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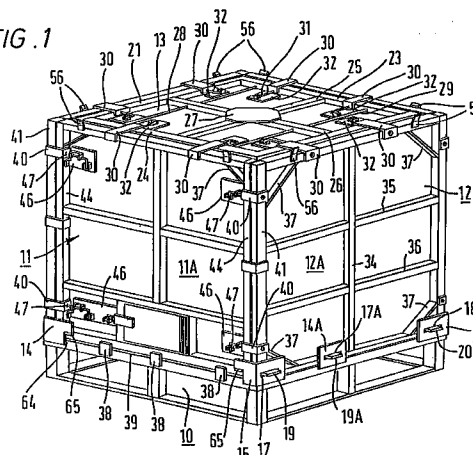
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under INID code 60.

(54) **Collapsible bulk or liquid container**

(57) A collapsible container of a kind used as an intermediate bulk container, particularly for carriage of hazardous materials. The container has a base (10) on which are placed sides (12) and a front gate (11) and a rear gate (not shown in Figure 1). The lid of the container sits flush between the top edges of the frameworks which constitute the sides and front and rear gates. A feature of the invention is that the front and rear gates are attached to the sides by means of U-shaped brackets (40) which are welded to the vertical members (41) of the side frames (12). A bolt (47) passes through aligned holes in the two ends of the U-shaped brackets and in the vertical side members of the gates and sides of the container. Further features include a strengthened base, upstanding lugs to support a second container stacked on the first, and modifications to prevent the nozzles for filling and emptying a plastic bag, to be placed in the container, from splitting from the bag when the container is mishandled.

FIG. 1



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Description

This invention relates to a collapsible container particularly of the kind which may be used as an intermediate bulk container and particularly adapted for the carriage of hazardous materials.

While the container of this invention may be used for hazardous materials, it is not so limited and may also be used for non-hazardous materials.

When hazardous materials, such as acids in liquid form, caustic materials and dangerous chemicals in liquid form, are carried in intermediate bulk containers in plastic bags, the containers have to be capable of meeting the requirements of the test for hazardous materials set out in B.S. 6939.

One test, applied to the type of intermediate bulk container which has a liner within which is placed a plastic bag containing hazardous liquids, is that the contents have to be reduced to -18°C and held at that temperature, but kept liquid if necessary by the use of anti-freeze, and then the intermediate bulk container has to be dropped from a height of 1.2 metres fully loaded with minimal spillage of the liquid within the plastic bag. The container in accordance with the present invention is designed to pass that test even when the container is dropped onto its face which normally includes the gate through which liquid is emptied from the plastic bag.

In accordance with the present invention, there is provided a collapsible container comprising:

- a base,
- two side panels,
- a front panel,
- a rear panel, and
- a top panel, or lid,

the panels being easily attachable to and detachable from the base, each panel comprising a braced metal framework,

in which the upper surface of the framework of the top panel is arranged to lie flush with the upper surfaces of the framework of the side, front and rear panels whereby the top panel or lid is located within the interior of the container, the top panel being located in position by brackets which engage the upper framework members of the side, front and rear panels and being retained in position by bolts.

In the accompanying drawings:-

Figure 1 is an isometric view of an intermediate bulk container constructed in accordance with the present invention;

Figure 2 is an isometric view of the lid when removed from the box and stood on one side;

Figure 3 is an isometric view of the base of the container;

Figures 3a, b and c show base details;

Figure 4 is an isometric view of the front panel or gate of the container;

Figures 4a, b, c, d, e, f and g show various details;

Figure 5 is an isometric view of the rear gate or rear panel of a container;

Figure 6 is an isometric view of one of the two sides of the container, the other side being similar;

Figure 7 is a cross-section through the container showing a liquid-filled bag inside the container ready for transport.

The intermediate bulk container shown in the drawings consists generally of a base on which are detachably mounted two sides, front and rear panels, the front panel being a gate panel and having a door through which a nozzle may protrude for emptying the contents of a plastic bag within the container. The container also comprises a lid or top panel. The container shown in the drawings has each of its panels lined in the interior of the panels with a sheeting material, shown as sheets 11A, 12A and 13A. The container is easily assembled and disassembled without the use of tools. After use it may be flat-packed for return and re-use.

Referring to Figure 1, it will be seen that the intermediate bulk container comprises a base 10, front panel or gate 11, side panel 12 and top panel or lid 13. The rear panel 9 or gate, and the other side panel 12 are not seen in this Figure but may be seen in Figures 5 and 6 respectively.

