

## **IMPROVED VARIABLE COVERED CARGO SECTION FOR CARGO TRANSPORT VEHICLE**

### **FIELD OF INVENTION**

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The invention relates to an improved cover for cargo transport vehicle where such cargo transport vehicles have a variable covered cargo section.

### **BACKGROUND PRIOR ART**

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Singapore Patent No. 105477 by the inventor describes an apparatus for covering cargo placed in a variable covered cargo section of transport vehicles, the apparatus comprising a first member, and at least one support member coupled to the first member and mountable to the variable covered cargo section, the at least one support member being adjustable to vary the height of the first member relative to a floor of the variable covered cargo section and thereby change the volume of space defined by the first member and the at least one support member for the variable covered cargo section, wherein one or more of the at least one support member further comprises a locking means for fixing the moveable member at a desired position along the each of the at least one support member.

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The inventor notes that while solving the problem of being able to adjust the height of the variable covered cargo section of the cargo transport vehicle, the invention faced a problem in that the said variable covered cargo section has to be manually raised or lowered. While raising the variable covered cargo section manually is feasible, it requires more than the driver and at least a few other persons to assist in the raising of the variable covered cargo section. It is therefore not productive requiring additional manpower and the process is also time consuming.

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The inventor also found that while lowering the variable covered cargo section can be done manually by releasing a lock for each supporting member, causing the first member to drop, as a result of gravity, the dropping of a relatively heavy variable covered cargo section may cause damage through shock to the apparatus. Although other embodiments proposed in the said Patent offered a mechanical feature, such as rotary gear or hydraulic piston, the inventor found that the raising and lowering of the variable covered cargo apparatus using manual efforts to be unproductive.

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There is therefore a need to improve the raising and lowering of the apparatus for variable covered cargo section efficiently and with less manpower. In the context of Singapore, where labour costs are very expensive, it would be preferable if the driver alone can operate the raising and lowering of the apparatus for variable covered cargo section.

A motorised improvement for raising and lowering of the apparatus for variable covered cargo section would be preferred.

In line with the need for improved productivity for loading and unloading cargo onto the transport vehicle or off the transport vehicle, the inventor found that the said motorised improvement can further assist in the loading and offloading of cargo. The inventor found that the same motorised device for the improved variable covered cargo section can also be used to lower and raise a cargo platform, attached to the transport vehicle. If such a motorised platform is used, further productivity gains can be achieved since less labour is now required to load cargo or offload cargo stored in the improved variable covered cargo section.

## **SUMMARY OF THE INVENTION**

It is an object of the invention to provide an improved motorised variable covered cargo section in which the improved variable covered cargo section can be raised or lowered in height efficiently, safely and by just one person.

A first object of the invention for an improved variable covered cargo section for a transport vehicle, said improved variable covered cargo section having a first member; said at least one front support member and at least one back support member mountable to said improved variable covered cargo section, each support member being adjustable to vary the height of said first member relative to a floor of said improved variable covered cargo section and thereby change the volume of space defined by said first member and said at least one front support member and at least one back support member for said improved variable covered cargo section, the improvements comprising:-

a motor; and

a plurality of cross shafts connected to each support member

5 wherein the motor turns the cross shafts which in turn raise or lower the support members to a pre-set height for the improved variable covered cargo section, thereby changing the volume of space defined by the first member and the support members.

10 Preferably the plurality of cross shafts comprise a long cross shaft between the front support member and back support member and a short cross shaft between each of the back support members.

15 Preferably, the motor has a switch, a height indicator which pre-sets the height of the improved variable covered cargo section to be raised or lowered, and a height sensor installed in at least one support member, so that when a height for the improved variable covered cargo section is set, the motor is switched on to raise or lower the improved variable covered cargo section until the said height sensor detects a height indicator at the pre-set height in the at least one support member and stops the motor.

20 Preferably the at least one support member comprises an outer mounting section fixed to the first member and an inner moveable member which is mounted onto mounting positions on the floor of the improved variable covered cargo section.

25 Preferably the at least one support member further has a safety chain to control the movement of the inner moveable member so that all support members do not move beyond the pre-set height to prevent stress on the improved variable covered cargo section.

