

CARGO TRANSPORT VEHICLE HAVING A VARIABLE COVERED CARGO SECTION

Field of the Invention

5 This invention relates to transport vehicles for transporting cargo. In particular, this invention relates to cargo transport vehicles having a covered cargo section.

Background

10 Transport vehicles such as, for example, trucks are known to have a cargo section for transporting cargo. Typically, the cargo section is covered to protect the cargo from damage due to, for example, exposure to weather. In addition, a covered cargo section provides a lockable cargo space to prevent unauthorised access to the cargo upon loading or during transport.

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 Typically, cargo to be transported from one location to another is loaded or unloaded in areas such as, for example, cargo bays of commercial or residential buildings. These loading or unloading areas generally have facilities such as lifts or ramps to support the loading or unloading of cargo. Due to a generally high cost of
20 land in urban areas, loading or unloading areas of buildings situated in urban areas are kept small to reduce space and thereby save cost. Hence, transport vehicles that need to transport cargo to or from the cargo bays of these buildings have size restrictions especially when the cargo bays are indoors.

25 Existing cargo transport vehicles have specifications for transporting cargo. An example of such specifications is a maximum laden weight that can be safely transported by a transport vehicle. However, specifying the maximum laden weight may not be appropriate for a transport vehicle having a covered cargo section when transporting bulky cargo. This is because cargo space within the covered cargo
30 section may be insufficient to carry the bulky cargo even though the maximum laden weight of the transport vehicle has not been exceeded.

Providing a large covered cargo section may be a solution to overcome the above problem of limited covered cargo space. However, this solution is likely to encounter the problem of size restrictions of small cargo bays. Furthermore, parking
5 lots within urban areas tend to accommodate passenger vehicles rather than cargo transport vehicles. Consequently, parking of cargo transport vehicles with a large covered cargo section is a problem especially in height-restricted multi-storey indoor car parks. Such indoor car parks generally have height limits that do not allow the entry of any vehicle exceeding those height limits.

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Therefore, a need clearly exists for cargo transport vehicles having variable covered cargo sections to alleviate the problem of access into height-restricted areas such as cargo bays or indoor car parks.

15 **Summary**

In accordance with one aspect of the invention, there is disclosed an apparatus for covering cargo placed in a cargo section of transport vehicles, the apparatus comprising:

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a first member;

and

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at least one support member coupled to the first member and mountable to the cargo section, the at least one support member being adjustable to vary the height of the first member relative to a floor of the cargo section and thereby change the volume of space defined by the first member and the at least one support member for the cargo section.

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Generally, the at least one support member can comprise a movable member for varying the height.

More generally, one or more of the at least one support member can further
5 comprise a locking means for fixing the movable member at a desired position along the each of the at least one support member.

Optionally, each of the at least one support member can comprise means for moving the movable member.

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More optionally, the moving means can comprise a pressure device.

Yet more optionally, the moving means can comprise a rotary gear.

15 Generally, the first member can comprise at least one wall extending therefrom and abutting at least one side of the cargo section.

More generally, one or more of the at least one wall can comprise a shutter curtain.

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In accordance with another aspect of the invention, there is disclosed a transport vehicle having a cargo section, the transport vehicle comprising:

a top member;

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and

at least one support member coupled to the top member and mountable to the cargo section, the at least one support member being
30 adjustable to vary the height of the top member relative to a floor of the cargo section and thereby change the volume of space covered by

the top member and the at least one support member for the cargo section.

5 Generally, each of the at least one support member can comprise a movable member for varying the height.

More generally, one or more of the at least one support member can further comprise a locking means for fixing the movable member at a desired position along the each of the at least one support member.

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Optionally, each of the at least one support member can comprise means for moving the movable member.

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More optionally, the moving means can comprise a pressure device.

Yet more optionally, the moving means can comprise a rotary gear.

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Generally, the top member can comprise at least one wall extending therefrom and abutting at least one side of the cargo section.

More generally, one or more of the at least one wall can comprise a shutter curtain.

25 In accordance with yet another aspect of the invention, there is disclosed a transport vehicle having a cargo section, the transport vehicle comprising:

a top member;

and

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at least one support member coupled to the top member and

mountable to the cargo section, one or more of the at least one support member comprising a movable member and a locking means for fixing the movable member at a desired position along the one or more of the at least one support member,

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wherein the movable member enables adjustments to the at least one support member to vary the height of the top member relative to a floor of the cargo section and thereby change the volume of space defined by the top member and the at least one support member for the cargo section.

