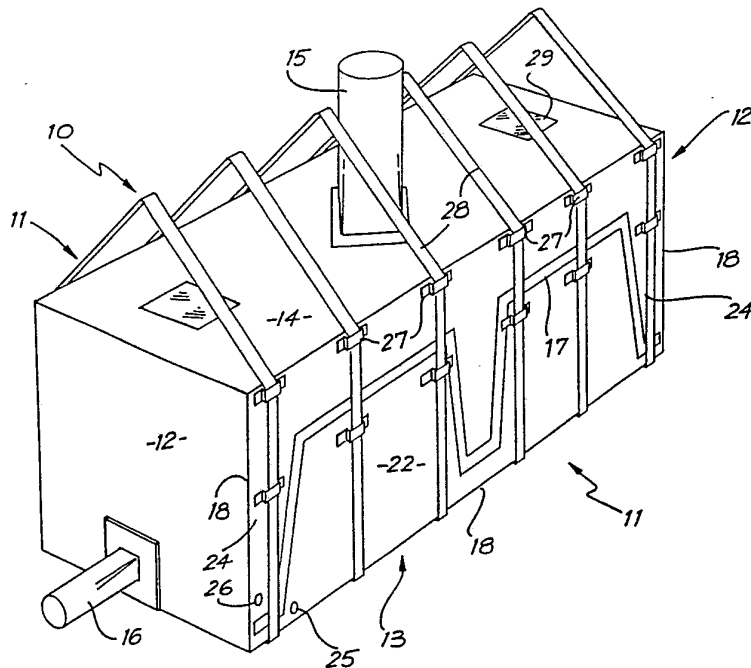




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(54) Title: BULK MATERIAL HANDLING UNIT



(57) Abstract

A flexible enclosure (10) formed of flexible sheet material, to be located in a generally rigid container, the enclosure (10) being adapted to receive granular or powdered material, the enclosure includes a pair of opposing side walls (11) which are each formed of a two-ply construction defining a generally airtight chamber (21), the chamber (21) is inflated so that the side walls (11) are generally upwardly extending enabling the enclosure (10) to be filled with the granular or powdered material.

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BULK MATERIAL HANDLING UNIT

The present invention relates to flexible enclosures within which powdered or granulated material can be transported.

5 Powdered or granulated material is generally not transported in "containers" due to problems in respect of loading the material into the containers, even if plastic or sheet liners are provided, problems in respect of removing the material, and further include safety problems if the powdered or granulated material is combustible, such as in the case of coal. In these particular cases, the powdered or granular material is
10 frequently bagged and transported in stacks, provided on a pellet.

The above discussed previous methods of transporting powdered or granular material have been unsatisfactory since they are generally labour intensive and require unnecessary handling particularly if bags are used.

15 It is the object of the present invention to overcome or substantially ameliorate the above disadvantages.

There is disclosed herein a flexible enclosure within which a powdered or granulated material is to be transported, said enclosure being formed of flexible sheet material and having a configuration to fit within a generally rigid container so as to be supported thereby when filled, said
20 enclosure including, a plurality of side walls formed of said sheet material, each side wall being of a two ply construction so that each side wall has an inner and outer sheet, and wherein said inner and outer sheets of each side wall are joined so as to provide a generally closed air tight chamber, and an aperture in each side wall enabling air under pressure to
25 be delivered into each chamber so that upon inflation the side walls are generally self supporting and are upwardly extending.

A preferred form of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

30 Figure 1 is a schematic perspective view of a flexible enclosure to be located within a generally rigid container;

Figure 2 is a schematic end elevation of the enclosure of Figure 1;

Figure 3 is a schematic perspective view of an alternative configuration of the enclosure of Figure 1;

35 Figure 4 is a schematic end elevation of the enclosure of Figure 1 positioned within a container; and

Figure 5 is a schematic end elevation of the enclosure and container of Figure 4, with the enclosure filled with a granular or powder material.

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In Figures 1 and 2 of the accompanying drawings there is schematically depicted a flexible enclosure 10 to be positioned within a container. The container contemplated is the typical large container employed in the shipping industry, and frequently used for road transport.

5 The enclosure 10 is formed of flexible sheet material such as plastics material. The enclosure 10 has a configuration to fit within the container so that it is supported thereby when filled.

The enclosure 10 has a pair of side walls 11 joined by end walls 12, a bottom wall 13, and a top wall 14.

