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(54) **Freight container**

(57) An open-sided freight container includes a base structure (5), a structural framework that extends upwardly from the base structure and corner fittings including four intermediate top corner fittings (10) at a longitudinal spacing between the centres of their top openings of about 11985mm to enable the container to be handled by load handling equipment for lifting 40ft (12192mm) containers. At least one of the intermediate top corner fittings (10) above an open side of the container is provided by a first end portion of a cantilever arm, the second, opposite, end portion of which is fixed to a vertical member (19) extending downwardly to the base structure and to a horizontal member (21) extending longitudinally away from the intermediate top corner fitting to an end portion of the container. The vertical and horizontal members are secured to the second end portion of the arm in a cantilever arrangement with the arm extending substantially horizontally and longitudinally inwardly to the first end portion.

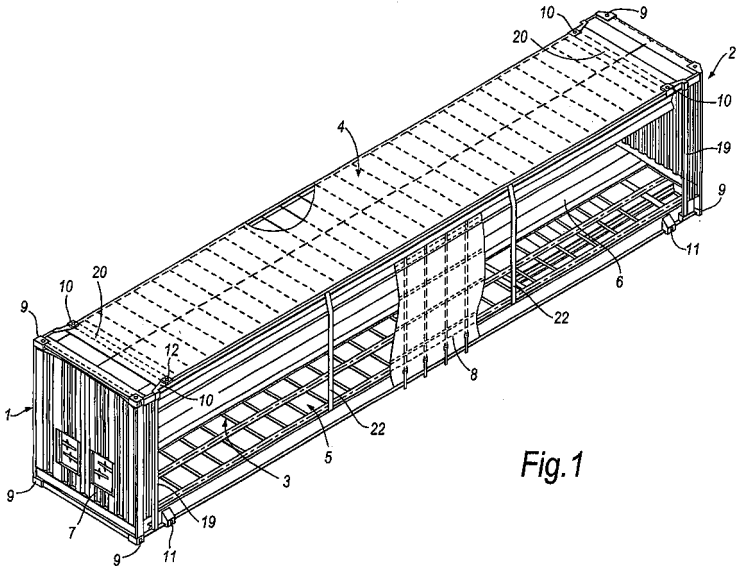

Fig.1

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Description

[0001] This invention relates to open-sided freight containers and more particularly, but not exclusively, to open-sided 45ft (13,716mm) freight containers, and to corner fittings for use in such containers.

[0002] Where reference is made in this specification to an open-sided freight container, it should be understood that the term includes, but is not limited to, the following: a container with at least one side which is able to be covered by a flexible covering such as a tarpaulin which can be moved away from the side of the container to allow access into the container through the open side (such a container is referred to herein as a curtain-sided container); a container with a roof but at least one side which is entirely open along most of its length to allow access into the container; and, a container having a base structure and ends upstanding from the base structure but no roof or sides along at least most of its length (such a container is referred to herein as a flatrack).

[0003] In the European freight container industry, although metric units are used for most measurements, container lengths are still referred to in units of feet and therefore in this specification such references are also provided in feet. For the convenience of the reader, metric equivalents, usually in mm, are included in parentheses after the units of feet. The units are given to the last mm, but it should be understood that the dimension referred to is not necessarily as precise as that. For example, a "45 foot container" might have a length of 13,706mm.

[0004] For many years containers have existed in standard lengths especially 20ft (6096mm), 40ft (12,192mm), 13,600mm (a container that is known by its metric length) and 45ft (13,716mm) lengths. The 40ft (12,192mm) length of container has been especially popular and load handling equipment provided at container facilities are usually able to handle 40ft (12,192mm) containers, whatever other length or lengths of container they may be able to handle.

[0005] 45ft (13,716mm) containers are becoming increasingly popular as the largest container that can be transported by road in Europe, but such containers are usually provided with intermediate corner fittings at the spacing (11,985mm centre-to-centre spacing) of the corner fittings on a 40ft (12,192mm) container so that they can be handled by load handling equipment intended for 40ft (12,192mm) containers. When such a 45ft (13,716mm) container is used it is desirable not only that it can be handled by equipment designed for 40ft containers but also that a 40ft (12,192mm) container can safely be stacked on top of it.

[0006] In the case of a 45ft (13,716mm) container with solid sides it is reasonably simple to provide the necessary structural support to the intermediate corner fittings of the container: the base of the container under the floor is relatively strong and the solid sides of the container provide structural support to the intermediate corner fittings at the top of the container. In the case of an open-sided container, however, a problem arises in providing the required structural support to the intermediate corner fittings at the top of the container. Typically that problem is solved by making the open-sided container with substantially closed sides along the end portion of the container (up to the position of the 40ft (12,192mm) intermediate corner fittings), but that reduces the length along which the container can rightly be regarded as open-sided.

[0007] The problem just described also arises with other containers longer that 40ft (12,192mm), for example with 13,600 containers.

[0008] This problem has been recognised and attempts made to overcome it. For example, it has been proposed to provide partly or totally removable side walls at the ends of a container and it has also been proposed to provide an open-sided container with a wall extending longitudinally along a central plane of the container between a base structure of the container and the roof. Such a design makes it possible to provide additional strength in the region of the 40ft (12,192mm) intermediate top corner fittings even when the container is open-sided in that area, but the presence of a central longitudinal wall is often not acceptable in a container that is specifically designed to be loaded from the side. In particular such a design requires that the container be loaded from both sides.