30 Preferably each of the plurality of cross shafts moves an inner moveable member, which in turn raises or lowers an outer mounting member fixed to the first member, so that when the outer mounting support member is raised or lowered by movement of the inner moveable member.

35 Preferably the motor is powered by electrical power.

More advantageously the motor will additionally raise and lower a lifting platform, for the lifting of cargo from and to the improved variable covered cargo section.

5 Preferably the lifting platform is folded up and inwards against the back of the transport vehicle when not in use and folded outwards for lifting cargo onto the improved variable covered cargo section or from the improved variable covered cargo section.

10 More advantageously a second motor raises and lowers a lifting platform, for the lifting of cargo from and to the improved variable covered cargo section.

15 Preferably a first motor is installed on at least one support member to raise and lower the at least one support member to change the volume of space of the improved variable covered cargo section.

Preferably a second motor is installed on at least another support member to raise and lower the lifting platform operable on the transport vehicle.

20 More advantageously the second motor will fold up the lifting platform against the back of the transport vehicle when not in use and when the lifting platform is to be used, the second motor will unfold the lifting platform outwards.

25 Preferably the improved variable covered cargo section has a safety chain in at least one support member so that the support members are not raised or lowered beyond the pre-set height.

30 More advantageously the improved variable covered cargo section further has a hand crank to turn the cross shafts manually in the event of a failure of the motor to operate the cross shafts.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

35 For a better understanding of the invention, its advantages, and the objects attained by its use, reference should now be made to the accompanying drawings. The accompanying drawings illustrate one or more embodiments of the invention and

together with the description herein, serve to explain the workings and principles of the invention.

Fig. 1 is a perspective view of the variable covered cargo section of the prior art.

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Fig. 2 is a perspective view of the improved variable covered cargo section and lifting platform of the invention.

Fig. 3 is a perspective view of the improved variable covered cargo section of the invention and lifting platform, shown separated from the transport vehicle.

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Fig. 4 is a perspective view of the improved variable covered cargo section of the invention.

Fig. 5a and 5b are perspective views of one support member installed with a motor which is used to raise or lower the improved variable covered cargo section.

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Fig. 5a shows one support member in a lowered position and Fig 5b shows one support member when it is fully raised.

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Fig. 6 is a perspective view of two support members installed with 2 motors, a first motor to raise and lower the improved variable covered cargo section and a second motor to raise or lower the lifting platform.

Fig. 7 is a perspective view of one support member which is not installed with a motor and having a feature of safety chain.

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Fig. 8 is a sectional view of one support member in Fig 7.

Fig. 9 is a perspective view of the improved variable covered cargo section with side opening in a different manner.

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## DETAILED DESCRIPTION OF INVENTION

Fig. 1 is a perspective view of the variable covered cargo section of the prior art. Since the features of the improved variable covered cargo section of the invention are identical in most aspects to the prior art, a general description of the workings of the improved variable covered cargo section is given herein. Most of the features identified in the prior art and listed therein had been retained. New features relating to the improved variable covered cargo section had been assigned new references.

10 The improved variable covered cargo section 14 is an apparatus 10 mountable to a cargo transport vehicle 12 as illustrated. The top of the apparatus 10 is cut-off to show internal elements. The apparatus 10 is for covering cargo placed in an improved variable covered cargo section 14 of the transport 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 24a, 24b, 24c abuts a respective side of the improved variable covered cargo section 14. The improved variable covered cargo section 14 of the transport vehicle 12 has two sideboards 28a, 28b and a tailboard 30.

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 22. A mounting position 38 is indicated in Fig. 1. Volume of cargo space for the improved variable covered cargo section 14 that is defined by the first member 16 and the support members 18a, 18b, 18c, 18d is variable by adjustment of the support members 18a, 18b, 18c, 18d, according to the required height.

30 Another embodiment proposed was an improved variable covered cargo section 14 comprising: a first member 16, and at least one support member 18a, 18b, 18c, 18d, coupled to the first member 16 and mountable to the improved variable covered cargo section 14, one or more of the at least one support member 18a, 18b, 18c, 18d comprising a movable member 52 and a locking means 56 for fixing the movable member 52 at a desired position along the one or more of the at least one support member 18a, 18b, 18c, 18d,

wherein the movable member 52 enables adjustments to the at least one support member 18a, 18b, 18c, 18d to vary the height of the first member 16 relative to a floor 22 of the improved variable covered cargo section 14 and thereby change the volume of space defined by the first member 16 and the at least one support member 18a, 18b, 18c, 18d for the improved variable covered cargo section 14.

