to the opposite side. Furthermore, the box may comprise several strap means above each other.

**[0010]** Evidently, it is desirable to accommodate as much containers as possible within the boxes, and also within the cargo hold of the drop trailer. The drop trailers which are fit for accommodating the boxes have cargo hold with particular sizes as to the length, width and height thereof. With the aim of providing a box both tai-

lored to the cargo hold dimensions and to accommodate several boxes within said cargo hold, preferably the length dimension of the cargo hold is at least twice the length dimension of the box. For instance, the transverse dimension of the base may range from 2440 to 2480 mm, preferably 2450 to 2470 mm and is more preferably 2460 mm.

**[0011]** Furthermore, having regard to the standard length dimension of the drop trailers in question, it may be desirable to apply boxes of two different longitudinal dimensions, that is a normal box and a reduced box. An optimal degree of loading of the cargo hold of such drop trailers is obtained with two normal boxes which have a longitudinal base dimension which ranges from 2660 to 2700 mm, preferably from 2670 to 2690 mm and is more preferably 2680 mm, as well as a reduced box having a longitudinal dimension which ranges from 2145 to 2185 mm, preferably from 2155 to 2175 mm and is more preferably 2165 mm. These boxes fit into a hold which has a length of about 7680 mm and a width of about 2480 mm, two normal boxes having a longitudinal dimension of about 2680 mm and one reduced box having a longitudinal dimension of about 2165 mm. As an example, the transport system as described before is in particular suitable for accommodating four tight head or open head drums with a diameter of 585 mm.

**[0012]** The open head drums referred to before are available in two types: ISO-compatible open head drums and Standard open head drums. The ISO open head drums have the same outer diameter as ISO tight head drums (585 mm). The Standard open head drum has an outer diameter of 610 mm, and thus requires a different loading scheme. Nevertheless, the box according to the invention may also well be used for the transport of such Standard open head containers. Moreover, the box is also suitable for transporting further types of containers, such as 60 liter drums, IBC's of 1.000 liter etc.

**[0013]** The invention is furthermore related to a box for the transport system according as described before, having a base with a transverse direction and a longitudinal direction and sides at opposite ends of the base and comprising a cargo space for accommodating empty containers, such as drums. The sides of said box are transferable between an upright position and a collapsed position. Additionally, strap means may be provided connected to the sides and having a loop shape for encircling the empty containers.

**[0014]** The invention will now be described further with reference to an embodiment shown in the drawings.

Figure 1 shows a box in perspective.

Figure 2 shows a top view of the box.

Figure 3 shows the box in perspective with strap means.

Figure 4 shows the view of the disassembled strap means.

Figure 5 shows the top view of the transport system according to the invention.

**[0015]** The transport system as shown in figure 5 consists of a drop trailer, in the embodiment shown a drop trailer having a cargo hold 2 and positioned on a motorized truck the drivers cabin 3 of which is visible. The cargo hold, which is a closed space with a bottom and top and possibly, sidewalls, front wall and backdoors, provides sufficient space for two normal boxes 4 with standard dimensions, as well as a reduced box 5 with reduced dimensions.

**[0016]** Figures 1-3 shows a standard box 4 having a specific length dimension which coincides with the longitudinal direction of the drop trailer, as well as a specific width dimension which is slightly smaller than the width dimension of the cargo hold 2. The standard box 4 has a base 6 which is carried out as a standard pallet, provided with openings 20 which can accommodate the prongs of a forklift truck by means of which the box can be handled. Furthermore, the box 4 has sides 8, 9 which are pivotably connected to the base 6 by means of pivots 10. The reduced box 5 has a base 7 or pallet similar width dimension, however the length dimension thereof is smaller for reasons which will be explained below.

**[0017]** The sides 8, 9 each consists of two uprights 11, in such a way that the uprights 11 of each side are interconnected by means of bars 12. Furthermore, as shown in figure 2 and 3, strap means 13 have been provided at several levels, in the embodiment shown at three levels. These strap means 13 are each fit for stabilizing a layer of drums within the box 4. As shown in figure 2, the layer of drums is arranged according to rows of four drums alternated by rows of three drums, which precisely fit within the boundary as defined by the base 6 and the sides 8, 9. It is thus possible to arrange three layers of drums on top of each other. The upper drums may extend above the sides 8, 9.