[0009] It is an object of the invention to provide an open-sided container with improved side access.

[0010] It is a further object of the invention to provide an intermediate corner fitting for an open-sided container that enables side access to the container to be improved.

[0011] According to a first aspect of the invention there is provided an open-sided freight container, the container including a base structure, a structural framework that extends upwardly from the base structure and corner fittings including four intermediate top corner fittings at a longitudinal spacing between the centres of their top openings of about 11,985mm to enable the container to be handled by load handling equipment for lifting 40ft (12,192mm) containers, wherein at least one of the intermediate top corner fittings above an open side of the container is structurally secured in a cantilever arrangement to the structural framework which includes a vertical member extending downwardly from the top corner fitting to the base structure of the container, the vertical member being offset outwardly in a longitudinal direction from the cantilevered intermediate top corner fitting by a distance of more than 150mm measured between the centre of the top opening of the top corner fitting and the longitudinally inner face of the vertical member, leaving the space on the longitudinally inner side of the vertical member and under the cantilevered intermediate top corner fitting open for allowing side access.

[0012] By providing such a cantilever arrangement the overall length of the open part of the open-sided container can be increased. Even a small increase can be very useful in enabling particular goods to be loaded through the open side

of the container.

[0013] Whilst it is possible to extend the length of the open side at one end only of the container, it is preferred to extend the length at both ends. Thus it is preferred that first and second intermediate top corner fittings above the same open side of the container and towards opposite ends of the container are each secured in a cantilever arrangement, the structural framework including a first vertical member extending downwardly from the first intermediate top corner fitting to the base structure of the container and a second vertical member extending downwardly from the second intermediate top corner fitting to the base structure of the container, each vertical member being offset outwardly in a longitudinal direction from the respective cantilevered intermediate top corner fitting by a distance of more than 150mm measured between the centre of the top opening of the top corner fitting and the inner face of the vertical member, leaving the space on the longitudinally inner side of the vertical member and under the cantilevered intermediate top corner fitting open for allowing side access.

[0014] Usually it will be preferred that the first and second intermediate top corner fittings are spaced by the same distances from the respective adjacent ends of the container, but it is also possible for them to be spaced by different distances. Similarly, it will usually be preferred that the inner faces of the first and second vertical members are spaced by the same distances from the respective ends of the container, but it is also possible for them to be spaced by different distances.

[0015] The container may be open on one side only, the other side in that case being closed. It is, however, preferable for there to be open access to both sides of the container and for the length of both open sides to be extended at both ends. Thus, it is preferred that both sides of the container are open-sided and third and fourth intermediate top corner fittings are arranged above the other side of the container in substantially the same manner as the first and second intermediate top corner fittings.

[0016] It will be noted that the intermediate bottom corner fittings are below floor level and are not affected by the open-sided nature of the container.

[0017] The invention is especially advantageous when applied to a 45ft (13,716mm) container although it may also be applied to containers of other lengths. In a conventional 45ft (13,716mm) container a vertical member is provided directly underneath each intermediate corner fitting and the gap between the vertical members is therefore less than 12,000mm. The more that gap can be increased the better the access to the container and in a container embodying the invention the gap is usually more than 12,300mm and preferably more than 12,500mm. In a container described below the gap is 12,600mm. As will be understood, in a case where the same offset arrangement is provided at both ends of the container an increase in gap of 200mm can be achieved by an increase in each offset of 100mm. Thus while the offset of the vertical member from the cantilevered intermediate top corner fitting is required, in the first aspect of the invention, to be more than 150mm, it is preferably more than 250mm and more preferably greater than 300mm.

[0018] Even when the offset is as great as 300mm, we have found that the container can be arranged such that even in the region of the vertical member it is not unduly narrow. More particularly the internal width of the container in the region of the vertical member may be more than 2420mm. In a container described below it is more than 2430mm, being 2434mm. Such widths are advantageous in allowing two pallets of 1.2m width or three pallets of 0.8m width to be placed across the container in the region of the vertical member.

[0019] Preferably the cantilevered intermediate top corner fitting is secured in a cantilever arrangement both to the vertical member extending downwardly to the base structure and to a horizontal member extending longitudinally outwardly to an end portion of the container. The cantilevered securing of the intermediate top corner fitting to both the vertical and horizontal members enables the loads to be shared between those members enabling those members to be of smaller cross-section and thereby enabling the free space within the container to be increased.

[0020] Preferably the cantilevered intermediate top corner fitting supports a horizontal beam extending across the top of the container, preferably aligned longitudinally with the top opening in the corner fitting. It is desirable for the container to be reasonably strong across its top at that position.

[0021] Corner fittings of freight containers are typically of cuboidal shape and formed in one piece, usually as castings. It is, however, possible to form corner fittings in other ways: for example openings may be formed in end parts extending from the top to the bottom of the container or the fittings may be fabricated from one or more metal sheets bent into the required shape. Similarly the intermediate cantilevered corner fitting described herein may be fabricated from one or more sheets of metal, but it is preferably of one piece construction and is preferably a casting.

