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B8P PG4 PK7

(56) Documents Cited:
GB 1274300 A **EP 1279621 A**
US 4736975 A **US 3750826 A**
US 2987340 A

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UK CL (Edition W) **B8P, B8Q**
INT CL[7] **B65D**
Other:

(54) Abstract Title: **A freight container having a removable roof from which goods can be suspended**

(57) A freight container 10 has a floor, walls 12 and a roof module 16a. The roof module 16a can be lifted off from the walls 12 and has means by which goods can be suspended therefrom. The goods can be lifted out of the container 10, suspended from the roof module 16a, when the roof module 16a is lifted off. The container 10 may have ISO standard external dimensions. The roof module 16a may incorporate a structural load bearing frame, which may be a rigid support frame, the goods being suspended from the frame. The goods may be suspended by slings or webbing straps 72. Drums may be fitted in the roof module 16a onto which the slings 72 can be wound up when they are not required for use. A method of handling freight, wherein a rigid support frame is placed on top of a stack of freight items, slings are passed from the frame beneath the stack and the frame is lifted by a crane is also disclosed.

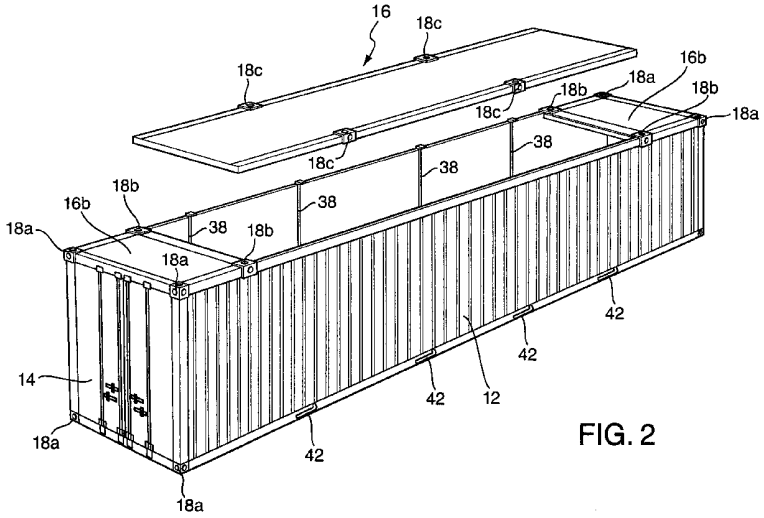

FIG. 2

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

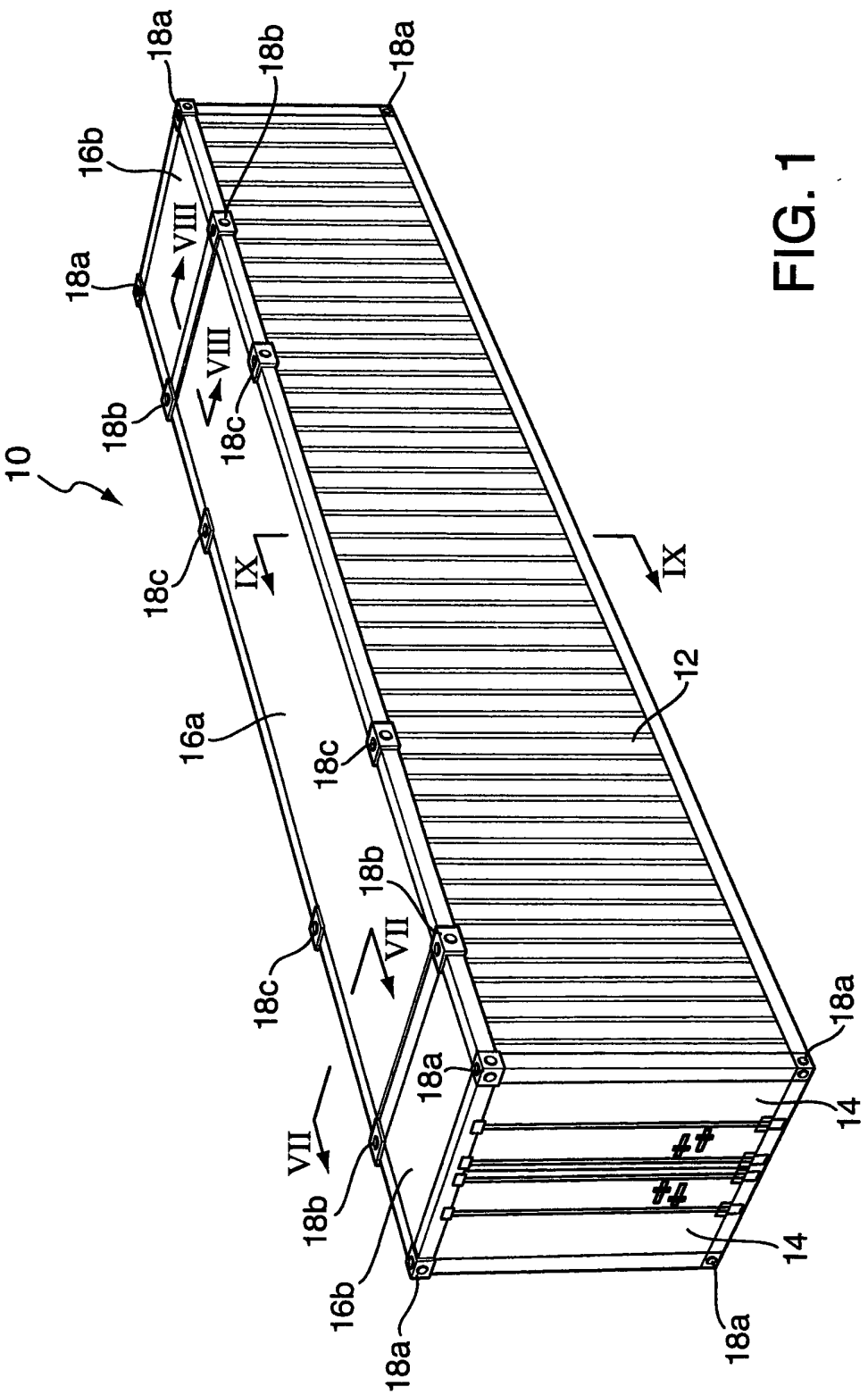
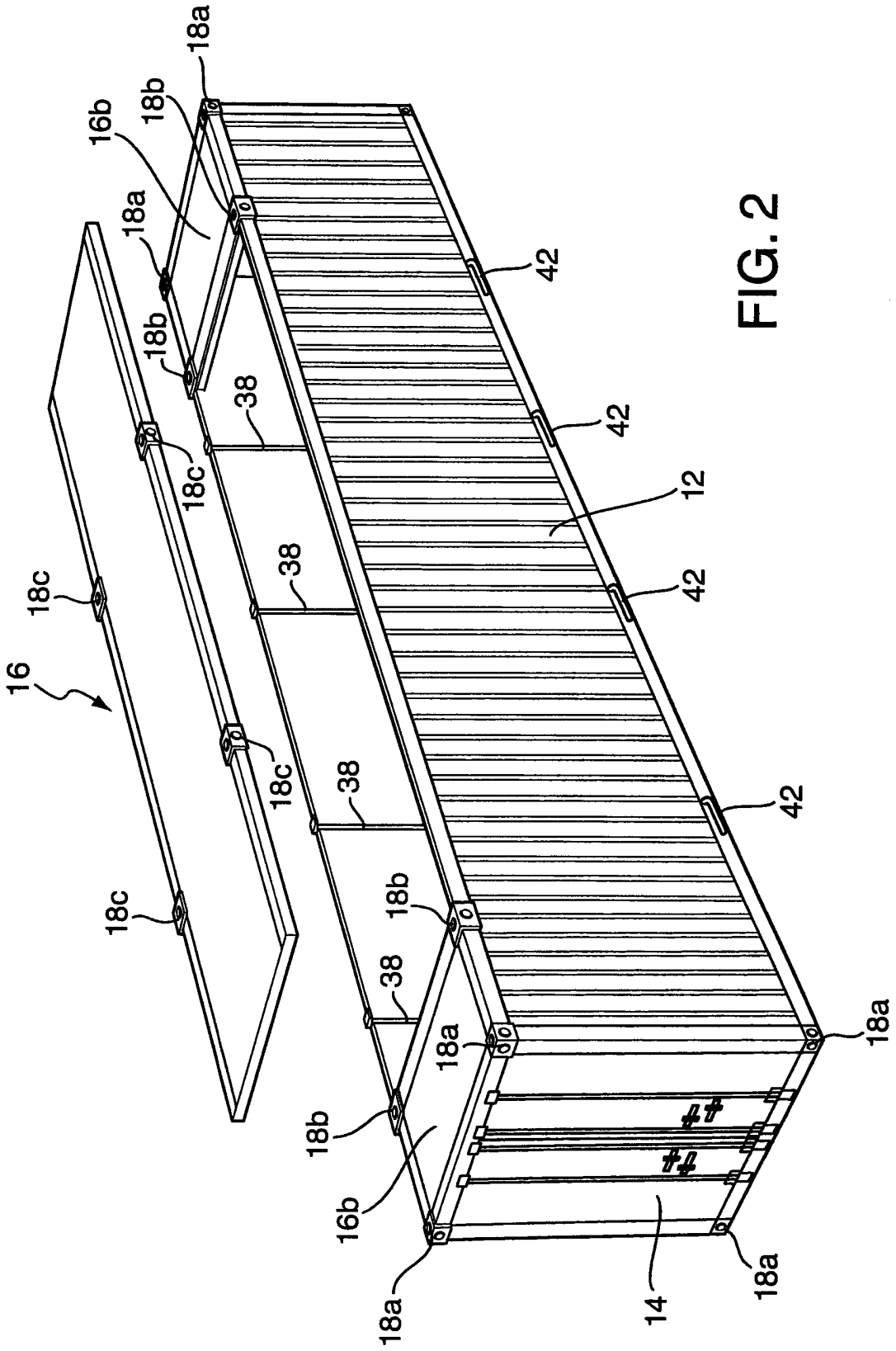


FIG. 1


18a
18b
16b
18a
18b
18c
38
42
12
18c
16
38
18c
38
42
18c
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38
18a
18a
18b
16b
18a
14
18a