**[0018]** As shown in figure 4, each strap means 13 consists of a straight part 14 having ends provided with connection means 15, 16. Between these connection means 15, 16, strap parts 17, 18 are connected, the free ends of which may be tied together by means of the buckle connection 19. With reference to figures 2 and 3, it is to be noted that the strap means 13 are connected to the sides 8 respectively 9 through the connection means 15, 16. The length of the strap parts 17, 18 is such that in this connected condition they closely follow the contour of the base 6 as shown in figure 2. The strap means 13 can be hooked onto the uprights 11 after the drums have been placed on the base. It is also possible to connect the strap means permanently to one of the uprights, so as to safeguard these against loss.

**[0019]** Similarly, the reduced box 5 comprises such strap means 13, however the length of the strap parts 17, 18 is smaller in such a way that in the buckled up position they closely follow the contour of the base of this reduced box. Through these strap means, the drums which are located at the corner of multitude of drums shown in figure 2 are safely clamped with an appropriate force, whereby a secure drum package is obtained with no or

little space for movements. As a result, transport damage such as scratches which could result from mutual rubbing of the drums under the influence of transport shocks and the like, is avoided.

**[0020]** As shown in figure 2, a standard box 4 accommodates three rows of four drums as well as two rows of three drums. The drums in the embodiment shown are standard tight head drums having a diameter of 585 mm. Therefore, the internal width of the box 4 should be at least 2420 mm, which can be achieved by selecting thickness of 10 mm for the side wall construction. For open head drums, the internal width of the box should be at least 2440 mm. It will be clear that the box 4 according to the invention is fit for these kind of drums.

**[0021]** Having regard to the internal length of the cargo hold of a drop trailer which is usually applied for the transport of such boxes, the length of the standard box 4 should be at most 2680 mm, the length of the reduced box should be at most 2165 mm. So-called drop trailers for the transport of boxes have an internal length of 7680 mm. thus, two standard boxes and one reduced box fit within the cargo hold of such drop trailer, the cumulated length of which is 7525 mm, leaving a play of 155 mm space.

#### List of reference numerals

#### **[0022]**

1. Drop trailer
2. Cargo hold
3. Driver's cabin of truck
4. Standard box
5. Reduced box
6. Standard pallet
7. Reduced pallet
8. Side of box
9. Side of box
10. Pivot
11. Upright
12. Bar
13. Strap means
14. Straight part of strap means
15. Connection means

16. Connection means
17. Strap part
18. Strap part
19. Buckle connection
20. Hole for forklift prong

#### **Claims**

1. Transport system for transport of empty containers, said system comprising at least one drop trailer (1) provided with a cargo hold (2), at least one box (4, 5) having a base (6, 7) with a transverse direction and a longitudinal direction and sides (8, 9) at opposite ends of the base, wherein the transverse dimension of the base is slightly less than the internal width of the cargo hold and the height dimension of the sides is slightly less than the internal height of the cargo hold, said box comprising a cargo space for accommodating said containers, **characterized in that** the sides (8, 9) are transferrable between an upright position and a collapsed position.
2. Transport system according to claim 1, wherein the sides (8, 9) are hinged according to the longitudinal direction of the base (6, 7) and have a height dimension which is smaller than the transverse dimension of the base.
3. Transport system according to claim 1 or 2, wherein the sides (8, 9) comprise uprights or legs (11) which are interconnected by transverse bars (10).
4. Transport system according to any of the preceding claims, wherein the box (4, 5) comprises strap means (13) for securing the containers, said strap means being connected to the sides (8, 9) and having a loop shape for encircling said containers.
5. Transport system according to claim 4, wherein the strap means (13) comprise a straight part (14) extending between the sides (8, 9) as well as a fixation part (17, 18) connected to the straight part (14), said straight part and the fixation part forming a loop shape, in such a way that the length of the loop shape generally corresponds to the inner circumference of the base (6, 7).
6. Transport system according to claim 4 or 5, wherein the straight part (14) is permanently connected to one of the sides (8, 9) and is releasably connected to the opposite side.
7. Transport system according to any of claims 4-6,

wherein the box (4, 5) comprises several strap means (13) above each other.