[0022] As already indicated, an open-sided container embodying the invention may take various forms. For example, it may have a roof and one or two open sides each covered with a flexible covering which can be moved away from the side of the container to allow access into the container. It is also within the scope of the invention for it to be without a roof and for the sides to exist only adjacent to the ends of the container; such a container is commonly referred to as a flatrack.

[0023] According to a second aspect of the invention, there is provided an open-sided freight container, the container including a structural framework that extends upwardly from the base structure and corner fittings including four intermediate top corner fittings at a longitudinal spacing between the centres of their top openings of about 11,985mm to

enable the container to be handled by load handling equipment for lifting 40ft (12,192mm) containers, wherein at least one of the intermediate top corner fittings above an open side of the container is provided by a first end portion of a cantilever arm, the second, opposite, end portion of which is fixed to a vertical member extending downwardly to the base structure and to a horizontal member extending longitudinally away from the intermediate top corner fitting to an end portion of the container, the vertical and horizontal members being secured to the second end portion of the arm in a cantilever arrangement with the arm extending substantially horizontally and longitudinally inwardly to the first end portion.

[0024] The container according to the second aspect of the invention preferably has, but does not necessarily have, each of the features described above with reference to the container of the first aspect of the invention. In particular, in the container according to the second aspect of the invention the offset of the vertical member in a longitudinal direction from the cantilevered intermediate top corner fitting need not be as great as 150mm.

[0025] The intermediate top corner fitting employed in embodiments of the present invention is itself of novel construction and according to a third aspect of the invention there is provided an intermediate top corner fitting for a 45ft (13,716mm) open-sided freight container, the corner fitting being of elongate form and including a cantilever arm having first and second opposite end portions, the first end portion including a top opening for engagement by load handling equipment for lifting 40ft (12,192mm) containers and the second end portion being fixable to a vertical member extending downwardly to the base structure of the container and to a horizontal member extending horizontally to an end portion of the container. The fitting may of course have other of the features described above with reference to the container of the first and second aspects of the invention.

[0026] The present invention still further provides an open-sided freight container including a corner fitting as defined above, the corner fitting being positioned along the top of the container intermediate the ends of the container. The open-sided freight container may also incorporate any of the features defined above with reference to a container of the invention.

[0027] Whilst it will usually be appropriate to include first and second corner fittings on the same side of the container along the top of the container intermediate the ends of the container, another possibility is to have just one intermediate top corner fitting on each side of the container so that, for example, there may be a total of six top corner fittings. Such an arrangement may be suitable where an especially asymmetric arrangement of side opening is desired.

[0028] By way of example an embodiment of the invention will now be described with reference to the accompanying drawings, of which:

Figure 1 is a perspective view of curtain-sided freight container,
Figure 2a is a perspective view of a top intermediate corner fitting employed in the structure of the container shown in Fig 1,
Figure 2b is a plan view of the intermediate corner fitting shown in Fig 2a,
Figure 3 is a side view from the inside of the container of an end region of the container shown in Fig 1,
Figure 4 is a side view of the container shown in Fig 1,
Figure 5 is a sectional plan view of the container shown in Fig 1 and
Figure 6 is a side view of a modified form of the container shown in Fig. 1.

[0029] The freight container shown in Fig 1 is of generally cuboidal shape having ends 1, 2, open sides 3 (only one of which is visible in Fig 1), a roof 4 and a base structure 5 on the top of which is a floor 6 (the floor being partly cut away in Fig 1 to reveal the base structure of the container). The end 1 of the container is provided with a pair of double doors 7. The container is symmetrical about a vertical longitudinal plane.

[0030] The sides 3 of the container are coverable by tarpaulins 8 (only partly shown in Fig 1) which can be tied securely to the container along their bottom edge but also untied and moved away to allow open access to the sides of the container in a manner well known *per se.*

[0031] The freight container is a 45ft (13,716mm) container and is provided with eight corner fittings 9 at the corner extremities of the container, with four intermediate top corner fittings 10 and with four intermediate bottom corner fittings 11 (only two of which are visible in Fig 1). As is customary, the openings in the intermediate corner fittings 10, 11 are at the same spacings (11,985mm centre-to-centre spacing) as the corner fittings located at the corner extremities of a 40ft (12,192mm) container so that the containers can be lifted by load handling equipment arranged to lift 40ft (12,192mm) containers by engagement of the equipment in top openings 12 of the intermediate top corner fittings 10, and to enable a mixture of 40ft (12,192mm) and 45ft (13,716mm) containers to be stacked on top of one another with twist-locks engaging corner fittings at the corner extremities of the 40ft (12,192mm) containers and intermediate corner fittings of the 45ft (13,716mm) containers.

[0032] The features of the container that are described above are conventional. In accordance with the invention, each intermediate top corner fitting 10 is of a special design which will now be described with reference to Figs 2a and 2b. The fitting 10 is of generally elongate form and comprises a cantilever arm 13 having a first end portion 14 and a

second, opposite, end portion 15. The first end portion 14 has the top opening 12 in the standard location but that represents just the end portion 14 of the fitting 10. Instead of having the usual almost cubic shape the fitting 10 is elongate and the second, opposite, end portion 15 is provided with a protuberance 16 for closely fitting inside and welding to a horizontal, longitudinal, member and a protuberance 17 for closely fitting inside and welding to a vertical member. Also, as best seen in Fig 2b, the first end portion 14 is formed with an open topped socket 18 for receiving as a close fit and welded thereto a horizontal, transverse, member.