The panels are attached to the base exactly as described and illustrated in our co-pending United Kingdom Application No. 9008410.4, now published as GB-A-2242891.

The base 10 is in the form of a pallet made up of steel square tubing and at each corner of the pallet is an upstanding corner plate of which numbers 14, 15 and 16 are shown in Figure 1. Each corner plate has a slot such as 17, 18 adapted to receive tongues 19 and 20. An intermediate plate 14A has a slot 17A adapted to receive a tongue 19A. The tongues 19 and 20 are welded to the framework of the side panel 12 and when engaged in the slots, retain the side panel in position, even when the other panels are removed, and prevented from falling over.

The way in which the side and front panels are interconnected by bolts as illustrated in Figure 1 and is an important part of the present invention which will be described in detail later.

Panel 13 (Figures 1 and 2) consists of a rectangular frame comprising side frame members 21 and 22, rear frame member 23 and front frame member 24. These frame members are braced by cross members 25 and 26. A gusset plate 27 is welded to the cross members 25 and 26 as illustrated to provide additional strength.

There are also round bars 28 and 29 which join the cross member 26 to the front and rear members 23 and 24. The round bars 29 can be used to enable the person placing the lid in position to grip and hold the lid and lower it gently onto the top of the container.

It will be seen that there are eight brackets 30 which are attached to the frame members of the lid and which are inverted U-shape so that they engage over the adjacent upper bars of the sides, front and rear panels. Bolts 31 supported on plates 32 are arranged on the lid and adapted to pass through aligned apertures in the U-shape brackets 30, in the frame members 21 to 24 of the lid and in the adjacent frame members of the side, front and rear panels.

The bolts also pass through the liners 11A and 12A where they are sandwiched between the edges of the top framework and the adjacent upper frame members of the sides, front and rear panels.

It will be appreciated that the lid can be dropped onto the top of the container so that it lies flush with the top surfaces of the upper portions of the side, front and rear frames and is located by the U-shape brackets 30 and retained in position by the eight bolts passing through aligned holes in the frame members. This arrangement coupled with the extra strengthening of the top, including the gusset plate, gives the strength required to stand up to the test for containers for hazardous materials mentioned above.

The side and rear panels have been strengthened by additional cross members. It will be seen in Figures 1, 5 and 6 that in addition to the vertical strengthening bar 34, there are two horizontal strengthening bars 35 and 36 uniformly spaced throughout the height of the sides and rear panels. There are also diagonal struts 37 on each of the side, front and rear panels which give additional strength and help to retain the liner 33 against bursting if the container is dropped.

Figure 5, which shows the front gate, also illustrates in more detail the way in which the bolts are formed which hold the front gate in position and Figure 6 shows the side panel, illustrated in more detail.

A further feature shown in Figures 1 and 3 is the use of three upstanding plates 38 welded to each end of the base and arranged to engage and hold the bottom bar 39 of the front panel or gate to prevent it bowing outwardly.

The liner may be of plastics material, such as polypropylene, or of GRP, or wood or metal such as steel sheet.

All of the panels are made up of all-welded steel construction of electro-zinc plated open-ended tubes blanked with plastic plugs.

Referring now to Figure 6 which shows one of the two sides of the container, it will be seen that there are three U-shaped brackets 40 welded to each of the vertical side members 41 of the side panel of the container. The section AA shown in Figure 6A illustrates how the U-shaped brackets 40 are welded at 42 to the vertical members 41. The U-shaped members have holes 43 in

each arm of the U and these holes line up with corresponding holes in the vertical members 41 in the sides and in the vertical members 44 in the front gate (see Figure 4) and again in the vertical members 45 of the rear gate (see Figure 5). On the front and rear gates there are four plates 46 each of which carries a sliding bolt 47 adapted to pass through the holes in the brackets 40 and the aligned holes in the vertical members such as 41 and 44. Thus the bolts pass right through the whole assembly of U-shaped bracket and adjacent vertical side members and in doing so pass through both ends of the U-shaped bracket. Of course the bolts go through both ends of the brackets and the brackets are welded to the vertical members. The U-shaped brackets create a strong resistance to any outward movement of either the front or rear gate caused for instance by the container being dropped or damaged in some way.

The bolting system on the rear gate is similar to that on the front gate, the front gate being shown in Figure 4 and the rear gate in Figure 5.

