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⑤⁴ **Frame bulkhead for standard transport containers and method of transporting bulk loads in a standard transport container provided with a flexible lining.**

⑤⁷ A rigid frame assembly for use as a removable bulkhead in standard transport containers fitted with a flexible liner bag for use in transporting bulk loads of granular or powder material, such as skim milk powder, chocolate crumb, refined sugar etc., comprises two side elements (1,2) each having engagement lugs (9) which extend downwardly from the lower end of each side element, and engage into corresponding slots in the floor (11) of a container (10), while the upper end of each side element engages with the roof (12) of the container, adjacent to the container opening. The side elements (1,2) are of such dimension that when positioned one in each lateral side of the container opening they partly close the opening but define between them a passage through which an operator can pass during loading of the container. A central element (3) fits between and engages with the side elements (1,2) to close or partly close off the passage, thereby defining in the frame assembly a loading (15) and/or a discharge (16) aperture. Suitably each element of the frame is made by joining two spaced apart uprights (4,5) or (6,7) by cross-planks (8) and constructed from aluminium.

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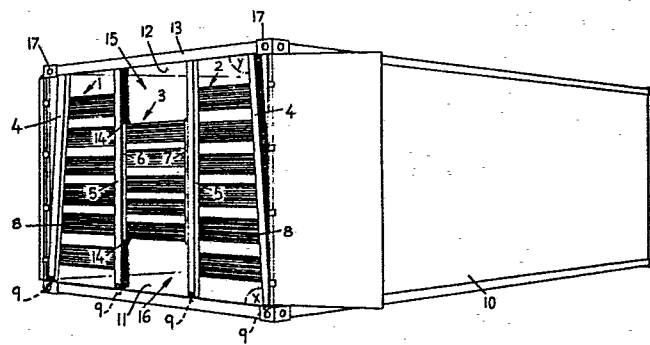


FIG. 3

TITLE MODIFIED

see front page

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Frame bulkhead for standard transport containers

This invention relates to a rigid frame assembly for use as a removable bulkhead in standard transport containers, particularly when the container is employed to transport bulk commodities in granular or powder form.

The system of transporting commodities in standard containers is well known, but when dry bulk materials such as skim milk powder, chocolate crumb, refined white sugar etc., are concerned, special handling equipment and methods of filling and emptying containers have been developed. Examples of these are described in British Patent Specification No. 1,439,019 and Canadian Patent Specification No. 948,039. Firstly, a liner bag of strong plastics material is placed inside the container which is then inflated and filled with the bulk commodity. A timber frame supports the load at the open end of the container during filling, and is kept in position adjacent to the doors of the container during transit. At the emptying point the bag is cut and the load is tipped into a receiver. The frame may then be removed and is ready for re-use.

A frame bulkhead constructed from timber has many disadvantages. It is not always safe for loads in excess of 17 tonnes, and collapse during loading is dangerous to operators and, of course, loss of the commodity

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is to be avoided. It is also subject to breakage in transit which causes difficulties at unloading. This frequently happens when a spacer beam between the frame and the container doors is not fitted properly or is omitted altogether. Fitting a wooden frame involves the use of nails and wedges, and must be carried out from the inside of the container so that the operator has to climb out through a narrow gap in the frame. Also, the wedges and nails can fall into the commodity during unloading. Although wooden frames are cheap to construct, recycling has generally been found to be uneconomic. Return journey costs are high as only about 35 wooden frames can be accommodated in a standard 20' container.

It is an object of the present invention to overcome many of the disadvantages of known frame bulkheads, and to provide a bulkhead which affords greater flexibility during use.

According to the invention a rigid frame assembly for use as a removable bulkhead in standard transport containers adapted for use in transporting bulk loads of granular or powder material is characterised in that the assembly comprises two side elements each having engagement means whereby the lower end of each side element is adapted to engage with the floor portion of a container while the upper end of each side element is engageable with the roof portion of the container, adjacent to the container opening, and wherein the side elements are of such dimension that when positioned one in each lateral side of the container opening they partly close the opening but define between them a passage through which an operator can pass freely during loading of the container, and a central element which is adapted to fit between and engage with the side elements to close or partly close off said passage but which defines in the frame assembly at least one aperture for discharge and/or loading. Preferably, each side element comprises two spaced apart uprights which are of channel-section and which are joined together by transverse planks. The channel openings of the uprights face laterally outwardly from each side element such that when two side elements are positioned one to each side of a container opening, the channel opening

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of one element faces towards the channel opening of the opposite element, and the channels are adapted to receive the lateral side edges of the central element. Preferably, the channels are provided with lip portions which are adapted to engage with a portion of an angle section forming the lateral side edges of the central element.

