Freight Container

Background of the Invention

The present invention concerns freight containers. More particularly, but not exclusively, this invention concerns freight containers used to transport dense ore materials such as nickel ore and iron ore.

Prior art freight containers for transporting dense ore materials are often open-topped half-height 20 foot freight containers. A standard 20 foot freight container has an external height of approximately 8 foot, 6 inches (approximately 2.6m). Therefore, an example half-height freight container has an external height of approximately 4 foot, 3 inches (approximately 1.3m). The freight containers are usually filled with ore by a front loader simply tipping the ore into the container. Once the freight containers are loaded, they are transported to the desired location. The transportation of the freight containers may be via road or rail. It is common for the freight containers to be transported from a mining area to a port, where the ore is loaded onto large shipping vessels. Rather than transport the freight containers as well as the ore, the freight containers are often tipped by a tippler such that they pour their load into a hold of the large shipping vessel. Usual operation of a tippler includes the freight container being rotated 180 degrees in order to ensure all of the ore is removed from the container.

The operation of the tippler may cause problems for the freight container. High side-wall loads are imposed during the rotation of the freight container due to the large mass

of ore inside the freight container. Typically, the side walls of a freight container can withstand approximately 0.6 of the payload without undue dynamic deflection. Typically, the maximum payload of a 20-foot freight container is 28 tons, so the maximum side-wall load is approximately 17 tons. However, the load inside a freight container carrying ore may be up to 35 tons or more. During the tipping process, the whole of that load, or at least a significant part of it, is imposed on a side wall of the freight container. Therefore, there is a need for a container with stronger side walls.

Existing solutions include bracing the top of the freight container by using a transverse beam running from the top of one longitudinal side wall to the top of the other longitudinal side wall in the centre of the freight container. However, such a solution causes problems when loading the freight container as the bucket on a front loader containing the ore to be loaded is often tipped partly inside the freight container. A transverse beam at the same height as the top rails will obstruct the bucket.

Alternatively, the side walls of a freight container may be reinforced. However, this increases the weight of the freight container and can be a time consuming and expensive process.

The present invention seeks to at least partially mitigate the above-mentioned problems.

Summary of the Invention

The present invention provides a freight container comprising a base, a first longitudinal side wall, a second

longitudinal side wall, and two end walls at opposite ends of the freight container, and, away from the end walls of the freight container, a first beam attached from an upper region of the first longitudinal side wall to a lower region of the second longitudinal side wall and a second beam attached from an upper region of the second longitudinal side wall to a lower region of the first longitudinal side wall.

Advantageously, the first beam and second beam act to brace the first and second longitudinal side walls when they are under load, thus increasing the load bearing capacity of the first and second longitudinal side walls. Additionally, as the majority, or all, of the first beam and second beam are located below the top surface of the container, the first beam and second beam obstruct a bucket loading the container less, or not at all, when compared to a container with a traverse top beam.

Preferably, the space taken up by the first beam and second beam within the freight container is minimised in order not to significantly reduce the loading capacity of the freight container.

The first longitudinal side wall and second longitudinal side wall may each comprise a top rail and bottom rail. The first beam may be attached to the top rail of the first longitudinal side wall and bottom rail of the second longitudinal side wall. The second beam may be attached to the top rail of the second longitudinal side wall and bottom rail of the first longitudinal side wall. The first beam and second beam are not necessarily each single members.

The first beam and second beam may be connected to each other. Advantageously, connecting the first beam to the second beam increases the strength of the freight container. The connection between the first beam and second beam may be via welding or mechanical means, such as bolts. Especially where the connection between the beams is a welded connection, each beam may originally be formed of two separate members joined end to end at the connection. Whilst any such two separate members are preferably of the same cross section and aligned with one another, it is within the scope of the invention for them not to be of the same cross section and not to be aligned.

The first beam and second beam may form a unitary X-beam. The unitary X-beam may comprise a number of welded parts or even be a single casting.

There may be one or more reinforcement gussets between the first beam and second beam.

The first beam and second beam may be connected to the first longitudinal side wall and second longitudinal side wall approximately half way between the two end walls of the freight container. Advantageously, locating the first beam and second beam in the approximate centre of the container increases the strength of the container.

The freight container may comprise a removable roof structure. Advantageously, a freight container with a removable roof structure prevents or reduces pollution from the ore escaping during transport of the freight container when the removable roof is fitted. During loading and unloading of the freight container the roof may be removed.

The freight container may be a half-height freight container. A half-height freight container may have an

external height in a range between 1 metre and 2 metres. The freight container may be a 20 foot container. The freight container may include all of the standard ISO corner fittings that enable a freight container to be handled by standard lifting equipment. In alternative embodiments of the invention, the freight container may be any of a 20 foot, 40 foot, 45 foot, full or half-height freight container or other non-standard sizes.

The freight container may include a plurality of first beams and second beams, further increasing the strength of the freight container.