As can be seen in Figures 4a, b, c and d, the bolt 47 on its plate 46 is supported in an inverted U-shaped bracket 48 and a second U-shaped bracket 49 with aligned holes 50 receives the end 47a of the bolt so that locking of the bolt may be effected by passing a padlock or similar locking device through the aligned holes 50.

Figure 4 also shows the door construction (see Figures 4, 4e, 4f and 4g).

The door 51 has an L-shaped bracket 52 welded to it and adapted to receive a bolt 53. On the inside of the door is fixed a bung 54 on which is a flat plate 55 of the same diameter as the exit nozzle on the plastic bag which is to be inserted in the container. This bung is added to hold the valve firmly, to be described with reference to Figure 7 later.

In Figures 1 and 6 particularly can be seen the overstacking guides in the form of lugs 56 upstanding from the top frame members of the four panels so as to provide for a second container being placed on top of the first container. The lugs prevent the top container from sliding off the bottom container.

The base 10 (see Figure 3) is strengthened by employment of three longitudinal bars 57, 58 and 59 in conjunction with two metal bars 60 and 61, all these bars being made of box section metal, preferably steel.

The corner supports 63 are cut away at 64 (see also Figure 3a) to provide an additional retention feature for the front and rear gates which have lugs 65 (see Figure 1) which engage under the cut away portions of the corners. These lugs can also be seen in Figure 4.

In Figure 7 is seen a cross section through the container, cassette and plastic bag, after the bag has been filled and is full of liquid. In general the cassette or bag retainer is of the design shown in our co-pending United Kingdom Application No. 9016546.5, now published as GB-A-2246336. The bag is supported on the base of the container on a wedge 66, which may, for example, be of expanded polystyrene. On the wedge is the cardboard cassette 67 for the plastic bag 68. As described in our

above-mentioned co-pending Application, the plastic bag has a discharge valve 69 and a filling valve 70. It has been found that there is sometimes a tendency for the discharge valve and/or the filling valve to tear away from the plastic bag when the container, with its plastic bag full of liquid, is dropped or otherwise mishandled. In accordance with an aspect of this invention to prevent such occurrences an annular packing piece of plastics material such as polystyrene 70A is placed around the filling valve and is seen to be of substantially the same height as the filling valve or slightly higher so that the filling valve is protected if pressure is exerted upwardly by the liquid on the filling valve during accidental mishandling.

Similarly packing 71 is provided around the discharge valve and this, in conjunction with the bung 54 and the plate 55 (described with reference to Figure 4g above), ensures that the discharge valve is also trapped in the packing and against the plate on the bung so that it cannot move independently of the bag and, therefore, tearing the bag is avoided if there is any movement.

The features described above, in particular the way in which the gates are supported in the U-shaped brackets by bolts extending right through the adjacent vertical members, the way in which the bung and filler are protected, the strengthened base and other features all combine to produce a container capable of heavy duty operation and of transporting hazardous materials in plastic bags with a high degree of safety.