[0033] Although Fig 2a may give the impression that the corner fitting is solid except in the region of the opening 12 that is not the case: the fitting is formed in one piece as a steel casting and is of limited wall thickness throughout as indicated by dotted lines in Fig 2b.

[0034] Referring also to Fig 1, it may be noted that the corner fitting exactly as shown in Figs 2a and 2b is only used for two of the intermediate top corner fittings 12 and that a mirror image of the corner fitting exactly as shown in Figs 2a and 2b is used for the other two intermediate top corner fittings.

[0035] In Fig 1 the vertical members that are welded at their top ends to the protuberances 17 of the intermediate top corner fittings 12 are referenced 19 (two of the four members being visible in Fig 1), and the horizontal, transverse, members whose opposite ends are received in and welded to the sockets 18 of the fittings 12 are shown in dotted outline and referenced 20. The horizontal, longitudinal, members whose longitudinally inner ends are welded to the protuberances 16 of the intermediate top corner fittings 12 are shown in Fig 3 and are referenced 21. They extend to the end portions of the container. Thus, each fitting 10 is secured in a cantilever arrangement to the vertical members 19 and the horizontal members 20.

[0036] As can readily be seen in Fig 1, the vertical members 19 are offset outwardly in a longitudinal direction from the top openings 12 in the corner fittings 10 with the result that the longitudinal gap between the vertical members 19 is greater than the spacing between the openings 12, thereby increasing the side access to the container. Such an increase, although small, is nonetheless valuable, especially as it does not result in any significant reduction in the interior width or height of the container in the region of the members 19, as can be seen from the drawings.

[0037] It may be noted that in the illustrated embodiment the open sides 3 of the container are interrupted at two locations by vertical support posts 22. Similar posts 22 are provided on the other side of the container (not visible in Fig 1) but are staggered slightly from the positions on the side shown in Fig 1. The purpose of the posts 22 is simply to support the roof partway along its longitudinal span. The posts 22 are not required to support greater loads, such as for example the load of a container stacked on top, and can therefore be of thin and lightweight construction; they may also be removable, if desired.

[0038] Whilst it will be understood that the invention is applicable to containers of various dimensions, certain dimensions of one especially preferred embodiment of the invention will now be given with reference to Figs 3, 4 and 5:

Overall length (1 in Fig 4): Longitudinal centre-to centre spacing of top openings 12 (s in Fig 4):	13,716mm 11,985mm
Offset of inner face of vertical members 19 from centre of top opening 12 (o in Fig 3):	312mm
Longitudinal gap between vertical member 19 (g in Fig 4):	12,610mm
Tranverse gap between vertical members 19 (t in Fig 5):	2434mm
Overall width (w in Fig 5):	2550mm

[0039] Whilst one particular example of the invention has been described, it will be understood that it may be modified in a wide variety of ways. For example, the intermediate top corner fittings 10 are shown each having a single opening, namely a top opening. It is possible for the fittings also to be provided with side openings as are some standard 45ft containers.

[0040] As already indicated the container described with reference to Figs. 1 to 5 is simply one example of a container that may be constructed in accordance with the invention. As will be understood, many modifications to the design are possible and Fig. 6 illustrates one such modification. Fig. 6 is a similar view to Fig. 4 but of the modified container and the same reference numerals are used in Figs. 4 and 6 to designate identical or almost identical parts. In Fig. 6, the two intermediate top corner fittings 10a adjacent one end of the container (in the illustrated case the end 1 with doors) are arranged in generally the same way as before but a little further from the end of the container, while the other two intermediate corner fittings 10b adjacent to the other end of the container (in the illustrated case the end 2) are arranged immediately adjacent to the end of the container. Thus the intermediate top corner fittings 10a, 10b are still spaced at the spacing s of 11,985mm as in the previous example, but they are asymmetrically positioned along the length of the container.

Claims

1. An open-sided freight container, the container including a base structure, a structural framework that extends upwardly from the base structure and corner fittings including four intermediate top corner fittings at a longitudinal spacing between the centres of their top openings of about 11,985mm to enable the container to be handled by load handling equipment for lifting 40ft (12,192mm) containers, wherein at least one of the intermediate top corner fittings above an open side of the container is provided by a first end portion of a cantilever arm, the second, opposite, end portion of which is fixed to a vertical member extending downwardly to the base structure and to a horizontal member extending longitudinally away from the intermediate top corner fitting to an end portion of the container, the vertical and horizontal members being secured to the second end portion of the arm in a cantilever arrangement with the arm extending substantially horizontally and longitudinally inwardly to the first end portion.

2. A container according to claim 1, in which first and second intermediate top corner fittings above the same open side of the container and towards opposite ends of the container are each secured in a cantilever arrangement, the structural framework including a first vertical member extending downwardly from the first intermediate top corner fitting to the base structure of the container and a second vertical member extending downwardly from the second intermediate top corner fitting to the base structure of the container, each vertical member being offset outwardly in a longitudinal direction from the respective cantilevered intermediate top corner fitting by a distance of more than 150mm measured between the centre of the top opening of the top corner fitting and the inner face of the vertical member, leaving the space on the longitudinally inner side of the vertical member and under the cantilevered intermediate top corner fitting open for allowing side access.