It will of course be appreciated that features described in relation to one aspect of the present invention may be incorporated into other aspects of the present invention.

Description of the Drawings

Embodiments of the present invention will now be described by way of example only with reference to the accompanying schematic drawings of which:

Figure 1 shows a schematic view of freight container according to a first embodiment of the invention;

Figure 2 shows a schematic plan view of a freight container according to the first embodiment of the invention; and

Figure 3 shows a schematic view of freight container according to a second embodiment of the invention.

Detailed Description

Figures 1 and 2 show a freight container 100 according to a first embodiment of the invention. The freight container comprises a base 102, a first longitudinal side wall 104, a second longitudinal side wall 106, and two end walls 108, 110, located at opposite ends of the freight container. The base, longitudinal side walls and end walls define an approximately cuboid-shaped space 112. At each of the corners of the freight container is a standard ISO fixing which allows the freight container to be handled by standard lifting equipment. In this embodiment, the freight container is a 20 foot, half-height container with the approximate dimensions 20 foot (6.058m) length, 8 foot (2.438m) width and 5 foot 11 inches (1.800m) height. The freight container also includes a series of rails running along the edges of the walls that make up the freight container, which give the freight container structural rigidity. The freight container also includes a first beam 116 attached to the top rail of the first longitudinal side wall 104 and the bottom rail of the second longitudinal side wall 106. The attachment is via welding and a gusset 122 is used at the attachment points to increase the strength of the connection. A second beam 118 is attached to the top rail of the second longitudinal side wall 106 and the bottom rail of the first longitudinal side wall 104. The second beam 118 is attached to the top and bottom rails in the same way as the first beam 116. The first beam 116 and second beam 118 are attached to the first longitudinal side wall 104 and second longitudinal side wall 106 approximately halfway along the longitudinal side walls. The first beam

116 and second beam 118 are also welded to one another with the use of additional strengthening gussets 120.

Figure 3 shows a second embodiment of the invention. The container is substantially identical to that as described for figures 1 and 2. The figure highly schematic with much detail removed in order to improve the clarity of the figure. The container also comprises a removable roof 124. The removable roof 122 may be removed from the container 100' when loading and unloading the container, and secured when transporting the container in order to reduce pollution, mostly in the form of dust, from escaping from the container.

In an alternative embodiment of the invention, the first beam and second beam may be arranged such that they are not connected to each other. In a yet further embodiment of the invention, the first beam and second beam may be connected to the upper region of the first longitudinal side wall and upper region of the second longitudinal side wall at positions lower than those shown with regards to figure 1.

The invention has been described in relation to a half-height 20 foot container. However, the invention may also be applied to any of a 20 foot, 40 foot, 45 foot, full or half height freight container or other non-standard container.

Whilst the present invention has been described and illustrated with reference to particular embodiments, it will be appreciated by those of ordinary skill in the art that the invention lends itself to many different variations

not specifically illustrated herein. By way of example only, certain possible variations will now be described.

Where in the foregoing description, integers or elements are mentioned which have known, obvious or foreseeable equivalents, then such equivalents are herein incorporated as if individually set forth. Reference should be made to the claims for determining the true scope of the present invention, which should be construed so as to encompass any such equivalents. It will also be appreciated by the reader that integers or features of the invention that are described as preferable, advantageous, convenient or the like are optional and do not limit the scope of the independent claims. Moreover, it is to be understood that such optional integers or features, whilst of possible benefit in some embodiments of the invention, may not be desirable, and may therefore be absent, in other embodiments.

Claims

1. A freight container comprising a base, a first longitudinal side wall, a second longitudinal side wall, and two end walls at opposite ends of the freight container, and, away from the end walls of the freight container, a first beam attached from an upper region of the first longitudinal side wall to a lower region of the second longitudinal side wall and a second beam attached from an upper region of the second longitudinal side wall to a lower region of the first longitudinal side wall.

2. A freight container as claimed in claim 1, wherein the first longitudinal side wall and second longitudinal side wall each comprise a top rail and bottom rail.

3. A freight container as claimed in claim 2, wherein the first beam is attached to the top rail of the first longitudinal side wall and bottom rail of the second longitudinal side wall.

4. A freight container as claimed in claim 2 or claim 3, wherein the second beam is attached to the top rail of the second longitudinal side wall and bottom rail of the first longitudinal side wall.

5. A freight container as claimed in any preceding claim, wherein the first beam and second beam are connected to each other.

6. A freight container as claimed in any preceding claim, wherein the first beam and second beam form a unitary X-beam.

7. A freight container as claimed in any preceding claim, wherein the first beam and second beam are connected to the first longitudinal side wall and second longitudinal side wall approximately half way between the two ends of the container.

8. A freight container as claimed in any preceding claim, comprising a removable roof structure.

9. A freight container as claimed in any preceding claim, wherein the height of the container is between 1 metre and 2 metres.