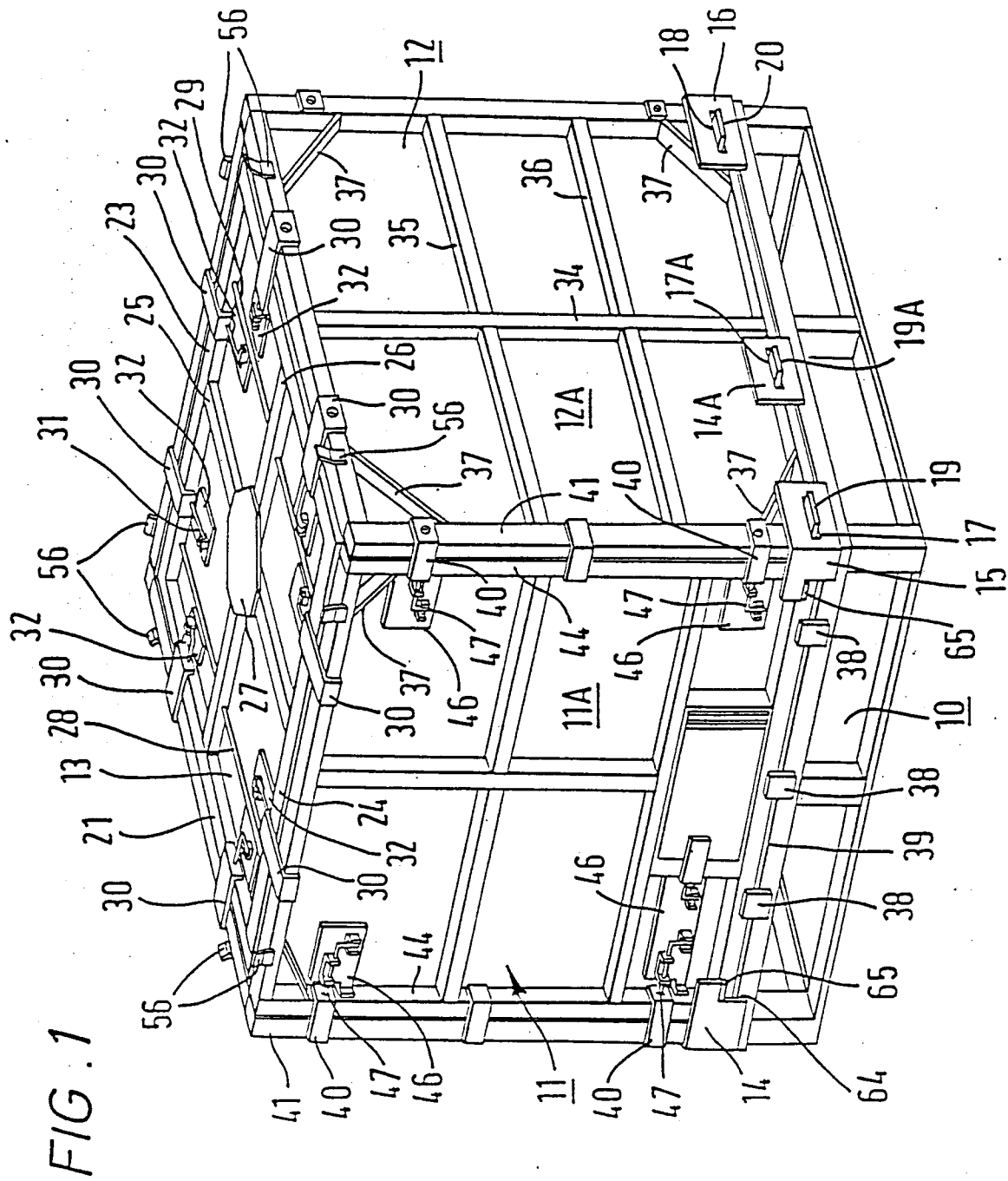
Attention is drawn to our co-pending Application No. 92200672.1, published as EP-A-0564717, from which the present Application has been divided. EP 564717 describes and claims matter described in the present Application.

Reference is made to Application No. 92200672.1, published as EP 564717, from which the present Application has been divided, which describes and claims matter claimed in the present Application.

Claims

1. A collapsible container comprising:
 - a base (10),
 - two side panels (12),
 - a front panel (11),
 - a rear panel (9), and
 - a top panel (13) or lid,
 the panels being easily attachable to and detachable from the base, each panel comprising a braced metal framework,
 - in which the upper surface of the framework (21, 22, 23, 24) of the top panel is arranged to lie flush with the upper surfaces of the framework of the side, front and rear panels whereby the top panel or lid is located within the interior of the container, the top panel being located in position by brackets (30) which engage the upper framework members of the side, front and rear panels and being retained in position by bolts (31).

2. A collapsible container according to Claim 1 further characterised by being used for the transport of liquid or bulk material, the liquid or bulk material being contained in a plastics bag placed within the collapsible container.