8. Transport system according to any of the preceding claims, wherein the length dimension of the cargo hold (2) is at least twice the length dimension of the box (4). 5
9. Transport system according to any of the preceding claims, wherein the transverse dimension of the standard base or pallet (6) ranges from 2440 to 2480 mm, preferably 2450 to 2470 mm and is more preferably 2460 mm. 10
10. Transport system according to any of the preceding claims, wherein the box is a normal box (4) having a longitudinal base dimension which ranges from 2660 to 2700 mm, preferably from 2670 to 2690 mm and is more preferably 2680 mm. 15
11. Transport system according to any of the preceding claims, wherein the box is a reduced box (5) having a longitudinal dimension which ranges from 2145 to 2185 mm, preferably from 2155 to 2175 mm and is more preferably 2165 mm 20 25
12. Transport system according to claims 9, 10 and 11, comprising a drop trailer (1) the hold of which has a length of about 7680 mm and a width of about 2480 mm, two normal boxes (4) having a longitudinal dimension of about a 2680 mm and one reduced box having (5) a longitudinal dimension of about 2165 mm. 30
13. Transport system according to any of the preceding claims, wherein the transverse dimension of the base (6, 7) corresponds generally to the accumulated width of four tight head or open head drums with a diameter of 585 mm. 35 40
14. Box (4, 5) for the transport system according to any of the preceding claims, having a base (6, 7) with a transverse direction and a longitudinal direction and sides (8, 9) at opposite ends of the base (6, 7) and comprising a cargo space for accommodating empty containers, such as drums, **characterized in that** the sides (8, 9) are transferrable between an upright position and a collapsed position. 45
15. Box (4, 5) according to claim 14, comprising strap means (13) connected to the sides (8, 9) and having a loop shape for encircling the empty containers. 50

#### Amended claims in accordance with Rule 137(2) EPC. 55

1. Transport system for transport of empty contain-

ers, said system comprising at least one vehicle (1) provided with a cargo hold (2), at least one box (4, 5) having a base (6, 7) with a transverse direction and a longitudinal direction and sides (8, 9) at opposite ends of the base, wherein the transverse dimension of the base is slightly less than the internal width of the cargo hold and the height dimension of the sides is slightly less than the internal height of the cargo hold, said box comprising a cargo space for accommodating said containers, **characterized in that** the vehicle is a drop trailer, **in that** the sides (8, 9) are transferrable between an upright position and a collapsed position, the box (4, 5) comprises strap means (13) for securing the containers, said strap means being connected to the sides (8, 9) and having a loop shape for encircling said containers.

2. Transport system according to claim 1, wherein the sides (8, 9) are hinged according to the longitudinal direction of the base (6, 7) and have a height dimension which is smaller than the transverse dimension of the base.

3. Transport system according to claim 1 or 2, wherein the sides (8, 9) comprise uprights or legs (11) which are interconnected by transverse bars (10).

4. Transport system according to any of the preceding claims wherein the strap means (13) comprise a straight part (14) extending between the sides (8, 9) as well as a fixation part (17, 18) connected to the straight part (14), said straight part and the fixation part forming a loop shape, in such a way that the length of the loop shape generally corresponds to the inner circumference of the base (6, 7).

5. Transport system according to wherein the straight part (14) is permanently connected to one of the sides (8, 9) and is releasably connected to the opposite side.

6. Transport system according to any of the preceding claims, wherein the box (4, 5) comprises several strap means (13) above each other.

7. Transport system according to any of the preceding claims, wherein the length dimension of the cargo hold (2) is at least twice the length dimension of the box (4).

8. Transport system according to any of the preceding claims, wherein the transverse dimension of the standard base or pallet (6) ranges from 2440 to 2480 mm, preferably 2450 to 2470 mm and is more preferably 2460 mm.

9. Transport system according to any of the preceding claims, wherein the box is a normal box (4) having

a longitudinal base dimension which ranges from 2660 to 2700 mm, preferably from 2670 to 2690 mm and is more preferably 2680 mm.