10 The top wall 14 is provided with a flexible filling chute 15, while one of the end walls 12 is provided with an emptying sleeve 16.

Each side wall 11 is of a "two ply" construction, so that each side wall 11 has an inner and outer sheet. The inner and outer sheets 19 and 20 are joined along a seam 17, as well as the peripheral edges 18.

15 Accordingly, the chamber 21 provided between the inner and outer sheets 19 and 20 is generally sealingly closed. The seam 17 divides the chamber 21 into two subchambers 22 and 23, with the chamber 23 having elongated portions 24.

The subchambers 22 and 23 are each provided with an inlet aperture 25 or 26 enabling air under pressure to be delivered into the subchambers 22 and 23.

Each side wall 11 is provided with a plurality of eyelets 27 through which a plurality of straps 28 pass. The straps 28 can move relative to the side walls 11, however preferably the straps 28 are secured to the
25 bottom wall 13.

If so required, the top wall 14 may be provided with transparent panels 29 enabling an operator to view the contents of the enclosure 10.

In operation of the above described enclosure 10, it is lifted by means of a crane or other device by means of the straps 28, and placed
30 within a generally rigid container as discussed above. Preferably the container would be of the type having a pivotable end door. This will enable a user to have access to the apertures 25. Initially, when the enclosure is placed in the container, a user connects a hose to the aperture 26 and inflates the subchamber 23. The side walls 11 are then
35 self supporting to a sufficient degree so as to be generally upwardly extending. The powdered or granular material is then delivered to the interior of the enclosure via the chute 15. As the enclosure 10 fills, the air is forced out of the subchamber 23 and passes through the aperture 26

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even though the air hose is still positioned therein. That is, the aperture 26 is not a tight fit around the air hose.

When the enclosure 10 is to be emptied, a vacuum tube is delivered to the interior of the enclosure 10 via the sleeve 16. Alternatively, the vacuum tube may already be positioned within the enclosure 10, and all that is required is for the vacuum tube to be connected to an air pump. Accordingly the contents can be withdrawn from within the enclosure 10. It may also be advantageous to connect an air hose to the aperture 25 in order to inflate the subchamber 22. Inflation of the subchamber 22 will force material away from the side walls 11 to the vacuum tube through which the material is drawn.

In Figures 3 to 5 an alternative configuration enclosure 30 is illustrated. In this particular embodiment, the enclosure 30 is of a rectangular appearance. The enclosure 30 has a pair of side walls 31 and a bottom wall 32. The side wall 31 is of a two ply construction so as to have inner and outer sheets 33 and 34 joined along their peripheral edges 35, as well as seams 36. The seams 36 being provided in order to inhibit undue separation of the inner and outer sheets 33 and 34.

The sheets 33 and 34 co-operate to define a generally closed air tight chamber 37, to which there extends an aperture 38. The aperture 38 enables an air hose to deliver air under pressure to the chamber 37.

Extending from the apex of the enclosure 30 is a filling chute 39, while extending from one of the end walls 40 is a sleeve 41 through which the contents of the enclosure 30 may be withdrawn from within the enclosure 30.

Located within the enclosure 30 is a vacuum tube assembly 42 consisting of a vacuum tube 43 which is located adjacent the bottom wall 32. Extending longitudinally on each side of the tube 43 are tubes 44 to which air under pressure is delivered. Each of the tubes 43 and 44 is provided with a plurality of openings 35 or 36.

In operation of the above described vacuum tube assembly 42, a vacuum is connected to the tube 43, while air under pressure is delivered to the tubes 44. The air under pressure delivered to the tubes 44 causes the powdered material to aerate in order to pass more easily into the vacuum tube 43.

When the enclosure 30 is to be filled, the side walls 31 are inflated so as to be generally self supporting and upwardly extending. Thereafter,

the powdered or granular material is delivered to the interior of the enclosure 30 via the spout 39.

CLAIMS

1. A flexible enclosure within which a powdered or granulated material is to be transported, said enclosure being formed of flexible sheet material and having a configuration to fit within a generally rigid container so as to be supported thereby when filled, said enclosure including, a plurality of side walls formed of said sheet material, each side wall being of a two ply construction so that each side wall has an inner and outer sheet, and wherein said inner and outer sheets of each side wall are joined so as to provide a generally closed air tight chamber, and an aperture in each side wall enabling air under pressure to be delivered into each chamber so that upon inflation the side walls are generally self supporting and are upwardly extending.