FIG. 2

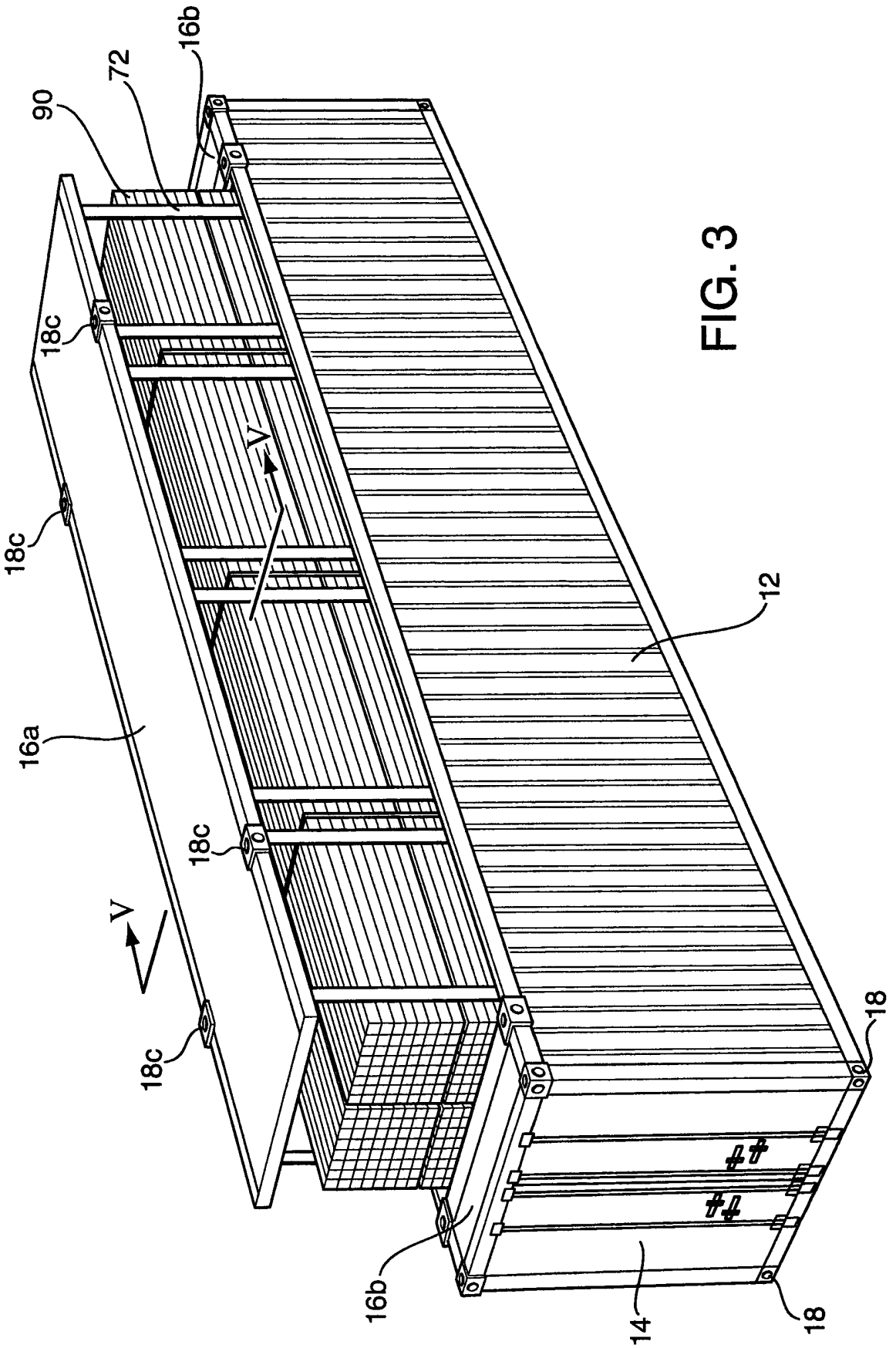

FIG. 3

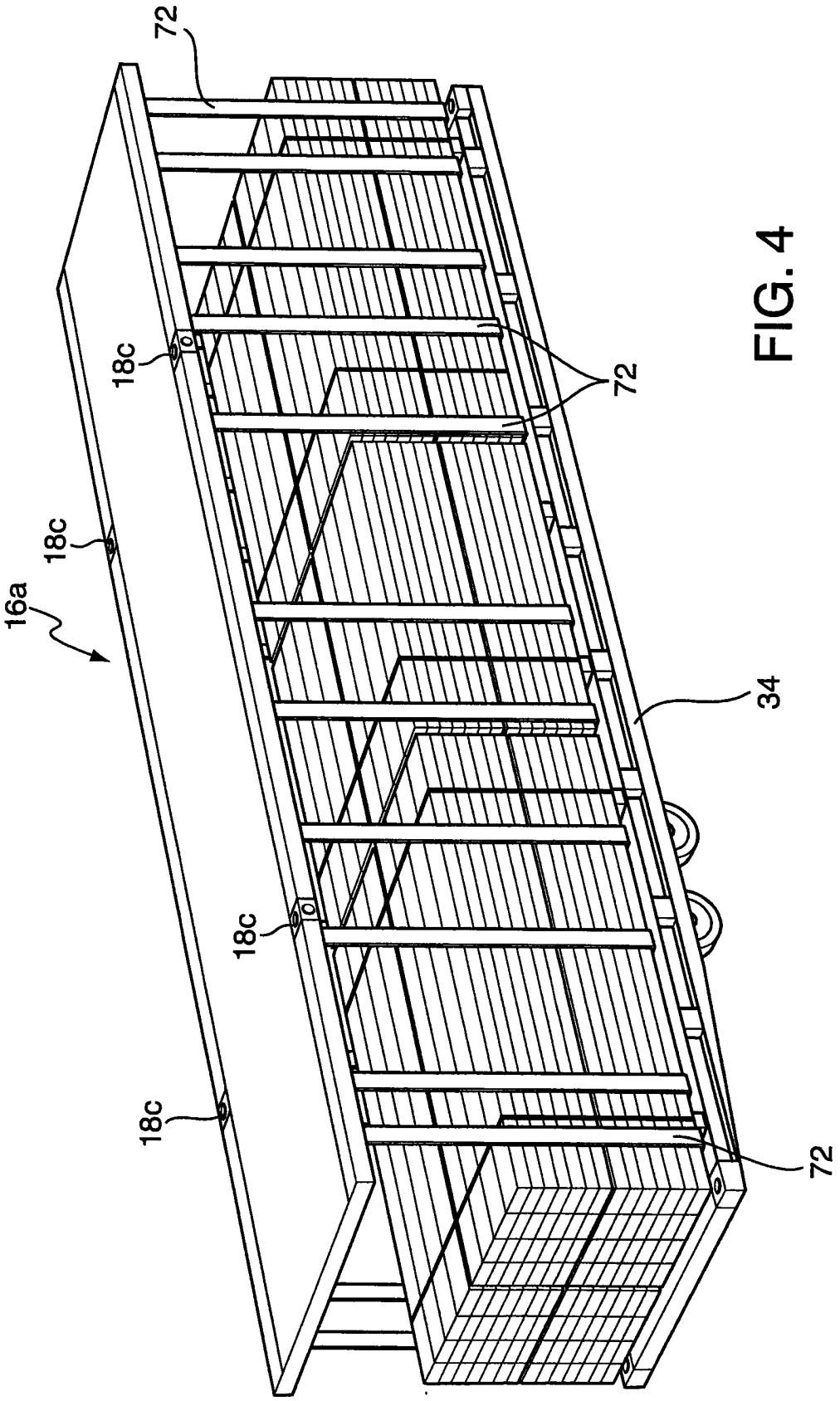

FIG. 4

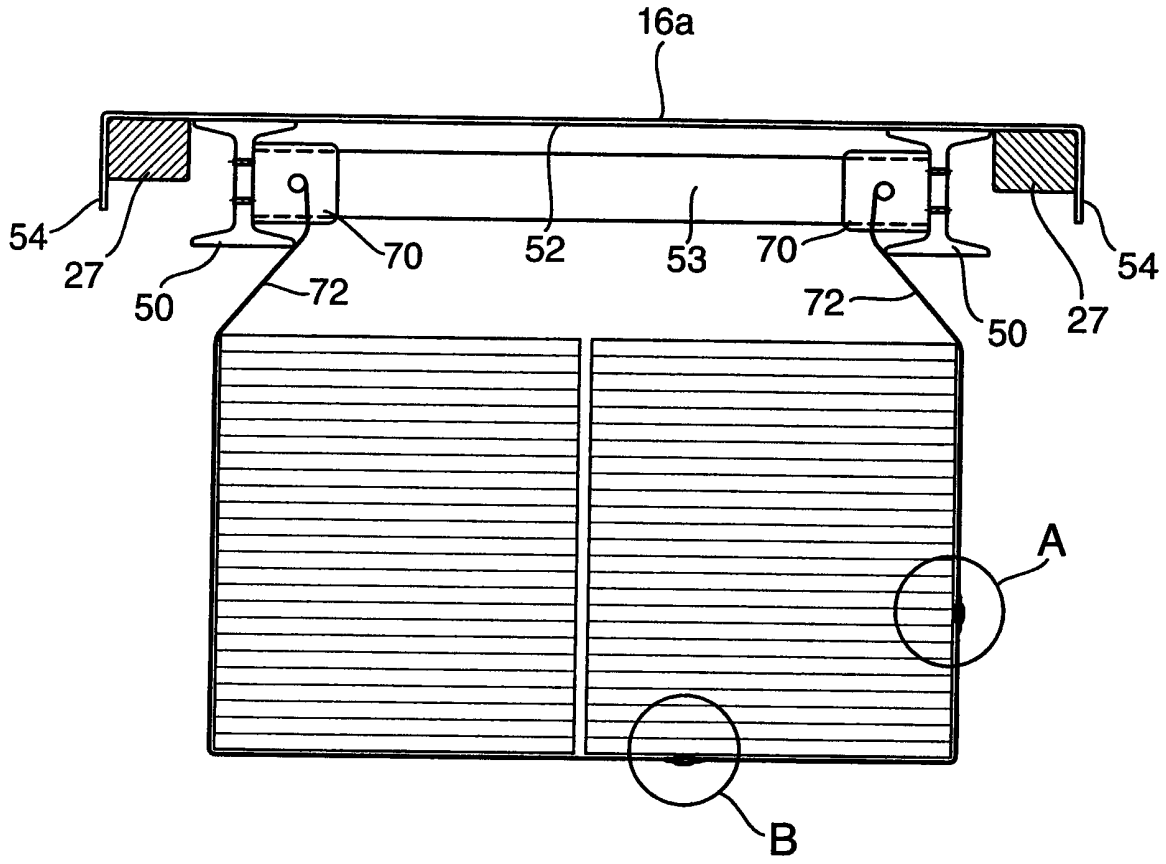

FIG. 5

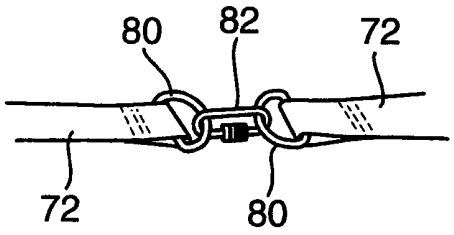

FIG. 5a

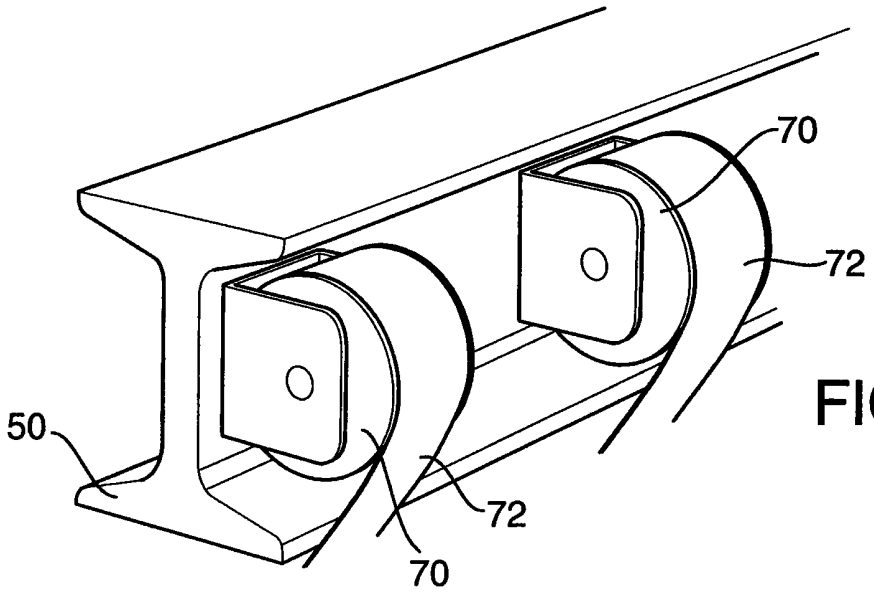

FIG. 6

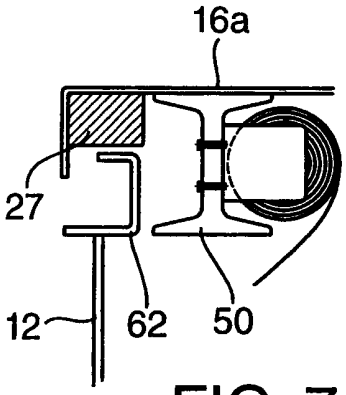

FIG. 7

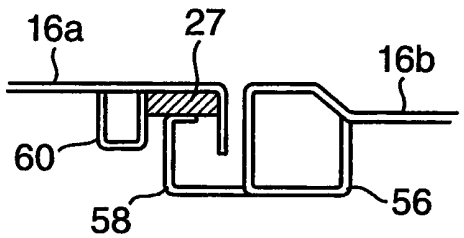

FIG. 8