**10.** Transport system according to any of the preceding claims, wherein the box is a reduced box (5) having a longitudinal dimension which ranges from 2145 to 2185 mm, preferably from 2155 to 2175 mm and is more preferably 2165 mm

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**11.** Transport system according to claims 8, 9 and 10, comprising a drop trailer (1) the hold of which has a length of about 7680 mm and a width of about 2480 mm, two normal boxes (4) having a longitudinal dimension of about a 2680 mm and one reduced box having (5) a longitudinal dimension of about 2165 mm.

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**12.** Transport system according to any of the preceding claims, wherein the transverse dimension of the base (6, 7) corresponds generally to the accumulated width of four tight head or open head drums with a diameter of 585 mm.

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**13.** Box (4, 5) for the transport system according to any of the preceding claims, having a base (6, 7) with a transverse direction and a longitudinal direction and sides (8, 9) at opposite ends of the base (6, 7) and comprising a cargo space for accommodating empty containers, such as drums wherein the sides (8, 9) are transferrable between an upright position and a collapsed position, **characterized by** strap means (13) connected to the sides (8, 9) and having a loop shape for encircling the empty containers.

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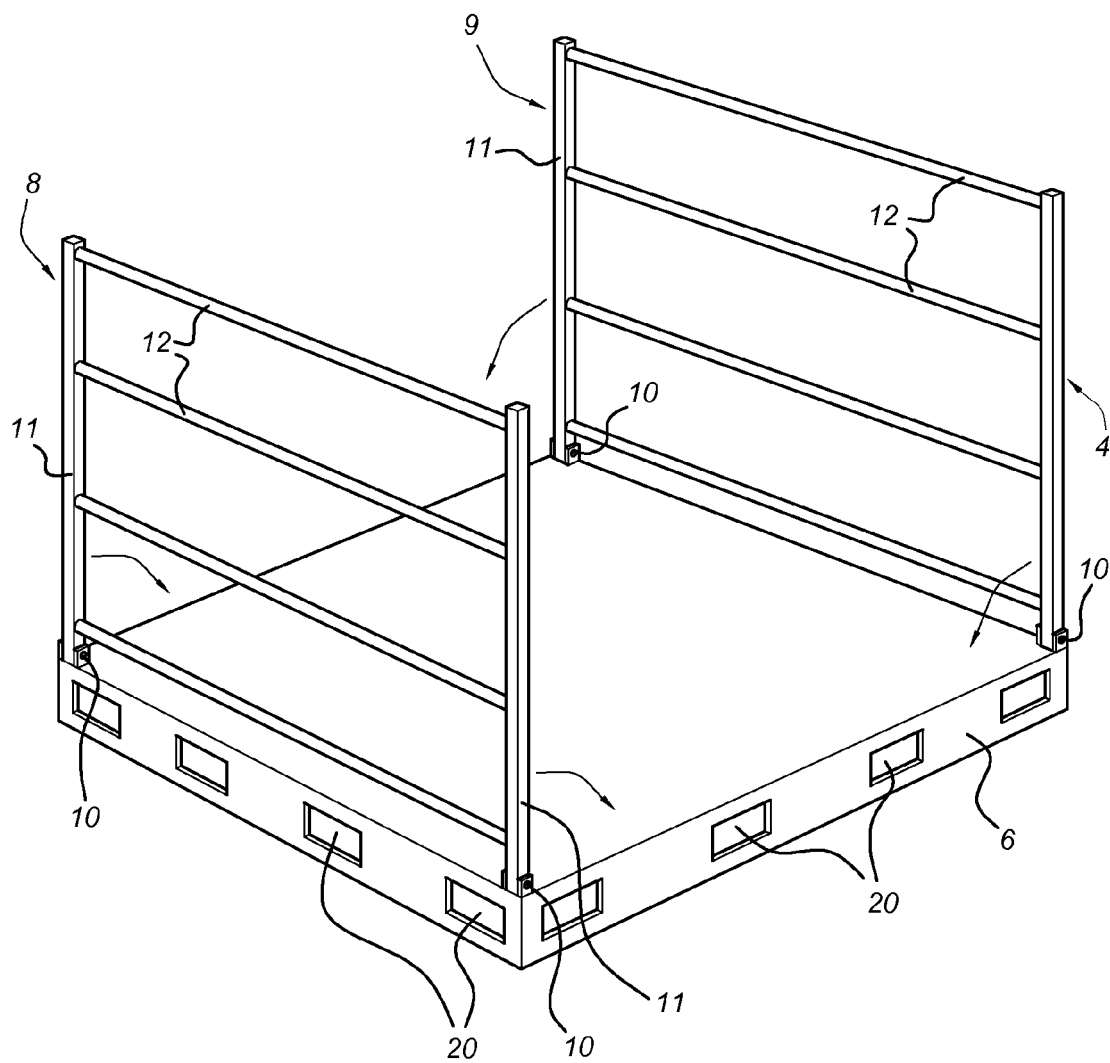
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*Fig 1*