Suitably, the side elements and central element are made from aluminium or a suitable lightweight but strong metal alloy.

In a preferred embodiment the laterally outermost upright of each side element is inclined at an angle towards the opposite upright so as to provide clearance between the top of each side element and any internal projections from the roof of the container.

Advantageously, there may also be provision for loading and discharging attachments to the frame assembly of the invention.

A preferred embodiment of the invention will now be described in detail by way of example only with reference to the accompanying drawings, wherein:

Figure 1 is a front view of the three elements of a rigid frame assembly according to a preferred embodiment of the invention;

Figure 2 is an enlarged cross-section along the line A - A as shown in Figure 1;

Figure 3 is a perspective view of a standard container showing the operative position of a rigid frame assembly according to a preferred embodiment of the invention.

Referring to Figures 1 and 2 of the drawings, a rigid frame assembly for use as a bulkhead in standard containers comprises side elements 1 and 2 and a central element 3 preferably constructed from extruded aluminium sections such that the side members 4 and 5 of the elements 1 and 2 are of channel section, and the side members 6 and 7 of the central element 3 are of angle section, as shown in Figure 2. A plurality of equally

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spaced corrugated aluminium cross planks 8 are bolted to the side members 4 and 5 of the elements 1 and 2, and also to the side members 6 and 7 of the central element 3.

The positioning of the frame assembly of the invention within a standard container 10, will now be described with reference to Figure 3 of the drawings. Firstly, the two side elements 1 and 2 are fixed in position to each side of the container opening by placing lugs 9, which extend downwardly from the ends of each of the side members, into corresponding slots in the container floor 11. The tops of the side members 4 and 5 rest against the inside of the container roof 12, and roof edge 13. The tops of the side members 4 and 5 may be clamped in position with G-clamps (not shown). The two side elements, when in position, define an opening through which an operator can pass freely to assist in loading or discharging granular or powder material into a flexible lining positioned within the container. The flexible lining is preferably in the form of a large plastics bag which is fitted by battens or the like to the floor of the container. The mouth of the bag is disposed towards the opening in the container. The bag is filled with the powdered material e.g. by means of a pneumatic blower which blows the material through a nozzle inserted into the bag. The nozzle must initially be inserted as far back in the bag as possible to ensure that the front portion of the container is filled and for this purpose it is necessary for the operator to have easy access into the container to position the nozzle correctly and ensure it does not tear the bag. When the bag has been partly filled the operator can leave the container through the opening between the two side elements. The central element can then be fitted to complete the frame assembly.

The central element 3 may be engaged with the side members 5 by first inserting the side member 6 of the central element into the channel portion of members 5 of element 1. The channel portion of member 5 is sufficiently deep (see Figure 2) to permit the side member 6 to move laterally within the channel thus permitting the insertion of the oppo-

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site side member 7 of the central element to be similarly inserted in the channel of the opposite side member 5 of element 2. The side members 6 and 7 are of angle section (e.g. L-shaped in cross-section), and the forwardly extending portion 6a of each angle section engages with a lip portion 5a of each of the channel members 5. It will be appreciated that as the liner bag is filled with powdered material the load will press against the central element 3 thus tending to keep the portion 6a in tight engagement with the lip portions 5a which in turn prevent any lateral movement of the central element 3. The central element 3 is further held in position by brackets 14 which are fixed to the insides of the channel sections of the side members and prevent upward or downward movement of the central element relative to the side elements 5. The container may be filled with a commodity through a loading aperture 15 in the frame assembly above the central element, and an aperture 16 below the central element is used to discharge the commodity.

The outer side members 4 of the frame assembly are inclined at an angle x to the floor 11 of the container, approximately equal to $88\frac{1}{2}^{\circ}$, and make a complementary angle y approximately equal to $91\frac{1}{2}^{\circ}$ with the roof 12 of the container. This inclination affords sufficient clearance between the topmost corners of the frame assembly (i.e. the tops of side members 4) and any internal projections on the roof of the container associated with handling corners 17 of the container. Containers of different manufacture tend to have slight variations in design, which are all accommodated.

It may be advantageous to provide for a loading attachment to fit over the space above the central element of the frame assembly, which consists essentially of a bracket to hold an inlet pipe and an exhaust pipe.