The improved variable covered cargo section 14 of Singapore Patent No. 105477 was raised or lowered by either a hydraulic means or manually by a manual means. It was desirable that the operations of the improved variable covered cargo section 14 be improved for better productivity. The improvements are improved operations in raising and lowering the improved variable covered cargo section 14 by use of a motor and use of a lifting platform 64.

Fig. 2 is a perspective view of an improved variable covered cargo section 14 and lifting platform 64 of the invention. Fig. 3 is a perspective view of the improved variable covered cargo section 14 of the invention, shown separated from the transport vehicle 12. Fig. 4 is a perspective view of the improved variable covered cargo section 14 of the invention.

The workings of the improved variable covered cargo section 14 will be explained with reference to Fig. 2, Fig 3 and Fig. 4.

Fig. 2 is a perspective view showing the transport vehicle 12 (partially) with the inventive features of the improved variable covered cargo section 14 and lifting platform 64. The improved variable covered cargo section 14 comprises a first member 16 which is raised or lowered by a plurality of support members, 18a, 18b, 18c, 18d. The support members 18a, 18b, 18c, 18d could be either four or six. In the illustrations accompanying this description, a total of four support members 18a, 18b, 18c, 18d are shown. Although the prior art also refer to "support members", the support members 18a, 18b, 18c, 18d of this invention are constructed differently and operate differently from the support members 18a, 18b, 18c, 18d of the prior art. In Fig. 2, the improved variable covered cargo section 14 is shown in a raised position. The improved variable covered cargo section 14 of the transport vehicle 12 has two sideboards 28a, 28b. In Fig 2, the side of the improved variable covered cargo section 14 shows a portion of the sideboard removed, disclosing the interior. The side wall 24c will overlap the

sideboard 28b substantially when the support members 18a, 18b, 18c, 18d are lowered, and consequently when the improved variable covered cargo section 14 is lowered. In the prior art, the back of the variable covered cargo section has a shutter curtain 32. In the improved variable covered cargo section 14, the back now consists of an upper back door and a lifting platform 64, which when in a closed position, acts as a lower back door.

Fig 3 shows the improved variable covered cargo section 14 removed from the transport vehicle 12, showing its internal structure. The improved variable covered cargo section 14 comprises a first member 16 (not shown in this drawing) and two front support members 18a, 18b and two back support members, 18c, 18d. The two front support members 18a, 18b are at the front of the improved variable covered cargo section 14 and the other two back support members 18c, 18d at the back of the improved variable covered cargo section 14 (also the back end of the transport vehicle 12). 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 improved variable covered 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 24a, 24b, 24c abuts a respective side of the improved variable covered cargo section 14.

The major improvement lies in the provision of a motor to raise and lower the support members 18a, 18b, 18c, 18d. With the provision of a motor, the raising and lowering of the improved variable covered cargo section 14 is much faster, thereby further reducing the time needed to be spent in multi storey car parks for loading and unloading operations. At least one of the support members 18a, 18b, 18c, 18d has a motor 68a, to lower or raise the support members 18a, 18b, 18c, 18d. As a motor is used, the construction of the support member 18a, 18b, 18c, 18d is also improved. The support members 18a, 18b, 18c, 18d are raised or lowered through the use of horizontal cross shafts 60 which turns gears in the at least one support member 18a, 18b, 18c, 18d. However, the rate of movement (either upwards or downwards) for all support members 18a, 18b, 18c, 18d have to be uniform else there would be undue stress on some of the support members 18a, 18b, 18c, 18d. To this end, a safety chain 66 has been included in the support member 18a, 18b, 18c, 18d, as a safety feature.