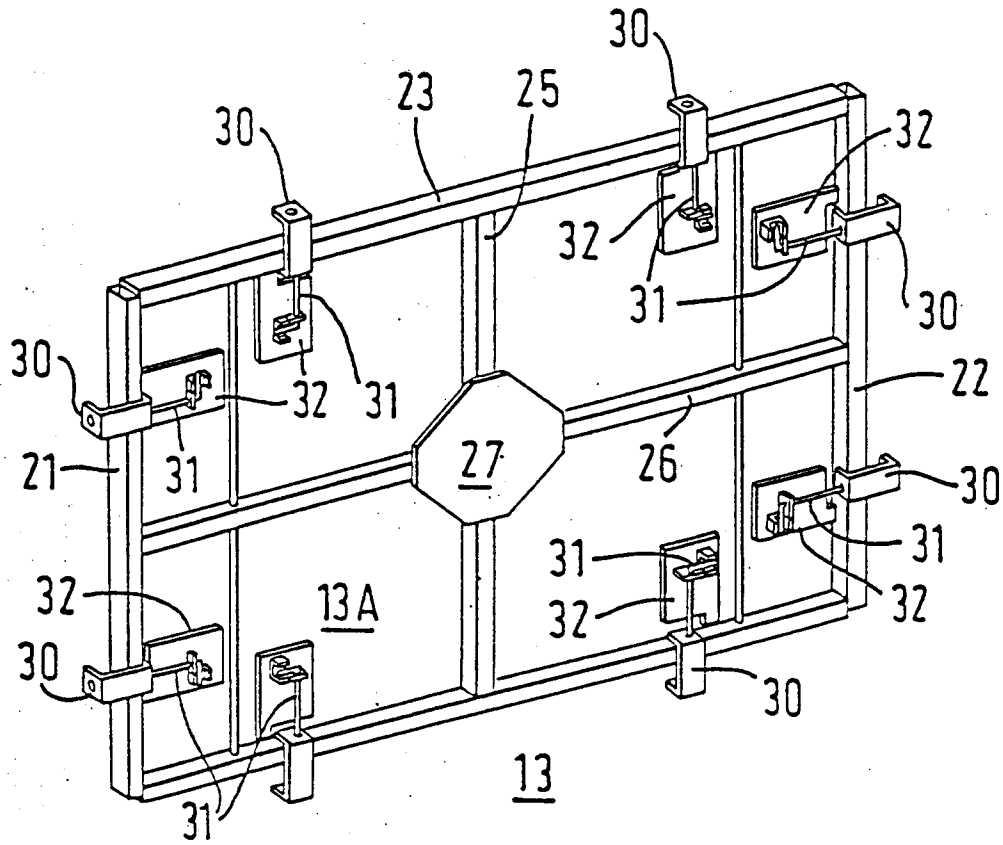
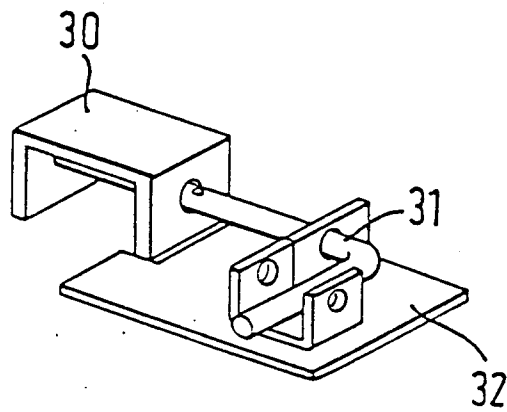