Preferably, a clip-on aluminium sheet is provided to cover the discharge aperture 16, to prevent the liner from ballooning out through the aperture when inflated. The sheet is removed after filling. This obviates the need for the polythene strip fitted across the discharge aperture of some wooden frames already in use.

It may also be advantageous to provide for various discharge attachments such as a gravity discharge funnel, a screw conveyor, a discharge funnel

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or a pneumatic conveyor.

Apart from the advantages over wooden frames already in use of greater flexibility in the provision of attachments, the frame of the present invention when broken into three elements may be stacked in a smaller space. At least 60 can easily be returned in a standard 20' container.

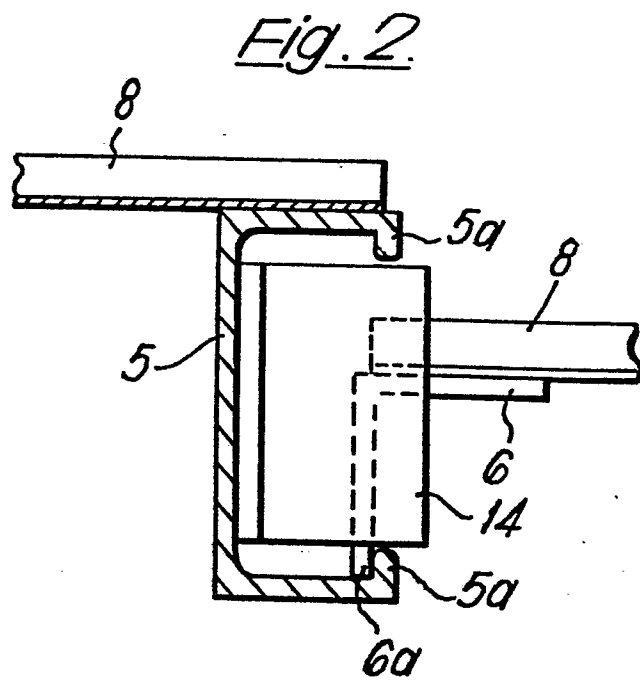
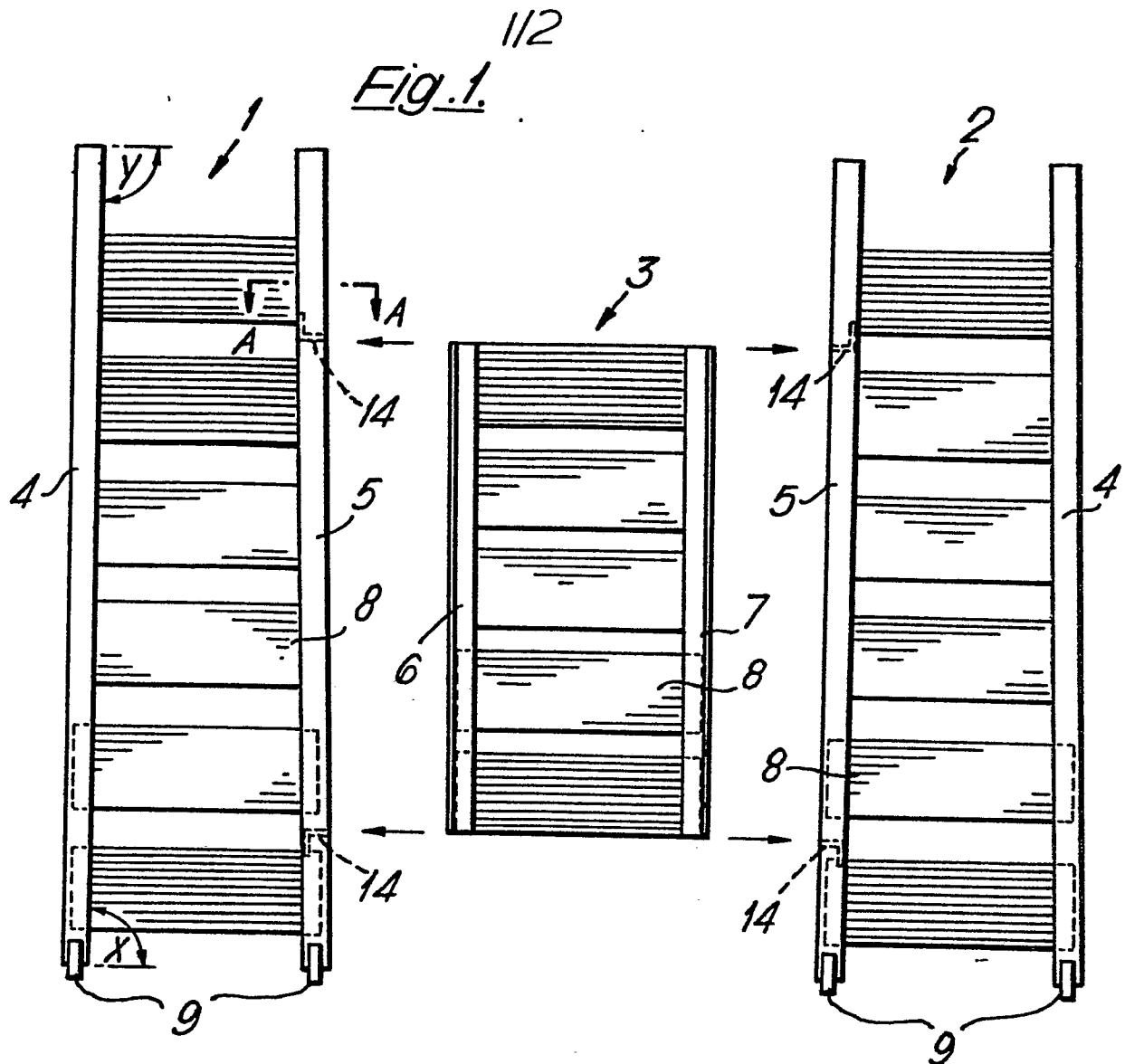
CLAIMS