Another improvement is a motorised lifting platform 64. The motor can also be used to operate a lifting platform 64. It is possible to have separate motors, one 68a on at least one support member 18a, 18b, 18c, 18d to raise or lower the improved variable covered cargo section 14 and one 68b on at least another one support member 18a, 18b, 18c, 18d to operate the lifting platform 64. The second motor 68b may also act as a back up for the first motor 68a in case the first motor 68a fails.

A fourth side 26d of the first member 16 supports a lifting platform 64 for lifting cargo at ground level to the floor level of the improved variable covered cargo section 14. In Fig 3, the lifting platform 64 is shown in a loading position (opened position). In Fig 2, the lifting platform 64 is shown in a closed position, acting as a back door for the transport vehicle 12.

Fig 4 shows the structure of the support members 18a, 18b, 18c, 18d. As a motor is used, the construction of the support members 18a, 18b, 18c, 18d have been improved. Since a motor is used to raise or lower these support members 18a, 18b, 18c, 18d, a different mechanism is used over the prior art. A long cross shaft 60 connects the back support member 18c to the front support member 18a. A short cross shaft 62 connects one back support member 18c to the other back support member 18d. The motor turns the long cross shaft 60 and the short cross shaft 62 to raise or lower the support members 18a, 18b, 18c, 18d. The long cross shaft 60 and short cross shaft 62 would then rotate the movable member 52, to either lower or raise the support members 18a, 18b, 18c, 18d. Therefore, through the operation of the motor, the height of each of the support members 18a, 18b, 18c, 18d relative to the floor 22 of the improved variable covered cargo section 14 can be raised or lowered. Each of the support members 18a, 18b, 18c, 18d is mountable to respective mounting positions 38 on the floor 22. Volume of cargo space for the improved variable covered cargo section 14 that is defined by the first member 16 and the support members 18a, 18b, 18c, 18d is therefore variable by raising or lowering of the support members 18a, 18b, 18c, 18d, according to the required height, by operation of the motor.

As mentioned earlier, the support members 18a, 18b, 18c, 18d of this invention are constructed differently and operate differently from the support members 18a, 18b, 18c, 18d of the prior art. The raising or lowering of the improved variable covered cargo section 14 through the raising or lowering of the support members 18a, 18b, 18c, 18d will

now be described in detail with reference to Fig 5a, Fig. 5b, Fig 6, Fig 7 and Fig 8.

Fig. 5a and Fig 5b are perspective views of one support member installed with a motor which is used to raise or lower the improved variable covered cargo section 14. Fig. 5a shows one support member in a lowered position and Fig 5b shows one support member when it is fully raised.

Fig. 6 is a perspective view of two support members installed with 2 motors, a first motor 68a to raise and lower the improved variable covered cargo section 14 and a second motor 68b to raise or lower the lifting platform 64. Fig. 7 is a perspective view of one support member which is not installed with a motor and having a feature of safety chain 66. Fig. 8 is a sectional view of one support member in Fig 7. Due to the use of a motor to raise or lower the improved variable covered cargo section 14, the construction and workings of the support members 18a, 18b, 18c, 18d are different from the prior art.

Fig 5a and Fig 5b shows one support member with a motor. The support member comprises an outer mounting member 50 and an inner movable member 52. Both the outer mounting member 50 and inner moveable member 52 are mounted on a mount 54. The outer mounting member 50 has a slit 74 for movement of a pre-set height indicator 76 until it reaches a height sensor 78. The pre-set height indicator 76 is placed on the same side as the slit 74 of the outer mounting member 50.

In Fig. 5a and Fig 5b, one support member is shown with a motor 68a. However, the motor could be installed in any of the support members 18a, 18b, 18c, 18d. The motor 68a is connected to a switch 72 and operable when needed. When the motor 68a is switched on and the height of the improved variable covered cargo section 14 to be raised or lowered is set, the height of the support member goes up or down as the inner moveable member 52 raise or lower the outer mounting member 50. When the inner moveable member 52 moves up or down to the pre-set height, the height sensor 78 will detect the height indicator 76 and sends a signal to the motor 68a, which then stop. As the outer mounting member 50 moves up or down, it moves the first member 16 along.