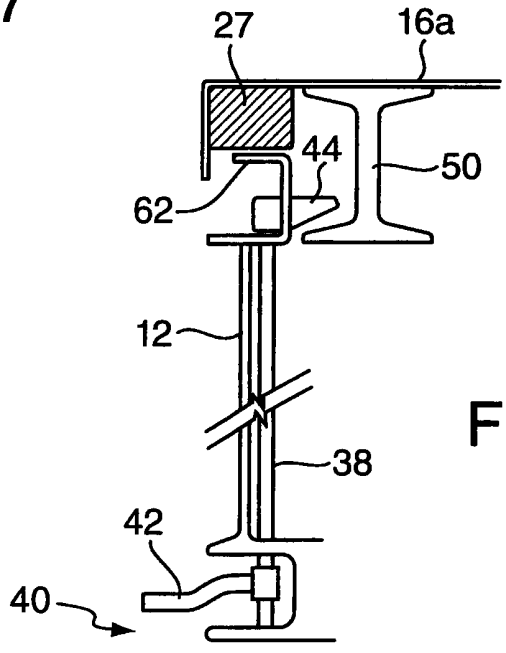

FIG. 9

Freight Container

This invention relates to a freight container and particularly (but not exclusively) to a container for transporting elongate cargoes, such as lengths of timber.

It is known to transport goods which exist in long lengths, eg timber or piping, on so-called flat racks which allow this type of cargo to be transported along with standard freight containers. Standard freight containers in this context are those also known as ISO containers. Flat racks fold down when they are not in use, so that when they are transported back to base empty they take up relatively little volume. However there is still a cost associated with repatriating such flat racks.