3. A container according to claim 2, in which the first and second intermediate top corner fittings are spaced by the same distances from the respective adjacent ends of the container.

4. A container according to claim 2 or 3, in which the inner faces of the first and second vertical members are spaced by the same distances from the respective adjacent ends of the container.

5. A container according to claim 2, in which the first and second intermediate top corner fittings are spaced by different distances from the respective adjacent ends of the container.

6. A container according to claim 2 or 5, in which the inner faces of the first and second vertical members are spaced by different distances from the respective adjacent ends of the container.

7. A container according to any of claims 2 to 6, in which both sides of the container are open-sided and third and fourth intermediate top corner fittings are arranged above the other side of the container in substantially the same manner as the first and second intermediate top corner fittings.

8. A container according to any of claims 2 to 7, in which the length of the gap between the vertical members offset from the first and second intermediate top corner fittings is more than 12,300mm.

9. A container according to any of claims 2 to 7, in which the length of the gap between the vertical members offset from the first and second intermediate top corner fittings is more than 12,600mm.

10. A container according to any preceding claim, in which the vertical member is offset from the cantilevered intermediate top corner fitting by a distance of more than 300mm.

11. A container according to any preceding claim, in which the internal width of the container in the region of the vertical member is more than 2420mm.

12. A container according to any preceding claim, in which the internal width of the container in the region of the vertical member is more than 2430mm.

13. A container according to any preceding claim, in which the cantilevered intermediate top corner fitting is secured in a cantilever arrangement both to the vertical member extending downwardly to the base structure and to a horizontal member extending longitudinally outwardly to an end portion of the container.

14. A container according to claim 13, in which the cantilevered intermediate top corner fitting supports a horizontal

beam extending across the top of the container.

15. A container according to any preceding claim, in which the cantilevered intermediate top corner fitting is of one piece construction.

16. A container according to any preceding claim, in which the cantilevered intermediate top corner fitting is a casting.

17. A container according to any preceding claim, in which the cantilevered intermediate top corner fitting is a fabrication.

18. An open-sided freight container, the container including a base structure, a structural framework that extends upwardly from the base structure and corner fittings including four intermediate top corner fittings at a longitudinal spacing between the centres of their top openings of about 11,985mm to enable the container to be handled by load handling equipment for lifting 40ft (12,192mm) containers, wherein at least one of the intermediate top corner fittings above an open side of the container is structurally secured in a cantilever arrangement to the structural framework which includes a vertical member extending downwardly from the top corner fitting to the base structure of the container, the vertical member being offset outwardly in a longitudinal direction from the cantilevered intermediate top corner fitting by a distance of more than 150mm measured between the centre of the top opening of the top corner fitting and the inner face of the vertical member, leaving the space on the longitudinally inner side of the vertical member and under the cantilevered intermediate top corner fitting open for allowing side access.

19. An open-sided freight container according to claim 18, in which the first end portion of the arm supports a horizontal beam extending across the top of the container.

