

TRANSLATION
FREIGHT CONTAINER

(10)

The invention relates to a freight container according to the preamble of claim 1.

A corner fitting for a freight container of this type is described in European patent application publication number 54 881. It is explained there, among other things, how a corner fitting can be produced from a circular or square blank having a circular or square central opening by bending steps, with two quadrants of the blank overlapping each other to form one surface of the corner fitting. In one embodiment, the opening in the corner region facing away from the container is formed merely by a cut which results in a bent, beak-like projection extending outwardly from this corner, a hole being provided in the same edge below this projection, through which hole the tip of a crane hook inserted behind the projection can exit. Moreover, the walls of the corner fitting according to the earlier patent application are provided with holes which serve for inserting special devices for the lateral coupling of adjacent containers, just as with the conventional corner fitting according to ISO Standard 1161.

German Offenlegungsschrift 2 942 104 discloses freight containers which - disregarding the corner opening - also correspond to the preamble of claim 1.

In order to enable manipulation of containers by means of fork trucks it is usual to provide channels for insertion of the truck arms at the container bottom between the corner fittings. On the one hand, such channels reduce the useful volume available inside of the space defined by the corner fittings; on the other hand, they require additional structural elements which increase the manufacturing costs and the weight of the container.

The invention is based on the object of providing a freight container which permits manipulation by fork trucks without additional structural elements.

The solution of said object in accordance with the invention is specified in claim 1. Accordingly, the section elements constituting the container frame are themselves used as truck channels, and the corner fittings where three respective section elements meet are so designed that the truck channels, which have open end faces, are accessible through the corner fittings. When all section elements are formed as truck channels, such a container may be received on the arms of a fork truck from any of its four sides and in any position, i.e., in the horizontal position, standing-up and upended.

With a view to this universal manipulation, the section elements according to claim 2 are hollow section elements having preferably substantially square or circular cross-section. This design offers the advantage of increased flexural strength relative to the flat cross-sections of conventional truck channels. Alternatively, it is also possible to use section elements of L-shaped cross-section, wherein only the respective two upper section elements of a container may be used as truck channels.

The further development of the invention according to claim 4 offers the advantage that the corner fittings

present as much area as possible for welding of the section elements, while there is maximum utilization of the corner opening. The radiused corners of the corner opening are in favour of close pressing and locking of
5 inserted crane hooks upon application of diagonal tension. The further development of the invention according to claim 5 also offers the advantage that the corner fittings present relatively large surfaces for joining to the edge elements.

- 10 The embodiment of the invention according to claim 6 is advantageous in that the openings of the corner fittings, which openings are suitable for the insertion of crane hook tips or coupling elements, are positioned in the dimensionally particularly stable edge portions. The
15 double thickness of material achieved according to claim 7 results in a particular strength of these openings under load. The edge holes formed by the cutouts mentioned in claims 6 and 7 may furthermore be used advantageously for the insertion of pins or hooks which are
20 either inserted into the ends of fork truck arms or may be fixedly connected thereto, whereby a reliable retaining on the arms of the fork truck may be achieved even if those arms - like the upper hooks of container side spreaders - are inserted only for a short distance into
25 the corner fittings and section elements.

An additional strengthening of the container corner portion is obtained by the further development of the invention according to claim 8, wherein the further development according to claim 9 is advantageous in that

the trimmings obtained in the fabrication of the corner fittings are utilized. An especially good strengthening is achieved in the embodiment of the invention according to claim 10.

5 Preferred embodiments of the invention will be explained in detail with reference to the accompanying drawing, in which:

- 10 Figure 1 is a perspective view of the section elements forming a container corner and welded to a corner fitting;
- Figure 2 is a side view of the arrangement shown in Figure 1;
- Figures 3 are modifications of the arrangement shown and 4 in Figure 2; and
- 15 Figure 5 is a perspective view of a container corner shown from inside to illustrate a further embodiment of an attachment fitting.

 Figures 1 and 2 show the structural members forming a left-hand bottom corner area of a cargo container, said

20 members including a corner fitting 30, three section elements 31, 32, 33 which constitute three parts of a container frame and extend perpendicularly to each other, and an attachment fitting 34 (shown only in Figure 2) reinforcing the corner fitting. The corner fitting

25 comprises three wall members 21, 22, 23 which extend perpendicularly to each other and together define a corner opening 24. The corner fitting 30 may be made from a flat blank by edge-forming and welding or by pressing,

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drawing or any other forming process. The attachment fitting 34 is that piece of material which is obtained on cutting the corner opening 24 from the corner fitting 30. Each of the three edges of the corner fitting 30 further 5 is provided with an edge hole 25 cut out of two adjacent wall elements.