*Fig 2*

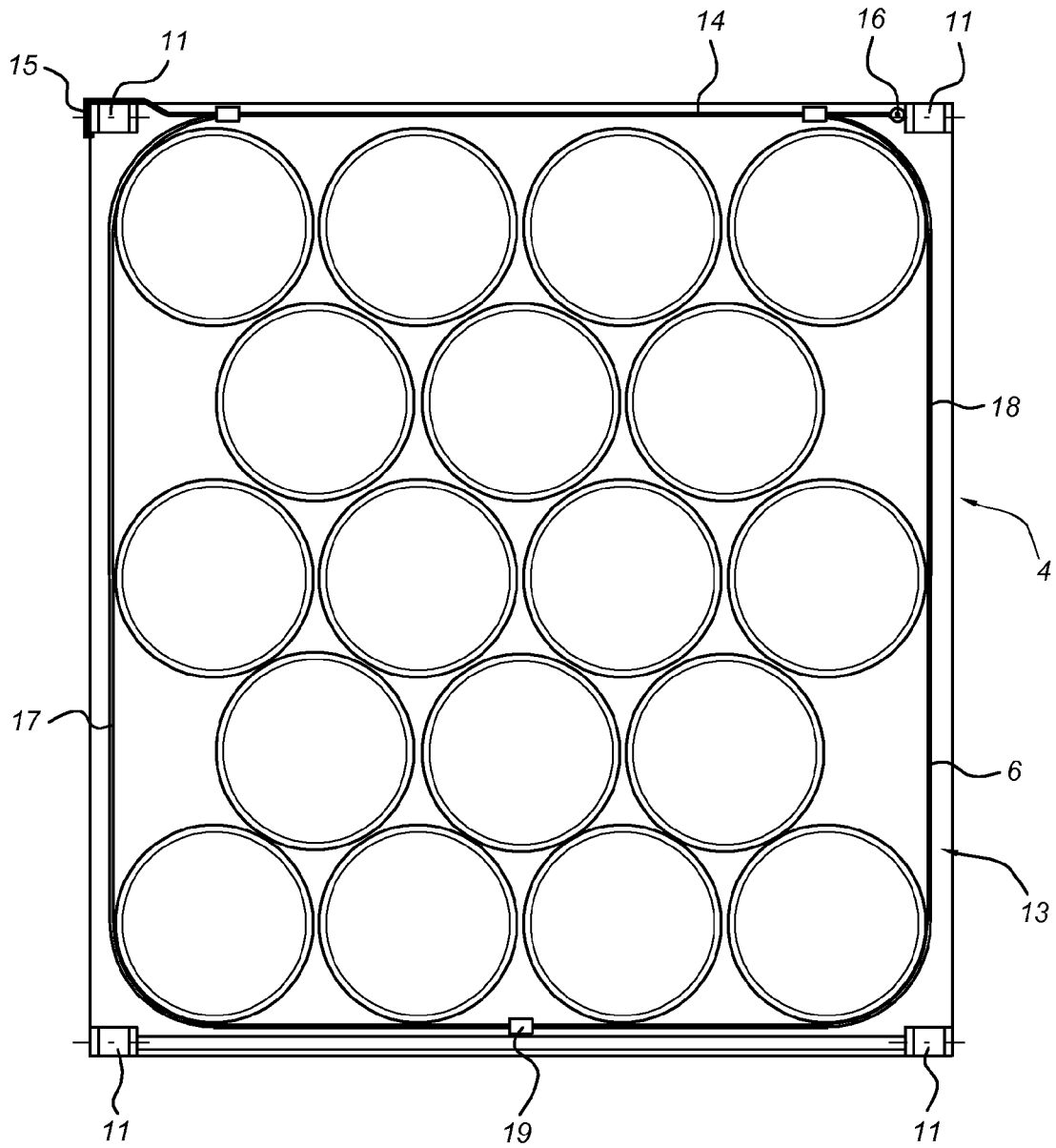
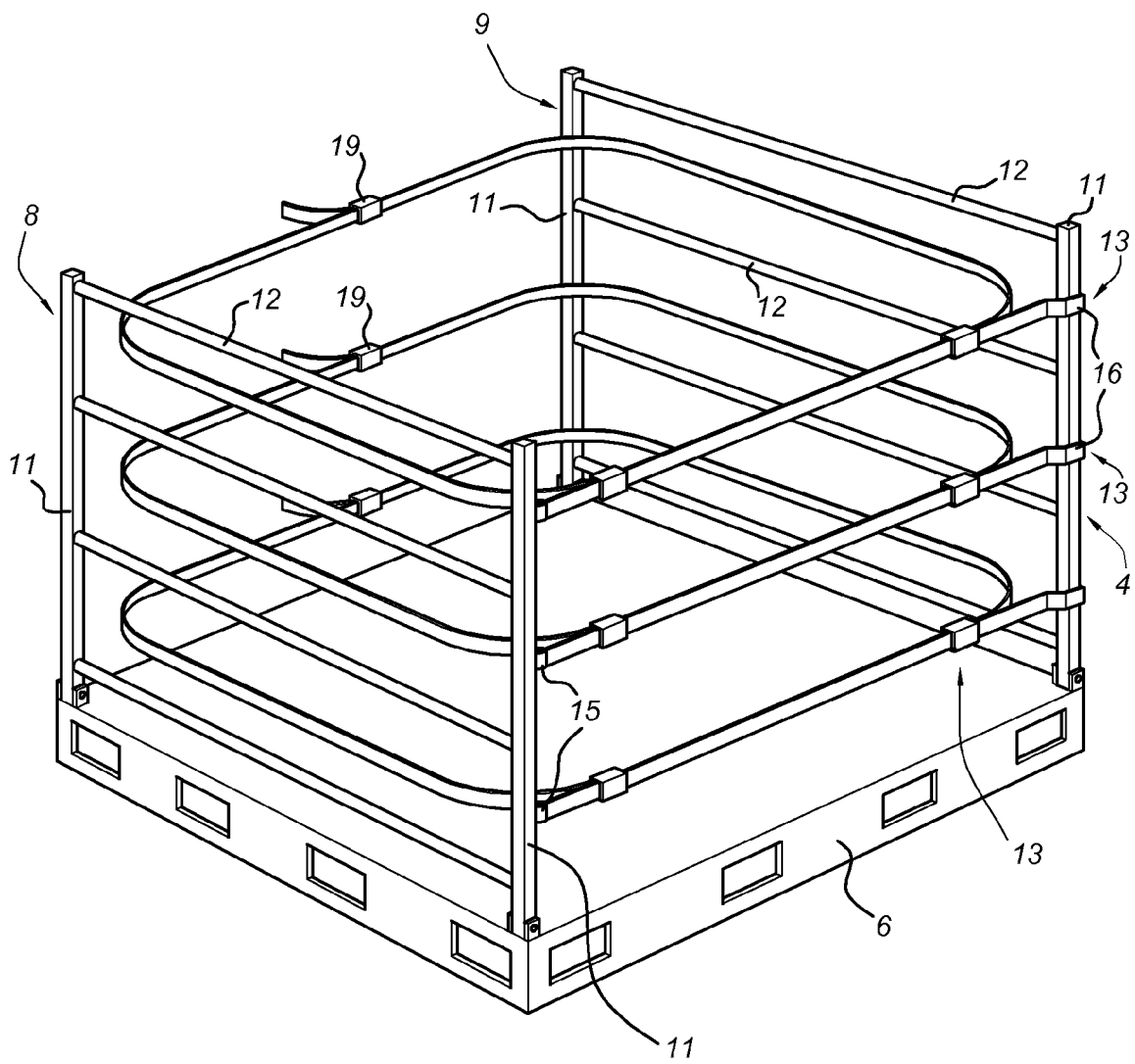
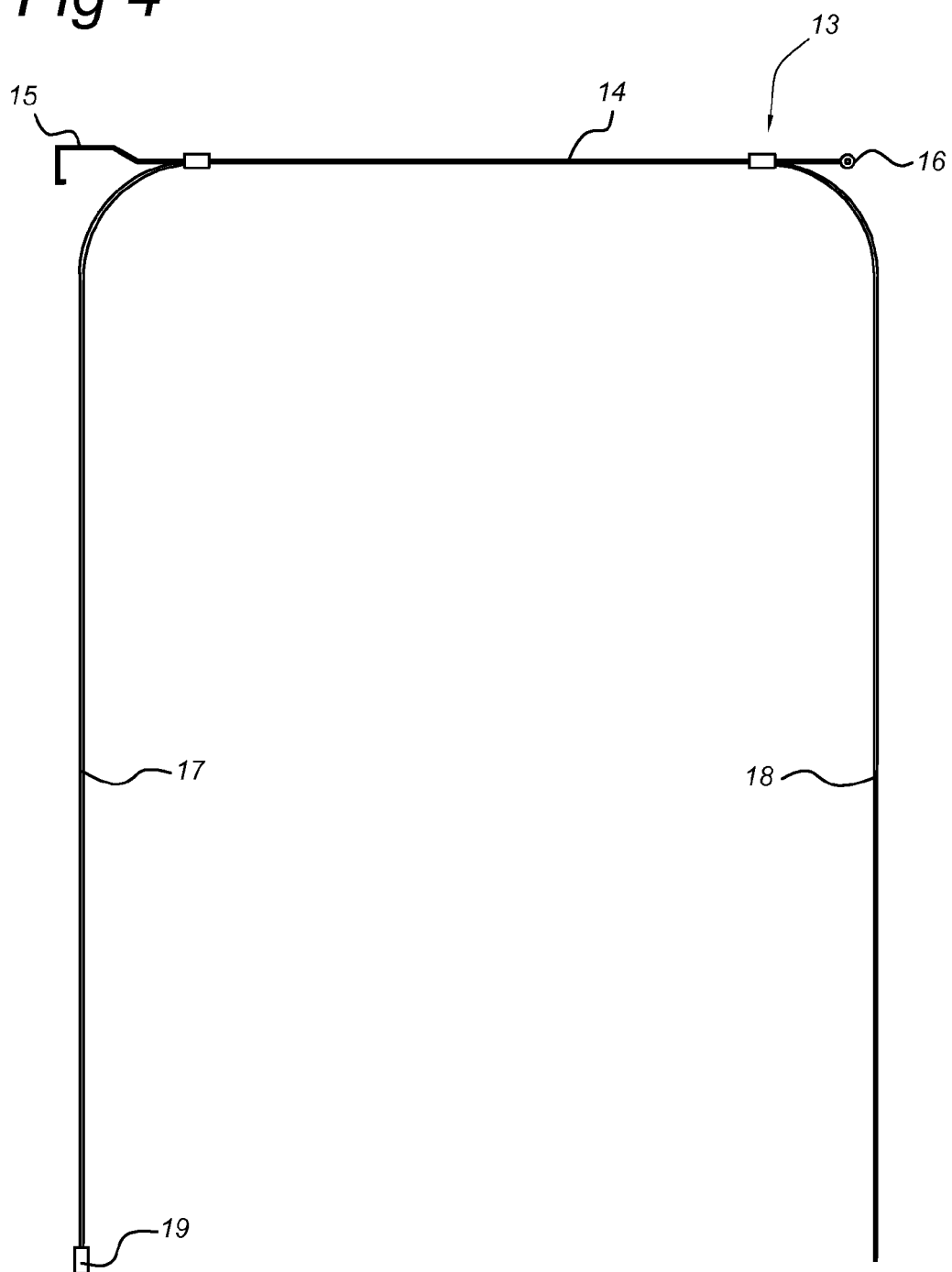
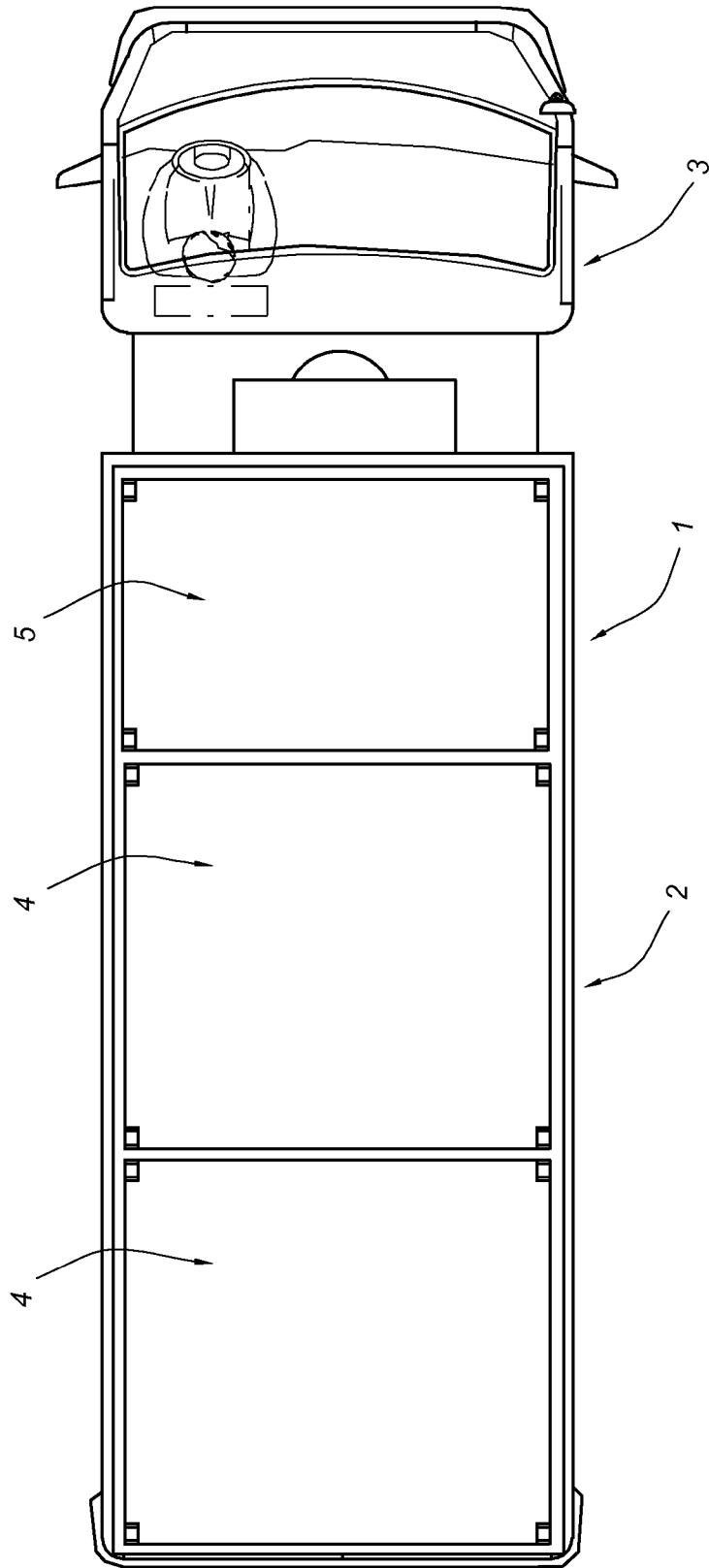


Fig 3



*Fig 4*





**Fig 5**



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Application Number  
EP 09 18 0996

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                              |                                                      |                                         |
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| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | * column 1, last line - column 2, paragraph 1 *                                                                                                                                              | 1,4-7, 14-15                                         |                                         |
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| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>.....<br/>&amp; : member of the same patent family, corresponding document</p> |                                                                                                                                                                                              |                                                      |                                         |

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 09 18 0996

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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