20. An open-sided freight container according to claim 18 or 19 and also according to any of claims 1 to 17.

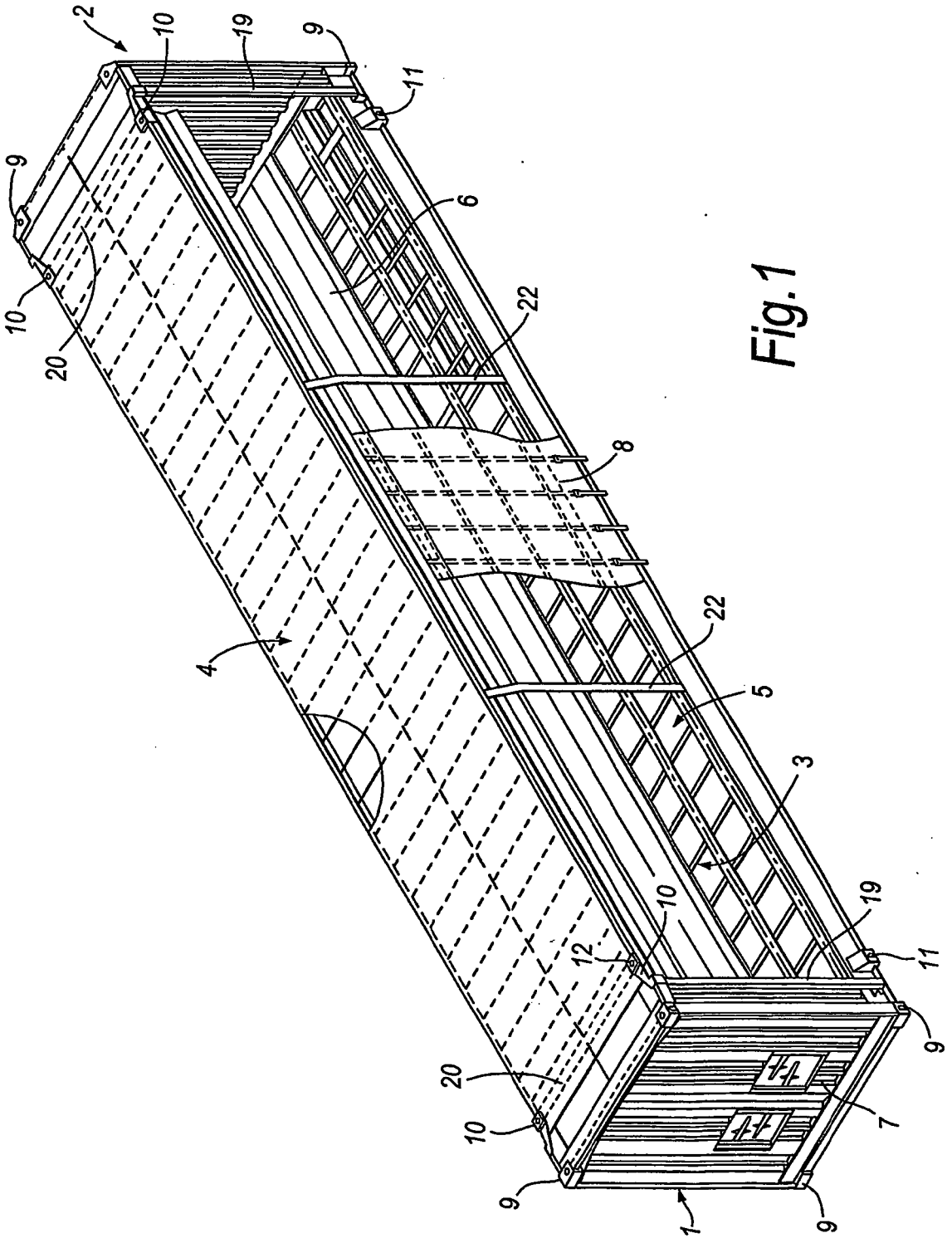