The three section elements 31, 32, 33 are inserted into the edge portions of the corner fitting 30 to such an extent as to terminate shortly before the corner opening 10 24. Each of said section elements is in turn provided with an edge hole 26 substantially in alignment with the corresponding edge hole 25 of the corner fitting 30. In this position the section elements 31, 32, 33 are welded to the corner fitting 30 at the locations indicated in 15 Figure 2. The attachment fitting 34 is disposed such that its two vertical side faces partially engage the vertical inner faces of the section elements 31 and 33 and are also welded thereto. If required, the joint between the attachment fitting 34 and the vertical section element 32 20 may be effected through an additional member (not shown in the drawing). If the relatively adjacent vertically extending edges of the attachment fitting 34 and of the vertical section element 32 are not excessively radiused, both members may also be directly welded at these edges.

25 The section elements 31, 32, 33 are designed as hollow section elements having substantially square cross-section. The corner opening 24 of the corner fitting 30 is formed by three substantially square cutouts disposed in the individual wall members 21, 22, 23, wherein the

corner of each cutout facing away from the common corner is radiused. These square faces are somewhat larger than the clear cross-section of the section elements 31, 32, 33, so that the section elements may be used as fork-
5 truck channels and their full cross-section is accessible through the corner opening 24. The outer shape of the three wall members 21, 22, 23 forming the corner fitting 30 respectively corresponds to the quadrant of a circle, the centres of the circles coinciding in the (imaginary)
10 corner of the corner fitting 30.

When all eight corners of a container are set up in accordance with the illustration shown in Figures 1 and 2, the container may be lifted by means of a fork truck in any desired position and from any side, because the
15 truck arms may be inserted in any of the three directions through any corner fitting into the truck channel formed by the respective section element 31, 32, 33. On account of the square cross-sections of the truck channels, which are provided for reasons of symmetry, it is advantageous
20 when the truck arms or fork tines, respectively, also have square cross-section. As compared to the normally flat tine cross-sections this is beneficial because of the increased flexural strength.

To manipulate the container by means of a fork truck,
25 the truck arms may be inserted into the two lower or the two upper corner fittings and the section elements provided behind the same to a correspondingly great distance. Instead thereof it is also possible to insert two substantially shorter fork arms or ram attachments

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- into the two upper corner fittings and section elements to a relatively short length and to secure them by retention pins which are inserted through the edge holes 25, 26 into corresponding recesses in the truck arms or
- 5 which are fixedly secured at an appropriate spacing from the arms at the truck-side end of the arms. Further, it is also possible to insert comparatively short ram attachments into all four corner fittings facing the fork truck and into the section elements disposed behind
- 10 the same, wherein also in this case side spreaders are employed. In that case the friction of the four ram attachments within the four section elements will provide for an even more reliable retaining of the container on the fork truck.
- 15 Finally, two parallel coupling rods may be inserted through the lower corner fittings and mutually aligned hollow section elements of a plurality of containers arranged one behind the other. A thus coupled unit could be mounted on axial members without a platform or undercarriage. The saving in weight
- 20 achieved by this concept is evident.

Instead of the section elements shown in Figures 1 and 2, which have substantially square hollow section, it is also possible to employ those having circular hollow section. In this case also the arms or tines of the fork

25 truck or side spreader, respectively, should have circular cross-section, as is known for manipulating paper rolls or the like.

Furthermore it is also possible to use L-section elements as elements 31, 32, 33, which are disposed in the usual

30 manner so that their edges form the outer edges of the container frame. In that case only those section elements may be used as truck channels which in the respective container position are the upper section elements.

To lift the container by means of crane hooks, the hook is inserted through the corner opening 24 in such a way that its tip will exit through that edge hole 25, 26 which is positioned in the direction of tension of the 5 crane cable. The radiused shape shown in Figures 1 and 2 of the corner opening 24, which for the rest is formed by square faces, causes that portion of the crane hook which is adjacent the point of contact of the cable to press close into the rounded portion, whereby it is centred in 10 a position in which it is secured against dropping when the cable is slack.

Upon coupling of containers which are either in side-by-side relationship or stacked upon each other it is possible to insert coupling elements through the corner 15 openings 24 or through the edge holes 25, 26 of the respective directly adjacent corner fittings 30 of the two containers, wherein these coupling elements may be additionally secured through the respective other holes or openings.

20 The embodiment according to Figure 3 differs from that according to Figures 1 and 2 in that the corner opening 24' is defined by three quarter circles whose radius is substantially equal to the diagonal of the interior cross-section of the section elements 31, 32, 33. The 25 wall members, of which Figure 3 shows particularly the wall member 23, are reduced to a relatively narrow ring which extends only to a portion of the edge holes 26 formed in the section elements 31, 32. In these edge regions the corner fitting according to Figure 3 is 30 provided with edge cutouts 25'.