FIG. 2



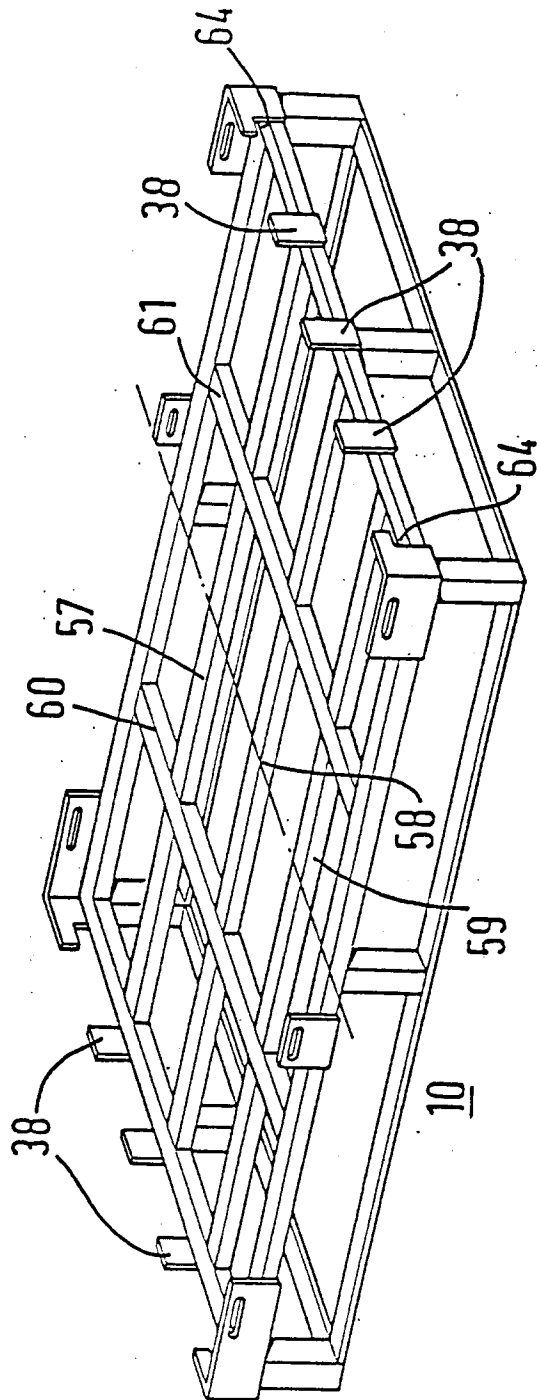


FIG. 3

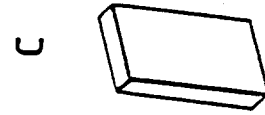
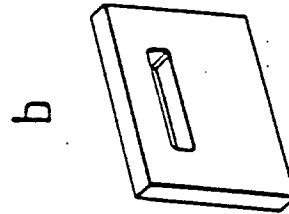
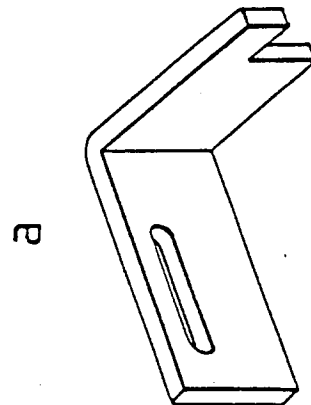