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Generally, each of the at least one support member can comprise means for moving the movable member.

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More generally, the moving means can comprise a pressure device.

Still more generally, the moving means can comprise a rotary gear.

Optionally, the top member can comprise at least one wall extending therefrom and abutting at least one side of the cargo section.

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More optionally, one or more of the at least one wall can comprise a shutter curtain.

In accordance with a further aspect of the invention, there is disclosed a method for varying the volume of cargo space of a cargo section for a transport vehicle, the method comprising the steps of:

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determining whether the volume of cargo space is sufficient for cargo;

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in response to the determining step, adjusting an apparatus to change the volume of cargo space defined by a first member and at least one support member of the apparatus, the apparatus being mountable to the cargo section;

5 and

setting the at least one support member at a fixed position when the first member is positioned at a desired height relative to a floor of the cargo section.

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Generally, the adjusting step can comprise the step of moving a movable member of each of the at least one support member.

More generally, the setting step can comprise the step of locking the movable member at the fixed position.

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Brief Description of the Drawings

Preferred embodiments of the invention are described hereinafter with reference to the drawings, in which:

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FIG. 1 is an isometric view of an apparatus mountable to a cargo transport vehicle in accordance with a preferred embodiment of the invention;

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FIG. 2 is a front view of a support member of the apparatus of FIG. 1;

FIG. 3 illustrates a cargo transport vehicle having an apparatus in accordance with an alternate embodiment of the invention;

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and

FIG. 4 illustrates a cargo transport vehicle having an apparatus in accordance with yet another alternate embodiment of the invention.

Detailed Description

5 A cargo transport vehicle and an apparatus to provide a defined cargo section for the cargo transport vehicle in accordance with preferred embodiments of the invention are described. In the following description, numerous details are provided for a more thorough description. It shall be apparent to one skilled in the art, however, that the invention may be practised without such details. In other instances, 10 well-known details have not been described at length so as not to obscure the invention.

 The advantages of the preferred embodiments of the invention are manifold. One advantage is that the apparatus enables the cargo transport vehicle to have cargo 15 space varied according to the volume of cargo space required.

 Another advantage of the preferred embodiments of the invention is that the height of the cargo section of the cargo transport vehicle can be minimized to alleviate the problem of access into height-restricted areas such as indoor cargo bays 20 or indoor car parks.

 Referring now to FIG. 1, an isometric view of an apparatus 10 mountable to a cargo transport vehicle 12 is illustrated. The top of the apparatus 10 is cut-off to show internal elements. The apparatus 10 is for covering cargo placed in a cargo 25 section 14 of the vehicle 12 and comprises a first member 16 and four support members 18a,18b,18c,18d. Each of the support members 18a,18b,18c,18d has, respectively, a base 20a,20b,20c,20d that is mountable to a floor 22 of the cargo section 14. The first member 16 comprises three walls 24a,24b,24c extending, respectively, from three edges 26a,26b,26c of the first member 16. Each of the walls 30 24a,24b,24c abuts a respective side of the cargo section 14. The cargo section 14 of the vehicle 12 has two sideboards 28a,28b and a tailboard 30.

A fourth side 26d of the first member 16 supports a shutter curtain 32 for controlling access to cargo space within the apparatus 10. The shutter curtain 32 is shown in a stored position in FIG. 1 with the cargo space accessible for loading or unloading cargo. A latch member 34 is provided on the shutter curtain 32 for latching
5 onto a catch 36 disposed at a corner of the wall 24c.

The support members 18a,18b,18c,18d are adjustable to vary height of the first member 16 relative to the floor 22 of the cargo section 14. Each of the support members 18a,18b,18c,18d is mountable to respective mounting positions on the floor
10 22. A mounting position 38 is indicated in FIG. 1. Volume of cargo space for the cargo section 14 that is defined by the first member 16 and the support members 18a,18b,18c,18d is varied according to that height.

Referring now to FIG. 2, a front view of the support member 18a is illustrated
15 with more detail. The support member 18a comprises a mounting section 50, a movable member 52, a mount 54 for mounting the movable member 52, a locking means such as, for example, a lock 56 and the base 20a. The mounting section 50 enables mounting of the support member 18a to the wall 24a. Moving the first member 16 in an upward direction as indicated by an arrow 58 varies the height of
20 the first member 16 relative to the floor 22. When positioned at a desired height, the first member 16 can be locked in place by using the lock 56 to lock the movable member 52. The desired height corresponds to a desired position for the movable member 52 along the support member 18a.