2. The enclosure of Claim 1, wherein said container is of a generally square or rectangular configuration in end elevation.

3. The enclosure of Claim 2, wherein the chamber of each side wall is divided into at least two subchambers, with one of the subchambers being positioned substantially adjacent the upper end of the side wall, while the other chamber is predominantly positioned adjacent the lower end of the side wall.

4. The enclosure of Claim 3 further including a vacuum tube assembly enabling the withdrawal of material from within the enclosure.

5. A flexible enclosure substantially as hereinbefore described with reference to the accompanying drawings.

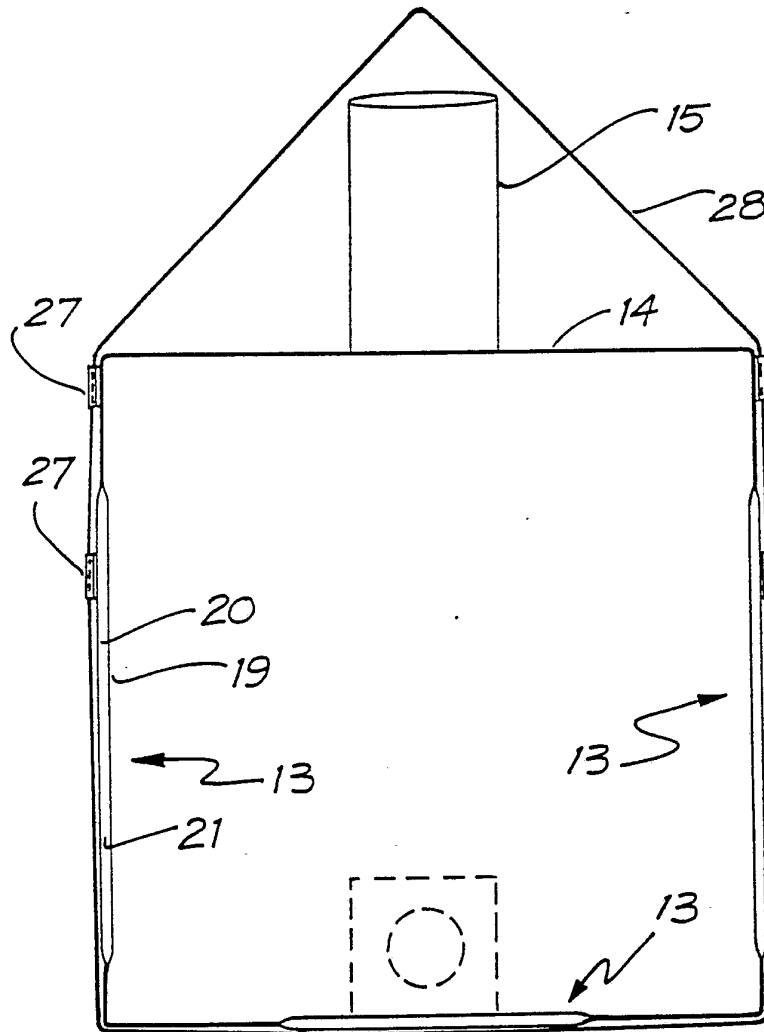
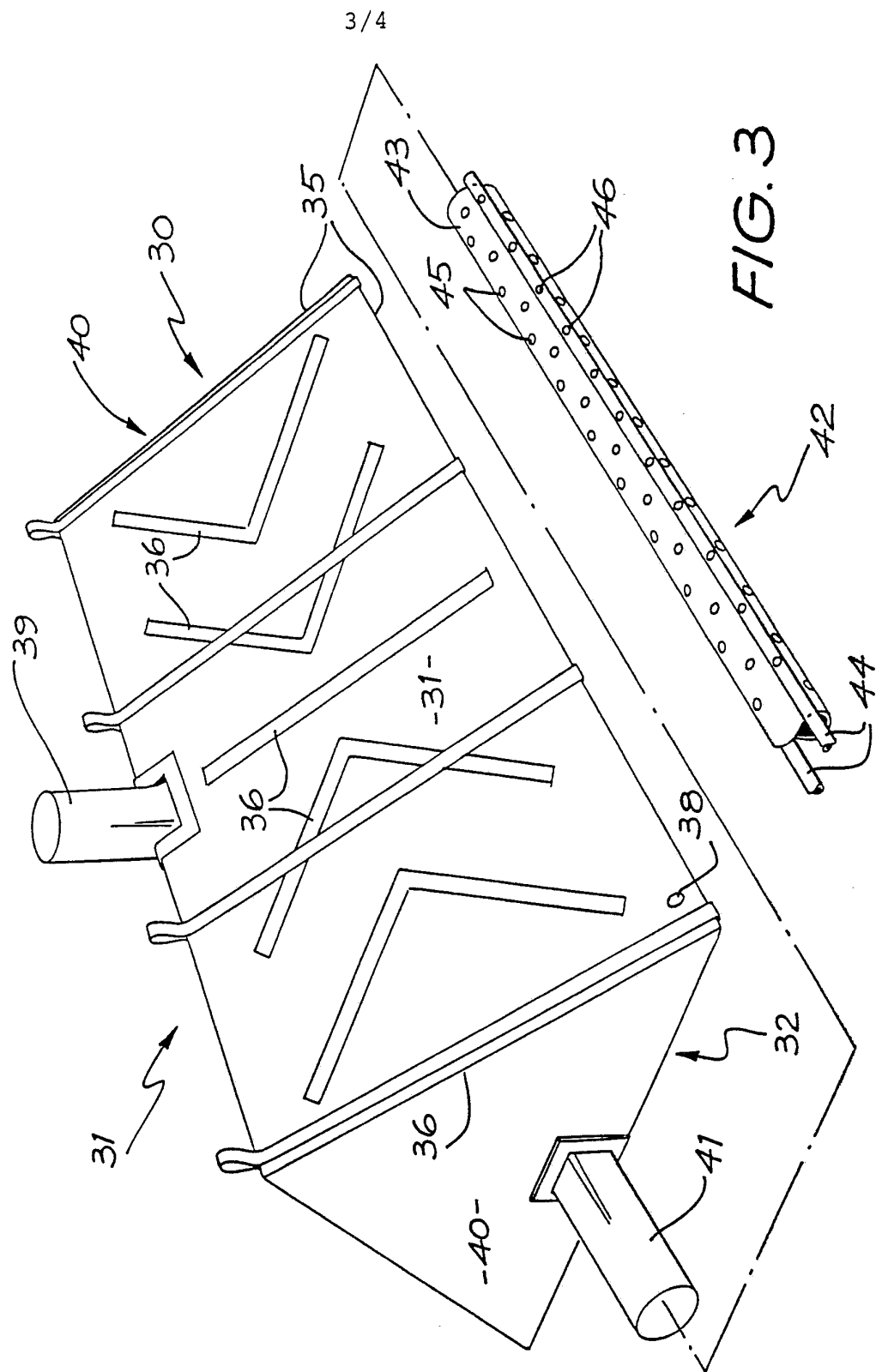