FIG. 4

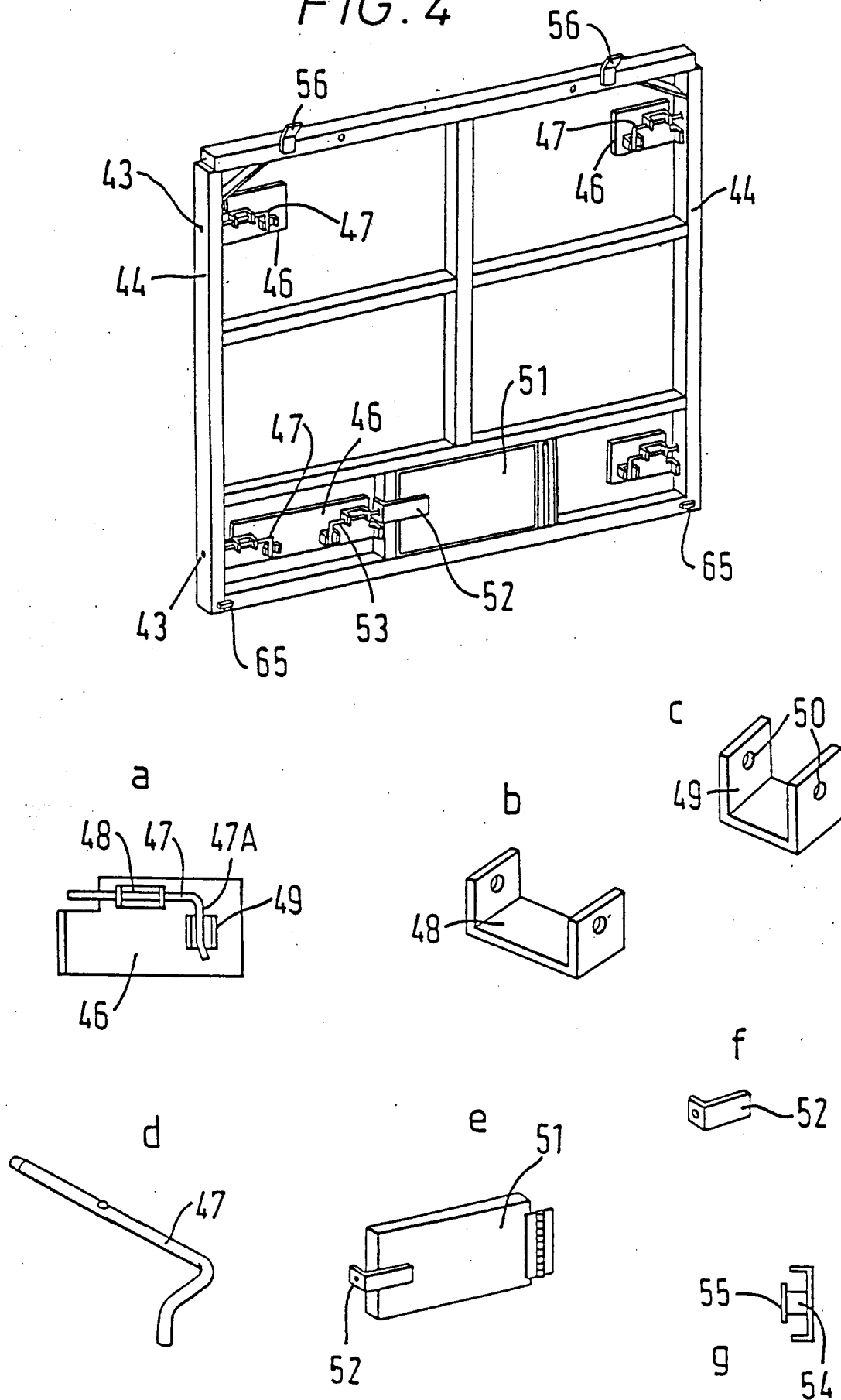


FIG. 5

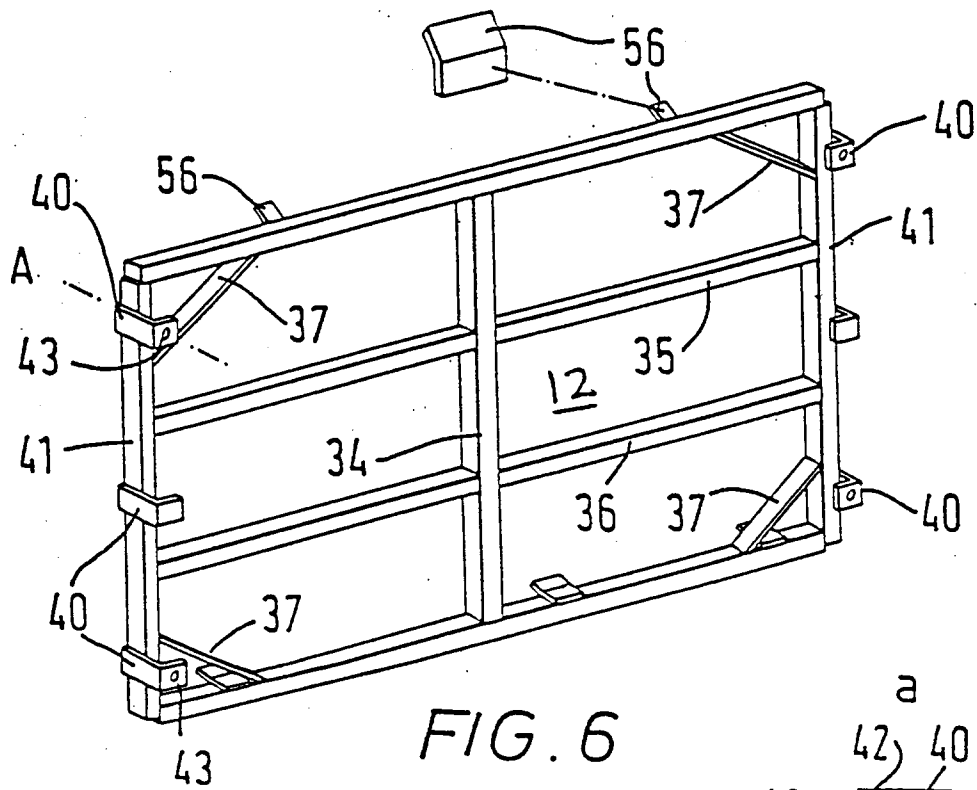
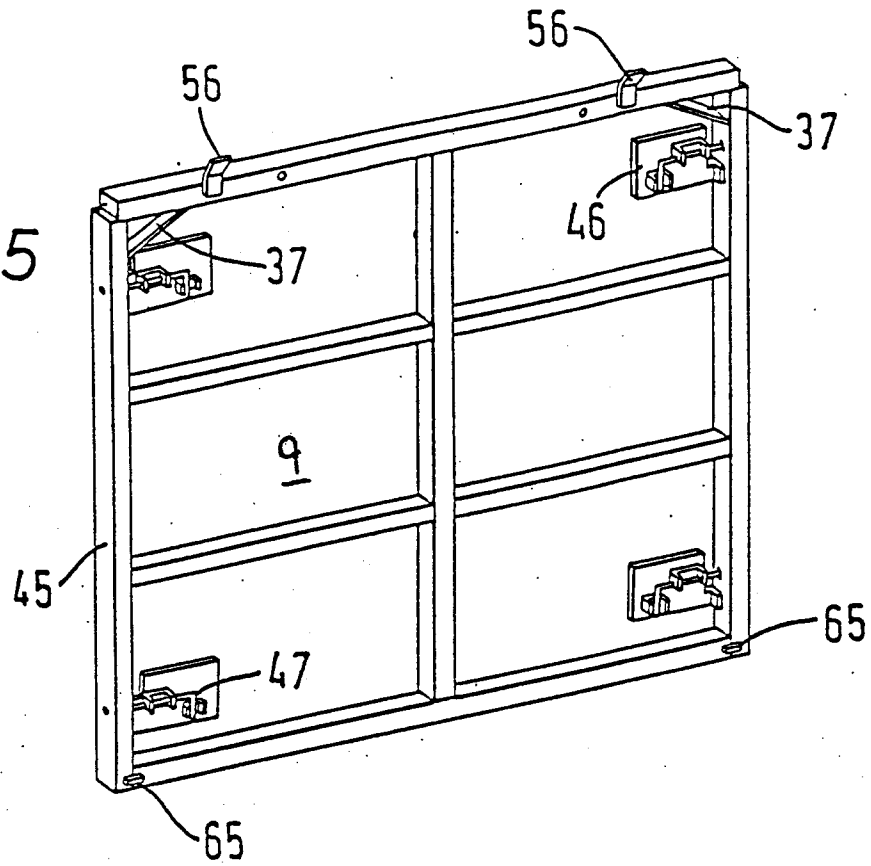