Fig 5a shows one support member when the improved variable covered cargo section 14 is to be raised. The height for the improved variable covered cargo section 14 set and

the motor is switched on. The support members 18a, 18b, 18c, 18d will be raised at an even and constant rate. The inner moveable member 52 of the support member will be moved upwards, through movement of a series of gears (not shown) in the inner moveable member 52. These gears are in turn turned by the rotating long cross shafts 60 and short cross shafts 62. As the inner moveable member 52 is raised, the pre-set height indicator 76 will move along the slit 74 until the pre-set height indicator 76 reaches the height sensor 78, as shown in Fig 5b. Upon the pre-set height indicator 76 reaching the height sensor 78, a signal is sent to the motor 68a, which then is switched off.

Fig 6 is a perspective view of two support members installed with 2 motors, a first motor 68a to raise and lower the improved variable covered cargo section 14 and a second motor 68b to raise or lower the lifting platform 64. When the motor is switched on, the motor turns both the horizontal long cross shaft 60 and horizontal short cross shaft 62. The long cross shaft 60 and short cross shaft 62 will turn the gears (not shown) in the support members at the same time, raising or lowering the support members 18a, 18b, 18c, 18d at a constant rate. The speed of the raising or lowering is also controlled by the safety chain 66, so that stress would not be caused to the support members 18a, 18b, 18c, 18d due to uneven height of the support members 18a, 18b, 18c, 18d.

Fig. 7 is a perspective view of one support member which is not installed with a motor and having a feature of safety chain 66. A portion of the long cross shaft 60 and short cross shaft 62 can be seen on the support member. If the height of the improved variable covered cargo section 14 is to be lowered, the moveable inner member 52 will move until the height indicator 76 is reached. The support members 18a, 18b, 18c, 18d will not drop down, as a result of gravity as proposed in the prior art. Instead, the motor is switched on and a height for the improved variable covered cargo section 14 set. The support members 18a, 18b, 18c, 18d will be lowered at an even and constant rate. The inner moveable member 52 of the support member will be moved downwards, through movement of a series of gears (not shown) in the inner moveable member 52. These gears are in turn turned by the rotating long cross shafts 60 and short cross shafts 62. As the inner moveable member 52 is lowered, the height indicators 76 will move along the slit 74 until the pre-set height indicator 76 is reached. When the pre-set height indicator 76 is reached, the height sensor 78 will

send a signal to the motor, which then is switched off.

With all these additional safety features, the improved variable covered cargo section 14 is therefore safer yet more efficient in operation.

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With reference to Fig. 8, the outer mounting member 50 supports the roof of the improved variable covered cargo section 14. The outer mounting member 50 is raised or lowered through movement of the inner moveable member 52. Moving the outer mounting member 50 in an upward direction as indicated by an arrow varies the height of the first member 16 relative to the floor 22. When positioned at a desired height, the first member 16 can be positioned in place when the height sensor 78 senses the height indicator 76 and a signal is sent to the motor to stop.

Overall, the safety improvements in the invention for an improved variable covered cargo section 14 include:-

safety chain 66 to ensure the pre-set height is not exceeded;

operation of height indicator 76 and height sensor 78 to ensure the improved variable covered cargo section 14 is raised or lowered to the pre-set height;

operation of the motor 68a which will stop when the height sensor 78 sends a signal to it indicating the set height has been reached.

a hand crank 70 to manually lower or raise the support members 18a, 18b, 18c, 18d, in case the motor 68a fails

While a preferred embodiment proposes the installation of one motor, to operate both the lifting platform 64 and raise or lower the support members 18a, 18b, 18c, 18d, two separate motors 68a, 68b may be installed, one installed on at least one support member and another installed on at least another one support member.

The workings of the improved variable covered cargo section 14 will be described hereinafter.

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The improved invention offers the same advantage for loading or unloading in buildings situated in urban areas which are kept small to reduce space due to costly land costs. Hence, transport vehicles 12 that need to transport cargo to or from the cargo bays of these buildings have size restrictions especially when the cargo bays are indoors. Another advantage is the problem of size restrictions of small cargo bays. Furthermore, parking lots within urban areas tend to accommodate passenger vehicles rather than cargo transport vehicles 12. Consequently, parking of cargo transport vehicles 12 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. While the improved variable covered cargo section 14 solves some of these problems, loading and unloading is still a problem, especially with tight car park space. Parking in urban or city area is more costly than outlying areas. Hence time is of the essence when loading or unloading. Hence the inclusion of a lifting platform 64 as a further improvement to this invention. In essence the lifting platform 64 will enable the cargo handlers to load and unload faster, reducing parking charges.