Whereas in the corner fitting 30 according to Figures 1 and 2 the edge holes 25, 26 are each defined as a semi-circle in the two contiguous wall members (wherein the edge hole 25 formed in the corner fitting is somewhat larger than the edge hole 26 in the section elements in order to accommodate tolerances in the mutual alignment), it is also possible to define the edge hole 26' in the section elements by a right-angled or inclined cutout as indicated in dashed lines in Figure 3. With a view to modes of fabrication, a straight cutout extending across the edge of the section element is particularly advantageous.

Figure 3 does not show an attachment fitting. Furthermore, the section elements are inserted into the corner fitting 30' only to a short distance. This configuration of the container corner therefore requires little material and is of lightweight construction, which may be useful and beneficial in the case of small containers.

In the further modification shown in Figure 4, the wall members of the corner fitting 30" have an even more reduced width of material. In this case the corner fitting terminates outside of the edge holes 26" provided in the section elements 31, 32. To increase the rigidity or strength, an attachment fitting 34 is again provided, which in this case is inserted in such a way that its vertical surface, which faces the viewer, engages the wall member 23" and is welded thereto, whereas the other two surfaces of the attachment fitting 34 are welded to the top surface of the section element

31 and the inner right-hand surface of the section element 32, respectively. In that case a joint between attachment fitting 34 and the third section element 33 may again be provided by means of an additional structural member (not shown).

Figure 5 shows a different attachment fitting 35, which consists substantially of an equal-sided flat plane member including bent trapezoidal portions on all three sides. The equal-sided area of the triangle extends substantially perpendicularly to the body diagonal of the container corner defined by the three section elements 31, 32, 33. The trapezoidal portions are bent opposite to the equal-sided area towards the corner so that their side edges engage the inner faces of the section elements 31, 32, 33 and are welded thereto. With the attachment fitting 35 it is possible to achieve a uniform and reliable bracing relative to all three section elements.

The design characteristics described above for the three embodiments shown in the drawing may be varied in accordance with requirements. Thus, an attachment fitting may also be used in the embodiment shown in Figure 3. In each case the attachment fitting may be designed in accordance with Figures 2 and 4 or Figure 5. Furthermore, in all cases the corner fitting may be formed of triangular or even square wall elements instead of the quadrants of a circle as shown. Similarly, the corner opening 24 of the corner fitting may in each case be formed of square cutouts with a radiused corner according to Figures 1 or 2, or of quarter-circle shaped cutouts according to Figures 3 and 4, or even of triangular cutouts.

PATENT CLAIMS

1. Freight container comprising section elements (31, 32, 33) forming the container frame, and corner fittings (30) joined to the ends of the section elements, each of said corner fittings including three wall members (21, 22, 23) defining the corner and forming a common corner opening (24), c h a r a c t e r i z e d in that at least a pair of said section elements (31, 32, 33) is configured as fork truck channels with open ends, that the corner opening (24) is dimensioned so as to leave free the clear opening of each fork truck channel in the extension thereof, and that each section element (31, 32, 33) terminates outside of the extensions of the clear openings of the respective other truck channels.

2. Freight container as claimed in claim 1, characterized in that the section elements (31, 32, 33) are hollow-section elements with substantially square or circular cross-section.

3. Freight container as claimed in claim 1, characterized in that the section elements are of L-shaped cross-section, the edges thereof forming the outer edges of the container.

4. Freight container as claimed in any of the claims 1 to 3, characterized in that the corner opening (24) forms



a square in each of the respective three wall members (21, 22, 23) of the corner fitting (30), the corner of said square opposite to the outer corner of the corner fitting being formed with a radius.

5. Freight container as claimed in any of the claims 1 to 4, characterized in that each of the three wall members (21, 22, 23) of the corner fitting (30) has the shape of a quarter circle, the centres of the circles coinciding in the outer corner of the corner fitting.

6. Freight container as claimed in any of the claims 1 to 5, characterized in that the end portions of the section elements (31, 32, 33) each are formed with a cutout (26) in the edge defining an outer edge of the container frame.

7. Freight container as claimed in claim 6, characterized in that the edges of the corner fittings (30) each are provided with a cutout (25) substantially in alignment with the cutout (26) of the respective section element (31, 32, 33).

8. Freight container as claimed in any of the claims 1 to 7, characterized by an attachment fitting (34) which joins the ends of the section elements (31, 32, 33) at locations facing away from the respective corner fitting (30).





9. Freight container as claimed in claim 8, characterized in that the attachment fitting (34) is the piece of material of a corner fitting (30) obtained upon cutting of the corner opening (24).

10. Freight container as claimed in claim 8, characterized in that the attachment fitting (35) is a plane piece which extends generally transversely to the body diagonal of the corner fitting (30) and is joined to inner faces of the section elements (31, 32, 33).