FIG. 2



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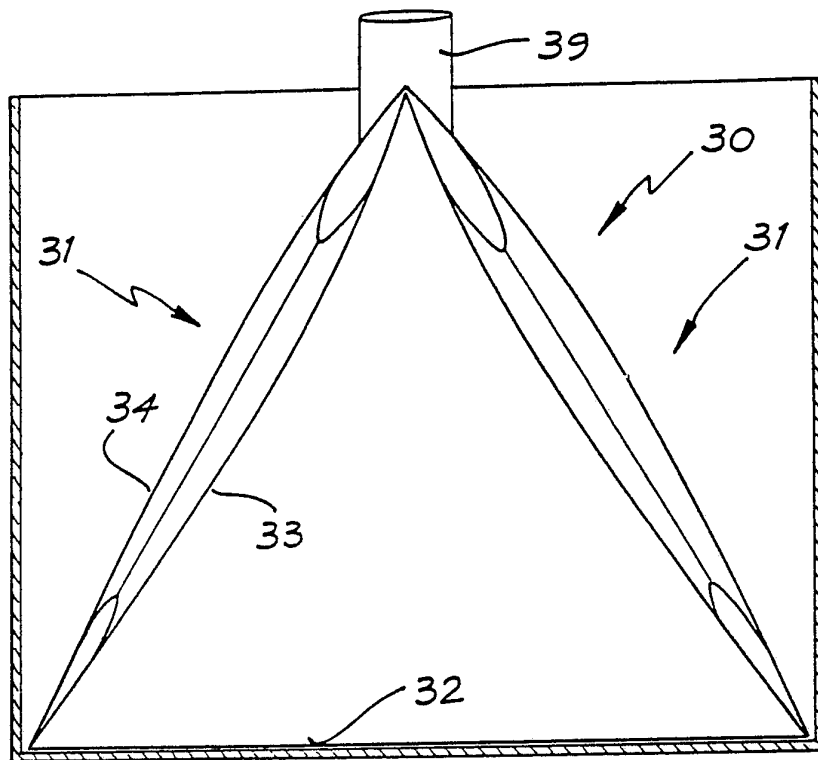