According to the invention, there is provided a freight container having a floor, walls and a roof module, wherein the roof module can be lifted off from the walls, and has means by which goods can be suspended within the container from the roof module, so that they can be lifted out of the container, suspended from the roof module, when the roof module is lifted off.

The ability to lift off the roof means that elongate cargoes can be loaded into the container transversely to their length, which is what happens when a flat rack is loaded. However, with the container of the invention, the roof module can be replaced after discharging the elongate cargo and the container can then be used in the same way

as a standard closed container. In other words, the container can also carry general cargo and earn revenue on the return voyage.

The roof module preferably incorporates a structural, load bearing frame, from which the goods can be suspended. Slings can be provided to suspend the goods, with the ends of the slings being mounted on the frame. The slings may be of fixed length, with the length being such that the slings will have just slightly more than sufficient length to follow the internal walls and floor of the container cross-section. As a result, when the roof module is in place on the container, the slings will be slack, and any goods suspended by the slings when the roof module is being lifted will rest on the container floor and will not be supported on the slings.

The roof module can have a series of drums along each long side, on a face of the module which, in use, will be inside the container, so that load slings can be passed beneath a stack of goods to be carried in the container, and attached to the drums at either end. The drums may be spring-loaded so that the load slings (which are preferably webbing straps) are retracted onto the drums when they are not in use. It is desirable to keep the slings out of the way when they are not in use, and winding them up onto a drum in the roof module will be particularly convenient.

The container preferably has ISO castings at it corners,

and the roof module fits between those castings. The roof module can also have ISO castings at points intermediate its ends, so that the roof module can be lifted by attaching a suitable lifting module such as a reach stacker to the intermediate ISO castings (the container as a whole can be lifted in a known manner using the corner castings).

The roof module may be slightly shorter than the full length of the container, with the container having short, fixed roof portions at each end which remain in place when the module is lifted away from the container. These fixed roof portions assist in maintaining rigidity and stability of the container when the roof module is lifted away.

A weathertight seal is provided between the roof module and the container walls to seal the inside of the container when the roof module is in place. The roof module can have clamps arranged around the periphery to clamp the roof to the walls of the container, and to load the seals to provide a weathertight seal. The clamps should be adequate to ensure that the seal is effective, but no external loads will normally be transmitted through the clamps.

The invention also extends to a method of handling freight, wherein a rigid support frame is placed on top of a stack of freight items, slings are passed from the frame beneath the stack and the frame is lifted by a crane or the like to lift the freight which is then suspended from

the frame within the slings.

A further aspect of the invention extends to a rigid support frame having means by which the frame can be suspended from a crane or the like, and slings for suspending a load from beneath the frame. The means for suspending the frame from a crane or the like may comprise a set of ISO castings suitably spaced so that the frame can be lifted by a reach stacker.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of a container in accordance with the present invention, in the closed condition;

Figure 2 shows the container of Figure 1 with the roof module lifted;

Figure 3 shows the roof module of the container separated from the floor and walls of the container, and with lengths of timber positioned beneath the module being loaded into the container;

Figure 4 shows the module preparing to unload a stack of timber onto a flatbed trailer;

Figure 5 is a cross-section through the roof module and a

suspended load, on the line V-V from Figure 3;

Figure 5a is a detail from the circle A in Figure 5;

Figure 6 is a detail showing winches located as part of the roof module;

Figure 7 is a section taken on the line VII-VII from Figure 1;

Figure 8 is a section taken on the line VIII-VIII from Figure 1; and

Figure 9 is a section taken on the line IX-IX from Figure 1;

The container 10 shown in Figure 1 is equivalent in external dimensions to a standard 45 foot ISO shipping container, and has walls 12, end doors 14 and a roof 16. The roof has three sections, a centre section 16a (hereinafter referred to as a roof module) and two end sections 16b. The floor which cannot be seen in the drawing will be conventional. The opposite end wall will be closed (ie without doors 14) as is conventional in such containers, and the opposite side wall will be the same as the visible side wall 12.

Although the container shown is a 45 foot standard container, the invention is equally applicable to other standard sized containers and can also be used with non-

ISO containers.

The centre part of the roof 16 of the container 10 is in the form of a detachable module 16a which can be detached from the tops of the walls. In this embodiment, the container has a length of 45 foot and the roof module 16a has a length of 40 foot, so the roof 16 has fixed end portions 16b, each of 2 foot 6 inches length. These short end portions help to keep the container stable when the roof module has been lifted off.

The container has pairs of ISO castings 18a, 18b and 18c along each long edge. The castings 18a at the corners (ie 45 foot apart) are used for securing the container to a trailer or to other containers on board a ship. The castings 18b are 40 foot apart and are used by a reach stacker to lift and stack the container. The castings 18c are 20 foot apart and are used when the container has to be secured to other containers with 20 foot spaced castings. More importantly however, the castings 18c will be used to lift the roof module using (in this case) a 20 foot spreader bar, when the module has been disengaged from the base of the container. All of these castings will be of the known form by means of which the container can be secured with twistlocks to adjacent containers and/or to a crane or a transport vehicle.