1. A rigid frame assembly for use as a removable bulkhead in standard transport containers adapted for use in transporting bulk loads of granular or powder material is characterised in that the assembly comprises two side elements (1, 2) each having engagement means (9) whereby the lower end of each side element is adapted to engage with the floor portion (11) of a container (10) while the upper end of each side element is engageable with the roof portion (12) of the container, adjacent to the container opening, and wherein the side elements (1, 2) are of such dimension that when positioned one in each lateral side of the container opening they partly close the opening but define between them a passage through which an operator can pass freely during loading of the container, and a central element (3) which is adapted to fit between and engage with the side elements (1, 2) to close or partly close off said passage but which defines in the frame assembly at least one aperture (15, 16) for discharge and/or loading.
2. A rigid frame assembly as claimed in claim 1, wherein each side element (1, 2) comprises two spaced apart uprights (4, 5) joined together by transverse planks (8).
3. A rigid frame assembly as claimed in claim 2, wherein the two spaced apart uprights (4, 5) are of channel-section.
4. A rigid frame assembly as claimed in claim 3, wherein channel openings of the uprights (4, 5) face laterally outwardly from each side element, such that when two side elements (1, 2) are positioned one to each side of a container opening, the channel opening of one element (1) faces towards the channel opening of the opposite element (2), and the channel openings are adapted to receive lateral side edges (6, 7) of the central element (3).
5. A rigid frame assembly as claimed in claim 4, wherein the channels are provided with lip portions (5a) adapted to engage with a portion (6a) of an angle section (6) forming the lateral side edges (6, 7) of the central element (3).

6. A rigid frame assembly as claimed in any preceding claim, wherein the side elements (1, 2) and the central element (3) are made from aluminium or a suitable lightweight but strong metal alloy.

7. A rigid frame assembly as claimed in any preceding claim, wherein laterally outermost uprights (4) of each side element (1, 2) are inclined at an angle (x) towards the opposite upright (5) so as to provide clearance between the top of each side element and any projections from the roof portion (12) of the container.

8. A method of transporting bulk loads of granular or powder material in a standard transport container provided with a flexible lining positioned within the container including the steps of fixing side elements (1, 2) in position one to each side of the container opening by placing engagement means (9), which extend downwardly from the ends of each of the side elements, into corresponding slots in the container floor (11), and resting the tops of the side elements against the inside of the container roof (12), thereby partly closing the opening but defining between them a passage through which an operator can pass freely during loading of the container, engaging the central element (3) between opposite uprights (5) of the side elements (1, 2) by first inserting one lateral side edge (6) of the central element (3) into a channel opening of one of the said opposite uprights (5) so that a portion (6a) of the lateral side edge (6) engages a lip portion (5a) of the channel opening, and then inserting the other lateral side edge (7) of the central element (3) into the other said opposite upright (5), whereby when the load of granular or powder material presses against the central element (3), the portions (5a, 6a) are kept in tight engagement.