FIG. 4

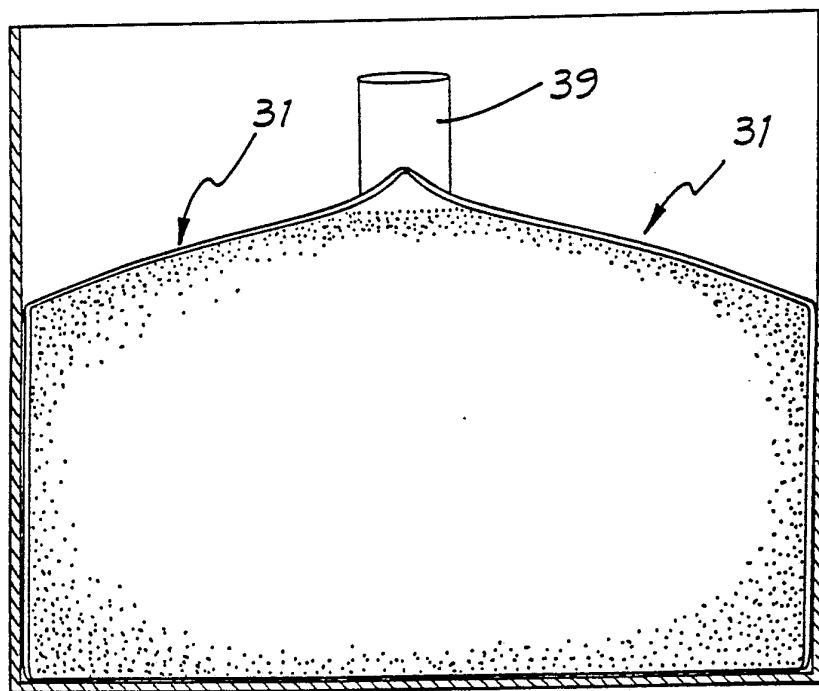
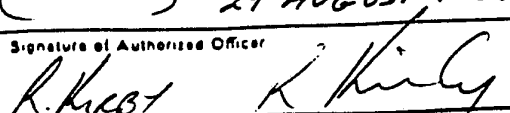


FIG. 5

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INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU88/00168

I. CLASSIFICATION OF SUBJECT MATTER : I search classification symbols apply, indicate this * According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. ⁴ B65D 88/16, 90/02		
II. FIELDS SEARCHED		
Minimum Documentation Searched *		
Classification System	Classification Symbols	
IPC	B65D 88/16, 89/02, 90/02	
Documentation Searched other than Minimum Documentation to the extent that such documents are included in the fields searched *		
AU : IPC as above; B65D 77/04, 77/06, 90/04 (1980-1988) E04H 15/20		
III. DOCUMENTS CONSIDERED TO BE RELEVANT *		
Category * 1	Citation of Document, ** with indication, where appropriate, of the relevant passages **	Relevant to Claim No. **
X,Y	AU, B, 34624/68(444618) (HICKEY) 11 September 1969 (11.09.69)	(1-3)
X,Y	AU,B, 26231/84(559917) (BONERB et al) 4 October 1984 (04.10.84)	(1-3)
X,Y	GB,A, 2037580(DANCO PLASTICS LIMITED) 16 July 1980 (16.07.80)	(1-3)
Y	AU,A, 63685/65 (AIR INFLATABLE PRODUCTS CORP.) 9 March 1967 (09.03.67)	(3)
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IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
10 August 1988 (10.08.88)	(29.08.88) 29 AUGUST 1988	
International Searching Authority AUSTRALIAN PATENT OFFICE	Signature of Authorized Officer 	

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON
INTERNATIONAL APPLICATION NO. PCT/AU 88/00168

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document
Cited in Search
Report

Patent Family Members

AU 26231/84

BR 8401465
JP 59184039
US 4678389

CA 1208980
US 4534596
ZA 8402310

EP 121419
US 4583663

END OF ANNEX