#### Operation of the variable cargo section

As the transport vehicle 12 enters a car park in a building, the improved variable covered cargo section 14 may have to be lowered to ensure the top of the transport vehicle 12 can remain within the height restriction for entry of vehicles into the car park. After entry into the car park, and once the transport vehicle 12 is parked at a location for loading, a switch on at least one support member 18a, 18b, 18c, 18d is turn on, and the motor will raise the height of the improved variable covered cargo section 14, to allow cargo handlers to stand up on the floor of the improved variable covered cargo section 14 to handle the cargo. Once the desired pre-set height of the improved variable covered cargo section 14 is reached, the motor is switched off. The support members 18a, 18b, 18c, 18d will remain at the desired height.

The motor to operate the lifting platform 64 is switched on. The lifting platform 64, which acts as the tailboard 30 of the transport vehicle 12 is then unfolded (by the motor) and lowered. Once the lifting platform 64 is lowered to ground level, the side barriers 65 will be lowered to allow free and easy movement of cargo onto the lifting platform 64. Once the cargo is moved onto the lifting platform 64, the motor 68a is

switched on, and the lifting platform 64 moves upwards, until it is level with the floor of the improved variable covered cargo section 14. Once the lifting platform 64 is at the same level as the floor 22 of the improved variable covered cargo section 14, the motor 68a is stopped. The cargo is then moved into the improved variable covered cargo section 14. If there is cargo to be offloaded, the offloaded cargo will now be moved onto the lifting platform 64. The motor 68a is then switched on so that the lifting platform 64 is then lowered until it touches the ground. The cargo is then offloaded. The tailboard 30 can then be placed into its normal position.

10 It can be seen that loading and unloading of cargo into and from the improved variable covered cargo section 14 is easily handled through the use of the lifting platform 64. This is especially in the case of car parks in Singapore where there is no raised loading area or loading ramp. Time spent in the loading and unloading operations is therefore reduced substantially, thus car park charges are reduced.

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Once the cargo is loaded onto the improved variable covered cargo section 14, the transport vehicle 12 is ready to leave the car park. The motor 68a on at least one support member is switched on and the motor 68a will start to raise the lifting platform 64. The lifting platform 64 is then closed inwards, towards the tail of the transport vehicle 12, and brought into a closed position. In the closed position, the lifting platform 64 acts as the back tailboard 30. However, the lifting platform 64 need not act as a back tailboard as another tailboard could be installed. Once the tailboard 30 is raised, the height of the support members 18a, 18b, 18c, 18d are then lowered, so that the top of the improved variable covered cargo section 14 is lower than the maximum height allowed for vehicle movement through the gantry in the car park. The transport vehicle 12 can then safely exit out of the car park.

In situation where the motor fails, the support members 18a, 18b, 18c, 18d can be operated manually to be lowered, thus lowering the height of the improved variable covered cargo section 14.

Fig 9 is a perspective view of the improved variable covered cargo section 14 with side openings in a different manner.

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## **ADVANTAGEOUS EFFECTS OF THE INVENTION**

A motorised improved variable covered cargo section 14 is more efficient as it requires less manpower to operate it. The improved variable covered cargo section 14 can also function safely too. The same or another motor can operate a lifting platform 64, for improved loading and unloading capability. These two improvements would ensure a quick turnaround for delivery and pick up of cargo in car parks in the city area, thus reducing parking charges.

The inclusion of the safety features would ensure safety and productivity with use of the invention.

## CLAIMS

1. An improved variable covered cargo section 14 for a transport vehicle 12, said improved variable covered cargo section 14 having a first member 16; said at least one front support member 18a and at least one back support member 18c mountable to said improved variable covered cargo section 14, each support member 18a, 18b, 18c, 18d being adjustable to vary the height of said first member 16 relative to a floor 22 of said improved variable covered cargo section 14 and thereby change the volume of space defined by said first member 16 and said at least one front support member 18a and at least one back support member 18c for said improved variable covered cargo section 14, the improvements comprising:-

a motor; and  
a plurality of cross shafts 60,62 connected to each support member 18a, 18b, 18c, 18d

wherein the motor turns the cross shafts 60, 62 which in turn raise or lower the front support members 18a, 18b and back support members 18c,18d to a pre-set height for the improved variable covered cargo section 14, thereby changing the volume of space defined by the first member 16 and the front support members 18a,18b and back support members 18c, 18d.