The roof module 16a is formed by a pair of spaced I-beams 50 which provide strength for the module, and a skin 52 spanning between the beams. This can be seen in Figure 5.

The skin 52, at the outer edges, has downturned lips 54 and weather seals 27 are fitted below the lips. Cross-braces 53 are also present between the I-beams 50 to add to the strength of the module.

Weatherproof seals 27 (Figures 7, 8 and 9) will be provided between the roof module 16a and the tops of the walls 12 and the edges of the fixed end roof portions 16b, so that when the roof module is in place, the interior of the container will be sealed, and will afford the container contents the same protection as would be the case with a standard, closed container.

A profiled section 62 (Figure 7) is fitted at the tops of the walls 12 and provides a seat against which a seal 27 makes a watertight joint.

At the edges of the fixed end portions 16b, cross beams 56 join the two castings 18b. The beams 56 each have an upturned lip 58 which seals against seals 27 (Figure 8). A strengthening beam 60 extends across the adjacent edge of the roof module.

Clamps 36 (Figure 9) will be positioned around the periphery of the container to hold the roof module 16 onto the walls 12. These clamps will comprise a rotatable bar 38 which extends from the bottom 40 of the container to the top. The bar has a handle 42 at the bottom, and an arm 44 at the top. In Figure 9, the bottom half of the clamp (with the handle 42) is shown in the open position,

while the upper half, with the arm 44, is shown in the closed or clamped position, with the arm 44 bearing against a lower flange of the I-beam 50. For the purposes of illustration, the arm 44 and the seal 27 are shown spaced from the parts against which they will in practice come into contact, when the clamp is closed.

There can be four such clamps along each side, as can be seen in Figure 2.

Figure 2 shows the roof module 16 lifted away from the walls 12 of the container.

The roof module is designed to be used as a lifting frame for lifting a stack of cargo, for example a stack of timber. The I-beams 50 have webbing drums 70 mounted on them (two such drums are shown in Figure 6), and the webbing straps 72 from the drums on either side extend down from the drums so that, when their ends are connected, they form slings looped around the timber stack. The drums have webbing return springs so that the webbing straps will be wound up onto the drums when it is not attached to anything, but can be unwound by pulling it off the drum when loads are to be slung beneath the module.

In use, the cargo (for example timber) to be shipped is assembled into a stack of approximately the same volume as the internal space of the container. The roof module is lowered onto the top of the stack. Webbing straps 72 are

pulled off from the drums 70 on one side and passed under the stack, to meet the end of the webbing strap 72 from the corresponding drum on the opposite side of the module. The ends of the webbing straps are connected together at a position in the circle A in Figure 5. As the straps are slack at this stage, the junction between the two straps can then be pulled round the stack to a position B, so that the junction is not in the way when the stack is lowered into the container.

The ends of the webbing straps 72 can be joined in any convenient manner. Figure 5a shows one possibility where both straps have a D-ring 80 at their free ends, and a snap shackle 82 or the like is used to connect the ends. It will be clear that many alternative ways of joining the ends are possible, although it is important that the joint be positive so that it does not disengage when the straps are loose.

The webbing straps 24 forming the slings can however be constructed in many different ways. They can be of a fixed length with loops or rings 80 at their ends, as shown. One length should be longer than the other so that the two ends meet at one side of the stack. The combined length should be equal to twice the height of one wall of the container, plus the width of the floor, plus a small extra length so that even when the largest possible volume of cargo is being placed in the container, the cargo will still rest on the floor of the container, and the slings will go slack when the roof module is fully in place.

In some circumstances, it may be desirable for the length of the slings to be adjustable. Adjustment can be provided by any appropriate conventional method, such as known ratchet tensioning buckles.

The module is lifted by engaging suitable lifting gear with the castings 18c. The first thing that will happen when the module is lifted is that the webbing straps 72 will go taut. Once the webbing is taut, further lifting of the module will cause the stack 90 to be lifted, slung beneath the module. The sack and the module will then be positioned over the container body and lowered into the container. Once the stack is fully inside the container, the stack will sit on the container floor and once the module is seated on the top of the container, the webbing straps will again be slack. The container is then ready to be shipped.

Because the stack will have a length less than that of the container internal space, conventional cargo restraint bars can be fitted at the ends of the container to stop the cargo moving lengthwise into the empty end spaces.

Unloading the container is a reverse of the loading process.

The container can be used as a conventional, end-loaded container, with the roof module clamped in place. The webbing drums are housed in the roof and obtrude very

little, if at all, into the load space. The webbing straps will be wound up completely onto the drums.

It will be seen in Figure 5 that there is a gap between the top of the timber stack 26 and the roof module. This gap arises because when the roof module is attached to the top of the container, the timber should be resting on the floor of the container, with the slings 24 slack. Therefore when the roof module is first lifted, it will lift a certain distance until the slings become taut and carry load, and then further lifting of the roof module will lift the cargo also. When the cargo is lowered into the container, at a certain point, the timber cargo will come into contact with and rest on the floor, before the roof module is in place on the tops of the walls. At this point, the slings will go slack.

In order to achieve this, the axis of the spools on which the webbing straps are wound may be vertical, and the straps can be turned through 90° to be wound onto the spools.