Fig.1

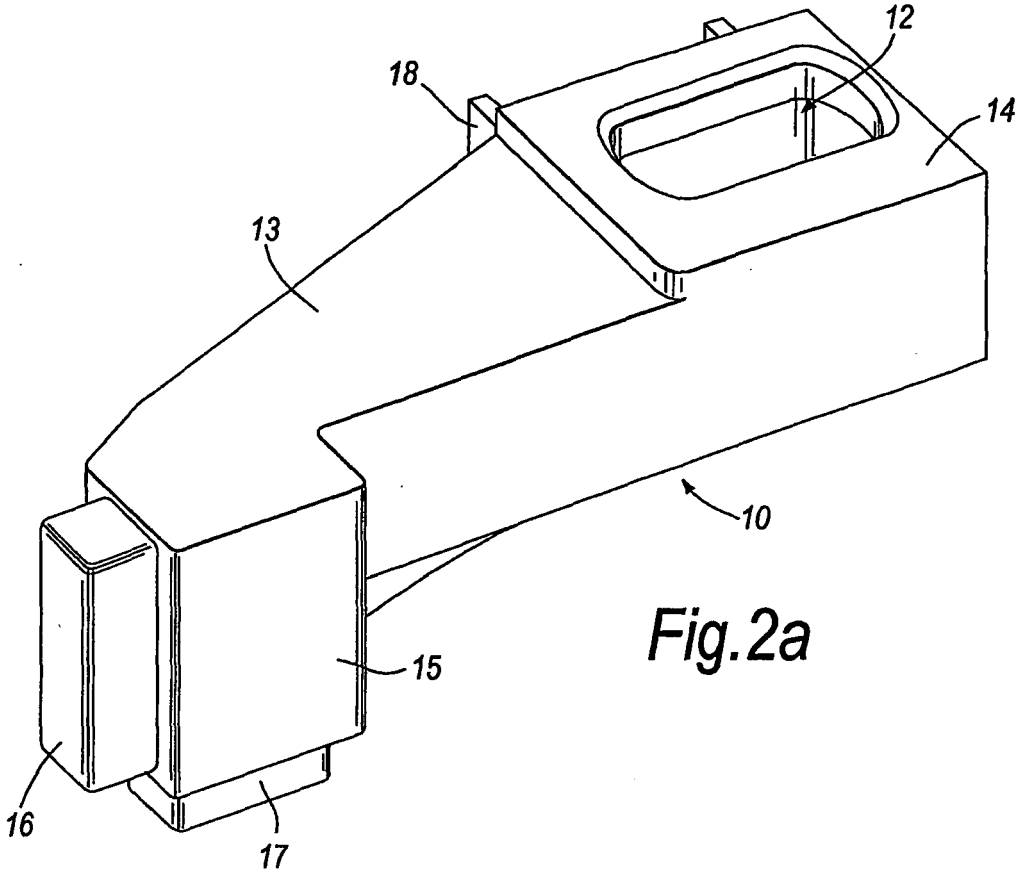

Fig.2a

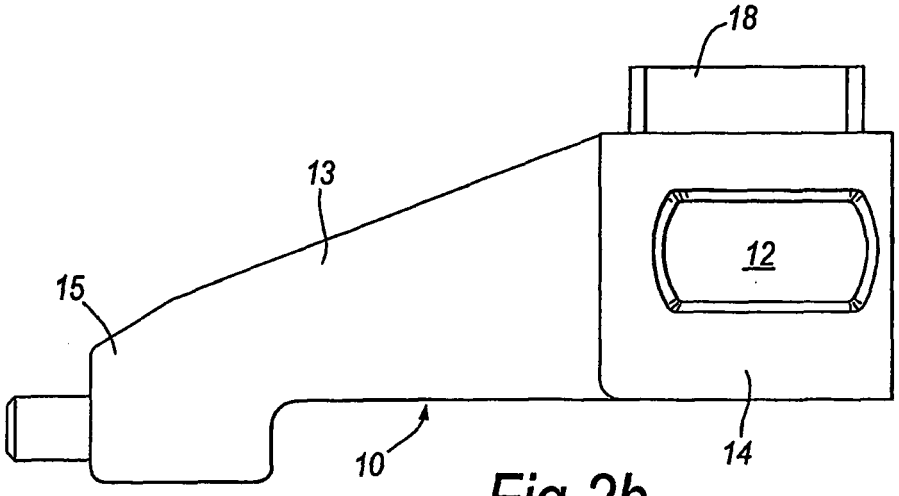

Fig.2b

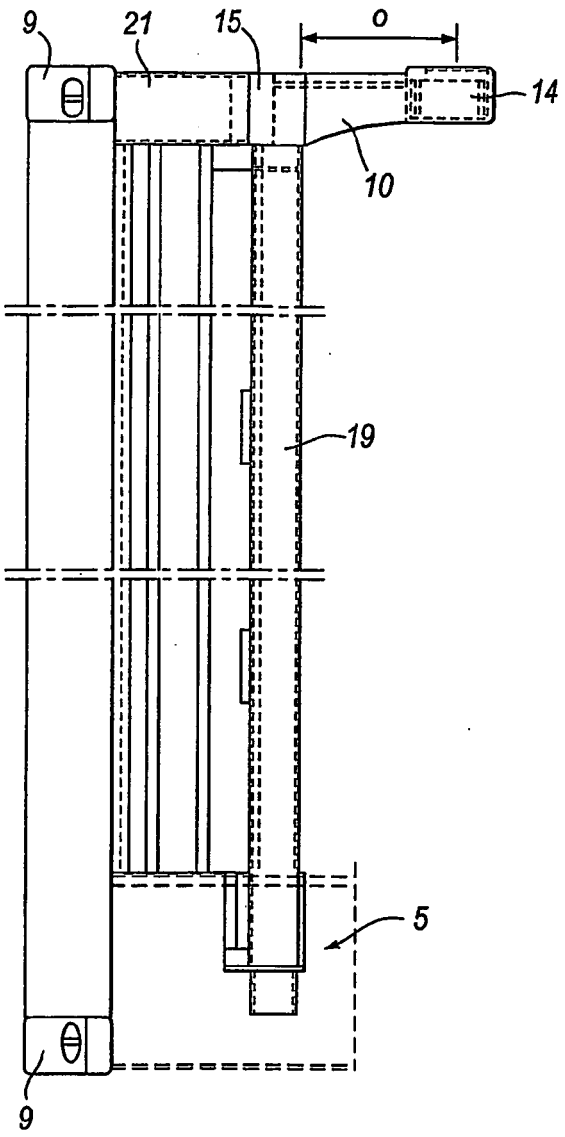