2. An improved variable covered cargo section 14 as claimed in Claim 1, wherein the plurality of cross shafts comprise a long cross shaft 60 between the front support member 18a and back support member 18c and a short cross shaft 62 between each of the back support members 18c, 18d.

3. A motor for an improved variable covered cargo section 14 as claimed in Claim 1, said motor further having a switch 72, a height indicator 76 which pre-sets the height of the improved variable covered cargo section 14 to be raised or lowered, and a height sensor 78 installed in at least one support member 18a, 18b, 18c, 18d, so that when a height for the improved variable covered cargo section 14 is set, the motor is switched on to raise or lower the improved variable covered cargo section 14 until the said height sensor 78 detects a height indicator 76 at the pre-set height in at least one support member 18a, 18b, 18c, 18d and stops the motor.

4. A support member for an improved variable covered cargo section 14 as claimed in Claim 1, said support member comprising of an outer mounting member 50 fixed to the first member 16 and an inner moveable member 52 which is mounted onto mounting positions 38 on the floor 22 of the improved variable covered cargo section 14.

5. A support member for an improved variable covered cargo section 14 as claimed in Claim 1, said support member further having a safety chain 66 to control movement of the inner moveable member 52 so that all support members 18a, 18b, 18c, 18d do not move beyond the pre-set height to prevent stress on the improved variable covered cargo section 14.

6. The plurality of cross shafts 60, 62 as claimed in Claim 1, wherein each of the cross shaft 60, 62 moves an inner moveable member 52, which in turn raises or lowers an outer mounting member 50 fixed to the first member 16, so that when the outer mounting support member 50 is raised or lowered by movement of the inner moveable member 52.

7. An improved variable covered cargo section 14 as claimed in Claim 1, wherein the motor is powered by electrical power.

8. An improved variable covered cargo section 14 as claimed in Claim 1, wherein the motor will additionally raise and lower a lifting platform 64, for the lifting of cargo from and to the improved variable covered cargo section 14.

9. The lifting platform 64 for an improved variable covered cargo section 14 as claimed in Claim 7, wherein the lifting platform 64 is folded up and inwards against the back of the transport vehicle 12 when not in use and folded outwards for lifting cargo onto the improved variable covered cargo section 14 or from the improved variable covered cargo section 14.

10. An improved variable covered cargo section 14 as claimed in Claim 1, having additionally a second motor 68b to raise and lower a lifting platform 64, for the lifting of cargo from and to the improved variable covered cargo section 14.

11. A motor for an improved variable covered cargo section 14 as claimed in Claim 1, comprising a first motor 68a installed on at least one support member 18a 18b 18c 18d to raise and lower the support members 18a, 18b, 18c, 18d to change the volume of space of the improved variable covered cargo section 14.

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12. A motor for an improved variable covered cargo section 14 as claimed in Claim 1, comprising a second motor 68b installed on at least one support member 18a 18b 18c 18d to raise and lower the lifting platform 64 operable on the transport vehicle 12.

10 13. The second motor 68b for an improved variable covered cargo section 14 as claimed in Claim 12, wherein the second motor 68b will fold up the lifting platform 64 against the back of the transport vehicle 12 when not in use and when the lifting platform 64 is to be used, the second motor 68b will unfold the lifting platform 64 outwards.

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14. An improved variable covered cargo section 14 as claimed in Claim 1, further having a safety chain 66 in at least one support member 18a, 18b, 18c, 18d so that the support members 18a, 18b, 18c, 18d are not raised or lowered beyond the pre-set height.

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15. An improved variable covered cargo section 14 as claimed in Claim 1, further having a hand crank 70 to turn the cross shafts 60, 62 manually in the event of a failure of the motor to operate the cross shafts 60, 62.

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