Figure 4 shows the roof module being used as a spreader and load frame, to lower the timber onto a road trailer 34. Once the weight has been taken on the trailer, the slings 24 can be released and the roof module and the slings will be taken away, back to the container within which the timber 26 had earlier been transported.

Of course a description here of loading applies equally to an unloading stage, and vice versa.

The container described here provides a container liner operator with container equipment options to correct trade route cargo and equipment imbalances. Two of the most important operational factors in determining the profitability of any scheduled containerised liner service is the ability to maximise the volumes of cargo carried on both the outward and inward voyages and to minimise the repositioning or returning empty of non revenue earning empty container equipment.

The cost of moving in or out of empty equipment cannot be underestimated with costs of trucking and empty lifts at both ends having to be added to the cost of taking up shipping space with no sea-freight income.

The arrangement shown here by way of example is applied to a type of 40ft container which can operate as an 8'6" dry van standard container for one leg of a trade and can convert if appropriate to a different type of top loading/unloading container for the contra voyage in order to carry cargo not carried in a standard container. By having a removable top lengthways cargo can be loaded or unloaded vertically. The top also acts as a cargo lifting spreader so commodities such as timber can be loaded and discharged by being under-slung from the top which is suitably structured to adequately support maximum weight loads. The top remains attached to the container all the

way through transit via a suitable locking arrangement, with the cargo resting all the time on the container floor (with slings slack) except when the top is lifted or lowered in/ out from the base module at the time of export loading or import discharge.

Loading/discharging the whole of the cargo (eg 35 tonnes) in or out of the base module is therefore a function of one single lift to separate the roof module and the cargo from the container (or to position the roof module and the cargo in the container for onward shipment). This can therefore be carried out on a container port quayside without the normal need to truck the container to a distant cargo unstuffing facility.

By having this convertible form of ISO container the operator can carry cargoes not normally within his equipment capability and rather than costing money to return standard equipment empty he can earn freight revenue from it's new flexible break bulk carrying operational role.

There are also benefits to shippers, importers or handling ports in terms of saving time over unloading a conventional vessel or in lower cost to importers who invariably pay for the loading and discharging.

This container is therefore especially valuable on liner services where the natural standard dry van cargo traffic is significantly imbalanced. Being able to convert the

equipment to break bulk capability allows the trade and equipment to be brought into balance.

Claims

1. A freight container having a floor, walls and a roof module, wherein the roof module can be lifted off from the walls, and has means by which goods can be suspended from the roof module, so that they can be lifted out of the container, suspended from the roof module, when the roof module is lifted off.

2. A freight container as claimed in Claim 1, wherein the roof module incorporates a structural, load bearing frame, and the goods can be suspended from the frame.

3. A freight container as claimed in Claim 2, wherein slings are provided to suspend the goods, and the ends of the slings are mounted on the frame.

4. A freight container as claimed in any preceding claim, wherein the container has ISO castings at it corners, and the roof module fits between those castings.

5. A freight container as claimed in any preceding claim, wherein the roof module has ISO castings at points intermediate its ends, so that the roof module can be lifted by attaching a suitable lifting module to the ISO castings.

6. A freight container as claimed in any preceding claim, wherein the roof module is shorter than the container, and the container has fixed roof portions at

each end which, together with the roof module, cover the whole of the container.

7. A freight container as claimed in any one of Claims 3 to 6, wherein drums are fitted in the roof module onto which the slings can be wound up when they are not required for use.

8. A freight container as claimed in Claim 7, wherein the drums are spring-loaded to wind up the slings when they are not needed.

9. A freight container as claimed in any one of Claims 3 to 8, wherein the slings are webbing straps.

10. A freight container as claimed in any preceding claim, wherein a weathertight seal is provided between the roof module and the container walls to seal the inside of the container when the roof module is in place.

11. A freight container as claimed in any one of Claims 1 to 23, wherein the length of the slings is slightly greater than the sum of the heights of the two container walls plus the width of the container floor.

12. A method of handling freight, wherein a rigid support frame is placed on top of a stack of freight items, slings are passed from the frame beneath the stack and the frame is lifted by a crane or the like to lift the freight which is then suspended from the frame within the slings.

13. A rigid support frame having means by which the frame can be attached to a crane or the like, and slings for suspending a load from beneath the frame.

14. A support frame as claimed in Claim 12, wherein the means for suspending the frame from a crane or the like comprises a set of ISO castings suitable spaced so that the frame can be lifted by a reach stacker.

15. A freight container substantially as herein described with reference to the accompanying drawings.

16. A support frame substantially as herein described with reference to the accompanying drawings.

INVESTOR IN PEOPLE

Application No:	GB0405514.1	**Examiner:**	Hayley Yates
Claims searched:	1-11	**Date of search:**	11 June 2004

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular reference
A	1	EP1279621 A Martin; see figure 2
A	1	US3750826 A Donath et al; see figure 1
A	1	GB1274300 A Inventio; see page 1 lines 19-32
A	1	US4736975 A Perez et al; see figure 1
A	1	US2987340 A Mattera; see figure 1

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[W] :

B8P; B8Q

Worldwide search of patent documents classified in the following areas of the IPC[07]

B65D

The following online and other databases have been used in the preparation of this search report

JAPIO, WPI, EPODOC