Fig.3

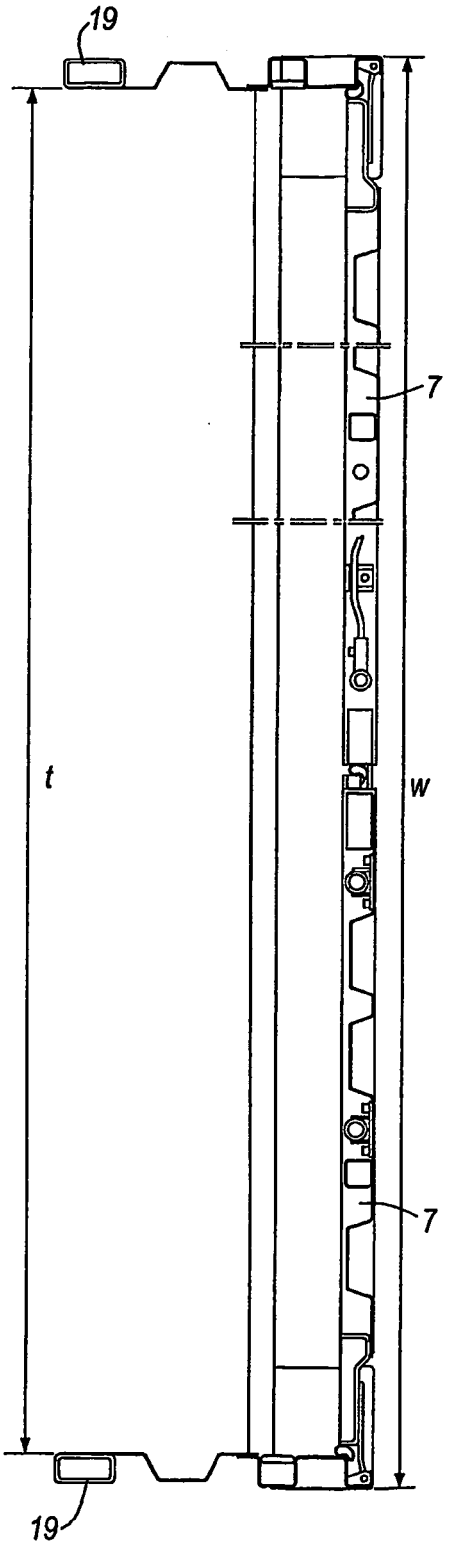

Fig.5

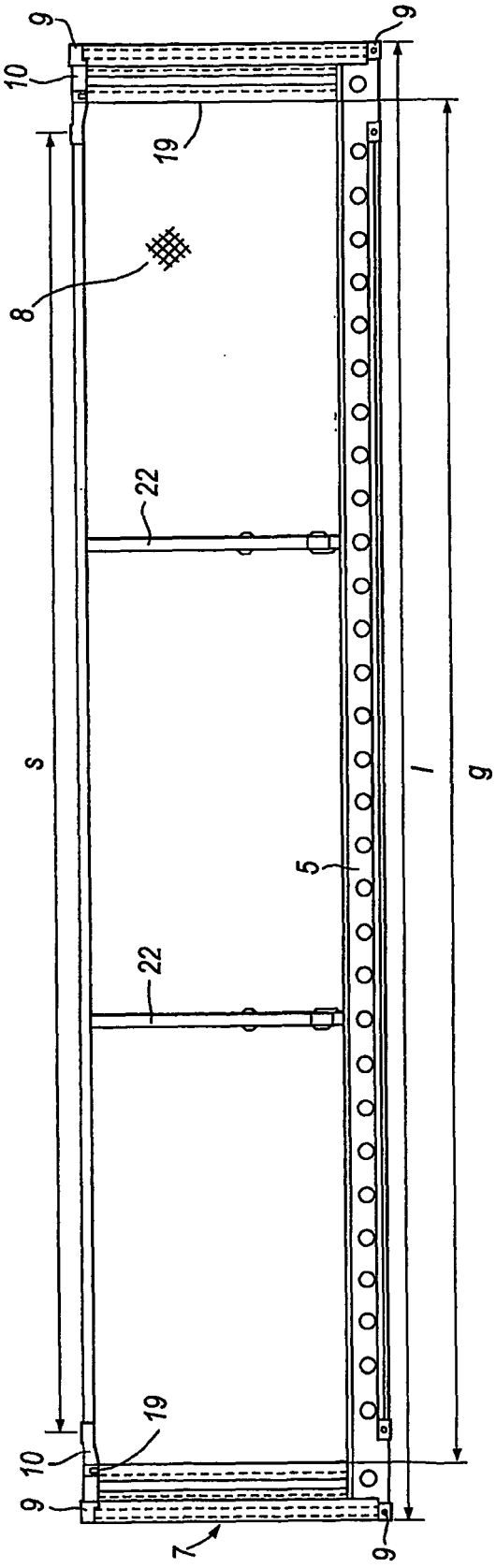

Fig.4

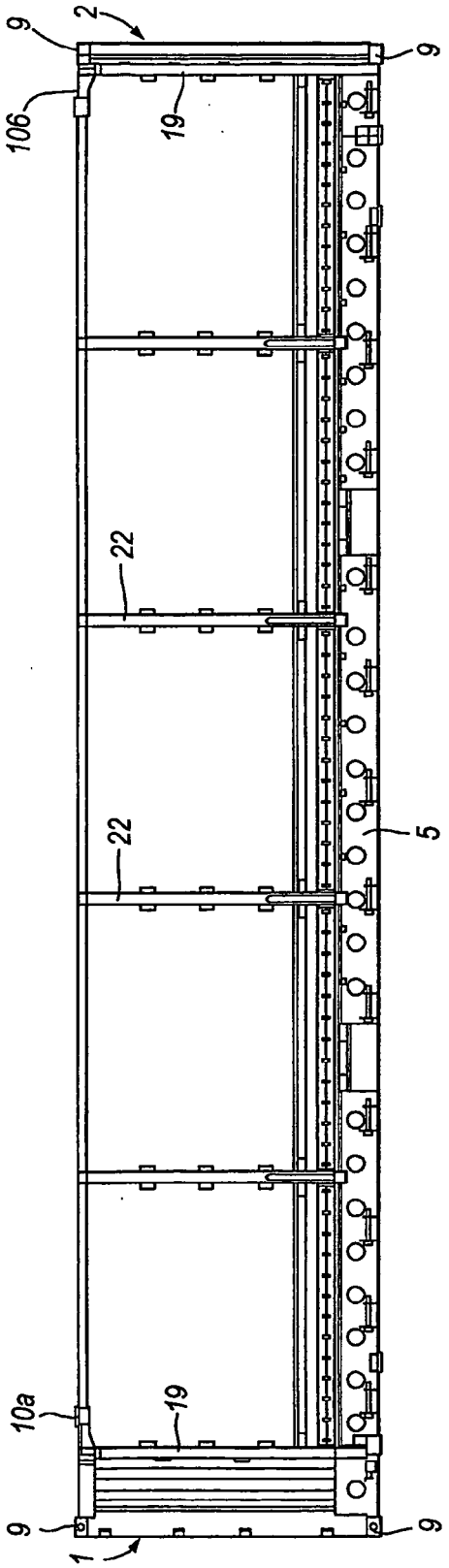

Fig.6