FIG. 6

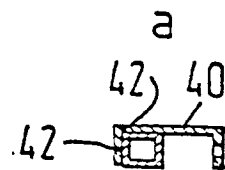
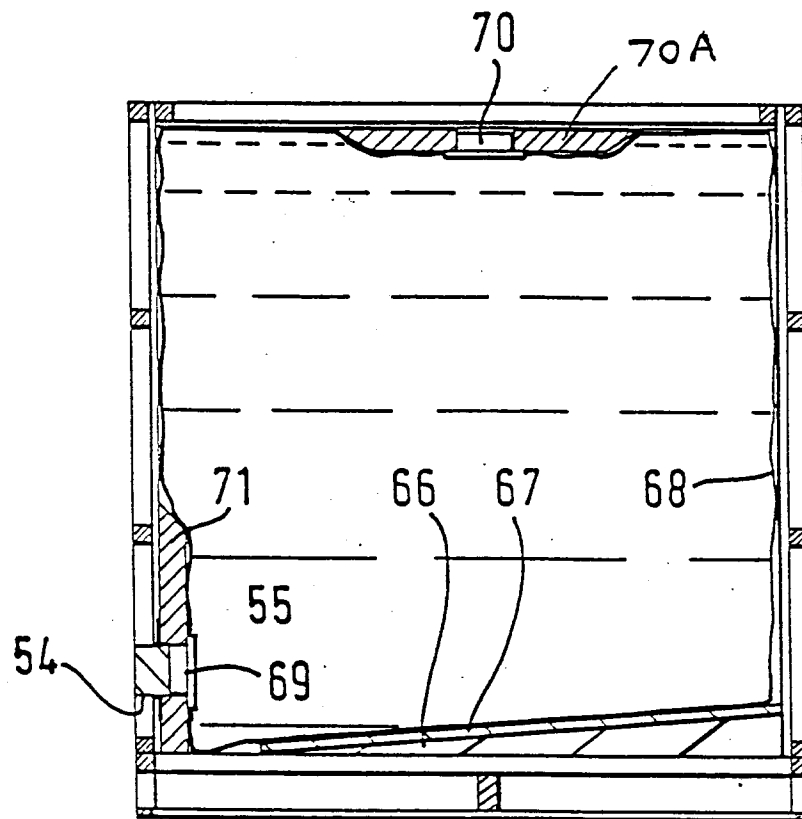


FIG. 7





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EUROPEAN SEARCH REPORT

Application Number
EP 95 11 3861

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
A	WO-A-87 06213 (VARIANTSYSTEMET) * page 1, paragraph 1 - paragraph 2; figure 1 *	1,2	B65D77/06 B65D19/12
A	GB-A-1 162 284 (VERHEIN ET AL.) * page 1, left column, paragraph 2; figure 1 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			B65D
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 3 November 1995	Examiner Spettel, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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