25 In the preferred embodiment of the invention as illustrated in FIGs. 1 and 2, the first member 16 is positioned at a desired height by manual force applied in the upward direction. Releasing the lock 56 for each of the support members 18a,18b,18c,18d causes the first member 16 to drop, as a result of gravity, to a default height shown in FIG. 1.

It is to be noted that the vehicle 12 is illustrated with the two sideboards 28a,28b and the tailboard 30. The height of the side boards 28a,28b and the tailboard 30 sets a predetermined height for which the first member 16 can be raised without exposing the cargo space within the apparatus 10. Also, the vehicle 12 is illustrated
5 with a protrusion 40 jutting up from the floor 36 as a result of one of the vehicle's 12 rear wheels. Hence, the wall 24a may require a corresponding recess (not illustrated) to accommodate the protrusion 40 depending on the separation between a bottom edge 42a of the wall 24a and the floor 22.

10 Although the preferred embodiment of the invention as illustrated in FIGs. 1 and 2 shows four support members 18a,18b,18c,18d, the number of support members 18 depends on how much support the first member 16 requires. Hence, the number of support members can be varied according to, for example, weight or size of the first member 16. Also, not all of the four support members 18a,18b,18c,18d may require
15 the lock 56 if the first member 16 can be locked at a desired height using just one lock 56.

Referring now to FIG. 3, a cargo transport vehicle 60 mounted with an apparatus 62 in accordance with an alternate embodiment of the invention is
20 illustrated. To simplify the description of the vehicle 60 and the apparatus 62, similar reference numbers are adopted for elements corresponding to those of the apparatus 10 and the vehicle 12.

The apparatus 62 has a top member 64, corresponding to the first member 16
25 of the preferred embodiment illustrated in FIG. 1, that is supported directly by four support members 18a,18b,18c,18d. Hence, when lifted above two sideboards 66a,66b and a tailboard 68, an upper portion of the cargo space is exposed. The tailboard can be lowered using, for example, two hydraulic levers 70a,70b.

30 Referring now to FIG. 4, another alternate embodiment of the invention is illustrated with a cargo transport vehicle 80 mounted with an apparatus 82. The

apparatus 82 has a top member that is supported directly by five support members 86a,86b,86c,86d,86e. The top member is not shown in FIG. 4 to illustrate positions of the support members 86a,86b,86c,86d,86e. The support member 86c has two arms 88a,88b connected by a bridge 90. Movement of the two arms 88a,88b is in response to actuation of, for example, a rotary gear 92. A shaft 94 of the rotary gear 92 couples to the two arms 88a,88b. By moving the support member 86c, the other support members 86a,86b,86d,86e can be moved accordingly to a desired position. A locking mechanism can be built into the rotary gear 92 to lock the two arms 88a,88b in that desired position. Such a locking mechanism is well within someone skilled in the art to enable.

Although the rotary gear 92 is coupled to enable movement of the two arms 88a,88b, other means for enabling this movement can be provided. For example, a pressure device such as a hydraulic piston or a vacuum-based piston may be coupled to the support member 86c to enable movement of the two arms 88a,88b. As is known in the art, such a pressure device is controllable via electromechanical switches (not shown).

The apparatuses 10,62,82 can be used to change the volume of cargo space when transporting cargo using, respectively, the three cargo transport vehicles 12,60,80. For example, if a user of the vehicle 12 determines that cargo space is insufficient for cargo, the first member 16 can then be pushed upwards to increase the volume of cargo space. Subsequently, the support members 18a,18b,18c,18d can be set at a fixed position when the first member 16 is positioned at a desired height relative to the floor 22. Setting the support members 18a,18b,18c,18d comprises moving the movable member 52 of each of the support members 18a,18b,18c,18d and locking the movable member 52 at the fixed position using the lock 56.

When less cargo space is needed, for example, after unloading cargo, the user then unlocks the lock 56 and let the first member 16 drop to a lower or a default position. Similarly, for the vehicle 80, the rotary gear 92 can be used to raise or to

lower a top portion of the apparatus 82 depending on required cargo space or desired height of the apparatus 82.