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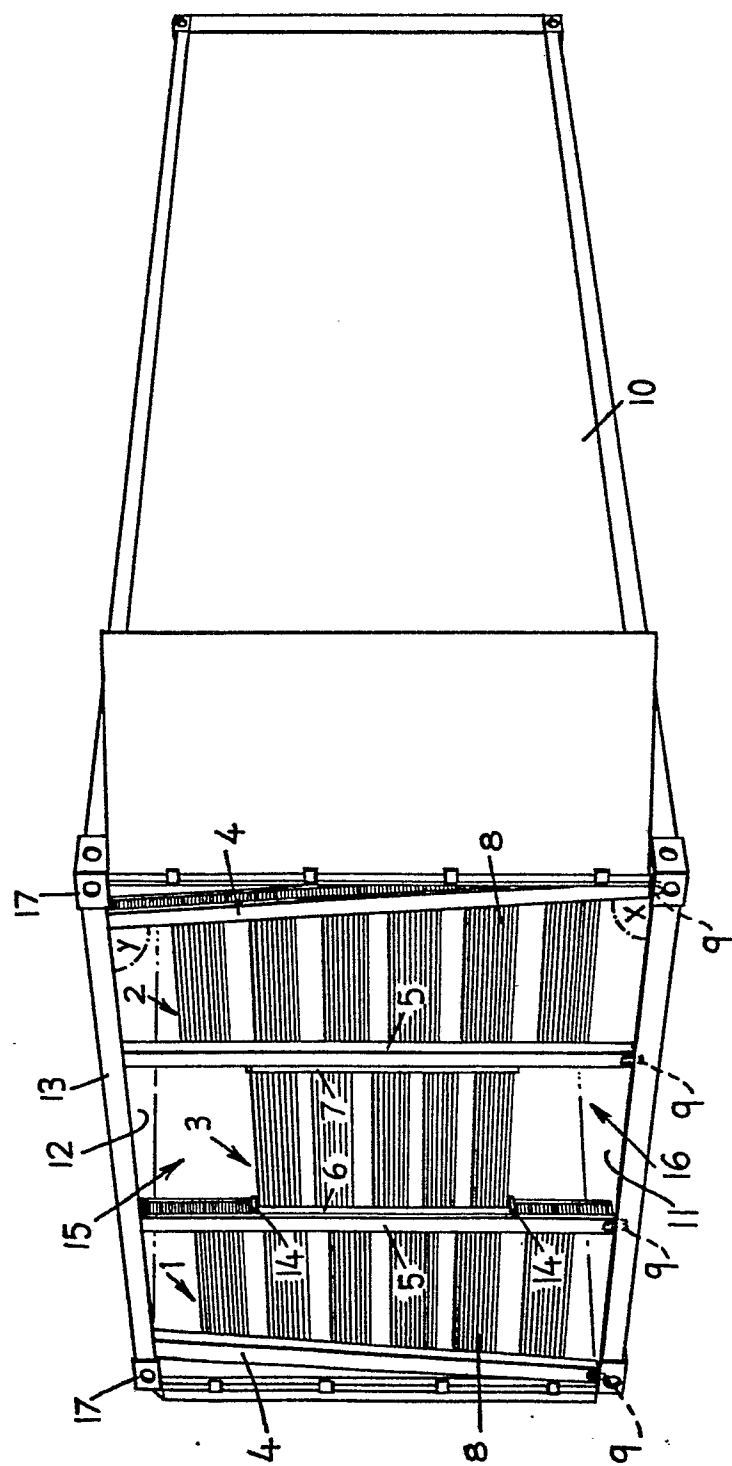


FIG. 3.



European Patent
Office

EUROPEAN SEARCH REPORT

0021814
Application number
EP 80 30 2097

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>FR - A - 2 199 733</u> (MONTECATINI)	1	B 65 D 90/04
A	<u>DE - A - 2 113 684</u> (SEA-LAND)	1	
A	<u>DE - A - 2 441 683</u> (GOLD & SILBER)		
A	<u>US - A - 3 951 284</u> (DU PONT)		
D, A	& GB - A - 1 439 019		
D, A	& CA - A - 948 039		

			TECHNICAL FIELDS SEARCHED (Int.Cl. ³)
			B 65 D
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
☒ The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 02-09-1980	Examiner BAETENS