In the foregoing description, three cargo transport vehicles 12,60,80 and three
5 respective apparatuses 10,62,82 to provide a covered cargo section 14 for the
vehicles 12,60,80 in accordance with preferred embodiments of the invention are
described. Although only three preferred embodiments are described, it shall be
apparent to persons skilled in the art in view of the preferred embodiments that
numerous changes and/or modifications can be made to such preferred embodiments
10 without departing from the scope and spirit of the invention.

**Claims:**

1. An apparatus for covering cargo placed in a cargo section of transport vehicles, said apparatus comprising:

5 a first member;

 and

 at least one support member coupled to said first member and
10 mountable to said cargo section, said at least one support member
 being adjustable to vary the height of said first member relative to a
 floor of said cargo section and thereby change the volume of space
 defined by said first member and said at least one support member for
 said cargo section.

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2. The apparatus as claimed in Claim 1, wherein each of said at least one support member comprises a movable member for varying said height.

3. The apparatus as claimed in Claim 1 or 2, wherein one or more of said at
20 least one support member further comprises a locking means for fixing said
 movable member at a desired position along said each of said at least one
 support member.

4. The apparatus as claimed in any one of Claims 1 to 3, wherein each of said
25 at least one support member comprises means for moving said movable
 member.

5. The apparatus as claimed in Claim 4, wherein said moving means
 comprises a pressure device.

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6. The apparatus as claimed in Claim 4, wherein said moving means comprises a rotary gear.
7. The apparatus as claimed in any one of Claims 1 to 6, wherein said first member comprises at least one wall extending therefrom and abutting at least one side of said cargo section.
8. The apparatus as claimed in Claim 7, wherein one or more of said at least one wall comprises a shutter curtain.
9. A transport vehicle having a cargo section, said transport vehicle comprising:
- a top member;
 - and
 - at least one support member coupled to said top member and mountable to said cargo section, said at least one support member being adjustable to vary the height of said top member relative to a floor of said cargo section and thereby change the volume of space defined by said top member and said at least one support member for said cargo section.
10. The transport vehicle as claimed in Claim 9, wherein each of said at least one support member comprises a movable member for varying said height.
11. The transport vehicle as claimed in Claim 9 or 10, wherein one or more of said at least one support member further comprises a locking means for fixing said movable member at a desired position along said each of said at least one support member.



12. The transport vehicle as claimed in any one of Claims 9 to 11, wherein each of said at least one support member comprises means for moving said movable member.
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13. The transport vehicle as claimed in Claim 12, wherein said moving means comprises a pressure device.
14. The transport vehicle as claimed in Claim 12, wherein said moving means comprises a rotary gear.
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15. The transport vehicle as claimed in any one of Claims 9 to 14, wherein said top member comprises at least one wall extending therefrom and abutting at least one side of said cargo section.
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16. The transport vehicle as claimed in Claim 15, wherein one or more of said at least one wall comprises a shutter curtain.



17. A transport vehicle having a cargo section, said transport vehicle comprising:

a top member;

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and

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at least one support member coupled to said top member and mountable to said cargo section, one or more of said at least one support member comprising a movable member and a locking means for fixing said movable member at a desired position along said one or more of said at least one support member,

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wherein said movable member enables adjustments to said at least one support member to vary the height of said top member relative to a floor of said cargo section and thereby change the volume of space defined by said top member and said at least one support member for said cargo section.

- 20 18. The transport vehicle as claimed in claim 17, wherein each of said at least one support member comprises means for moving said movable member.

19. The transport vehicle as claimed in Claim 19, wherein said moving means comprises a pressure device.

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20. The transport vehicle as claimed in Claim 19, wherein said moving means comprises a rotary gear.

21. The transport vehicle as claimed in any one of Claims 17 to 20, wherein
30 said top member comprises at least one wall extending therefrom and abutting at least one side of said cargo section.



22. The transport vehicle as claimed in Claim 21, wherein one or more of said at least one wall comprises a shutter curtain.

5 23. A method for varying the volume of cargo space of a cargo section for a transport vehicle, said method comprising the steps of:

determining whether said volume of cargo space is sufficient for cargo;

10 in response to said determining step, adjusting an apparatus to change said volume of cargo space defined by a first member and at least one support member of said apparatus, said apparatus being mountable to said cargo section;

15 and

setting said at least one support member at a fixed position when said first member is positioned at a desired height relative to a floor of said cargo section.

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24. The method as Claimed in Claim 23, wherein said adjusting step comprises the step of moving a movable member of each of said at least one support member.

25 25. The method as Claimed in Claim 24, wherein said setting step comprises the step of locking said movable member at said fixed position.

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