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Priority: 050391 IT RM91000151. (30) Priority : 05.03.91 (43) Date of publication of application : 09.09.92 Bulletin 92/37 (84) Designated Contracting States : AT BE CH DE ES FR GB LI NL SE (71) Applicant : INIZIATIVE INDUSTRIALI POMEZIA S.p.A. Via Montedoro 6 I-00040 Pomezia, Rome (IT)	(72) Inventor : Claudi, Vittorio, c/o INIZIATIVE INDUSTRIALI POMEZIA S.p.A., Via Montedoro 6 I-00040 Pomezia (Rome) (IT) (74) Representative : Taliercio, Antonio et al ING. BARZANO' & ZANARDO ROMA S.p.A. Via Piemonte, 26 I-00187 Roma (IT)
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(54) **Improvement to containers, tanks and like self-lifting and normally movable bodies.**

(57) The subject-matter of the invention is an improvement to containers, tanks and the like of a parallelepipedon shape, wherein in some of, or in all, the vertical edges vertical rooms are made extending between pairs of corner fittings and housing assemblies of mechanical or oleodynamical vertical legs flagwise hinged on vertical axes extending between said pairs of corner fittings, by means of at least two articulation arms, so that the legs are able to rotate between a recessed rest position and an extended working position.

Feet, eventually in the form of rollers or of small wheels, are mounted at the lower extremities of the legs, by means of axial articulated joint elements.

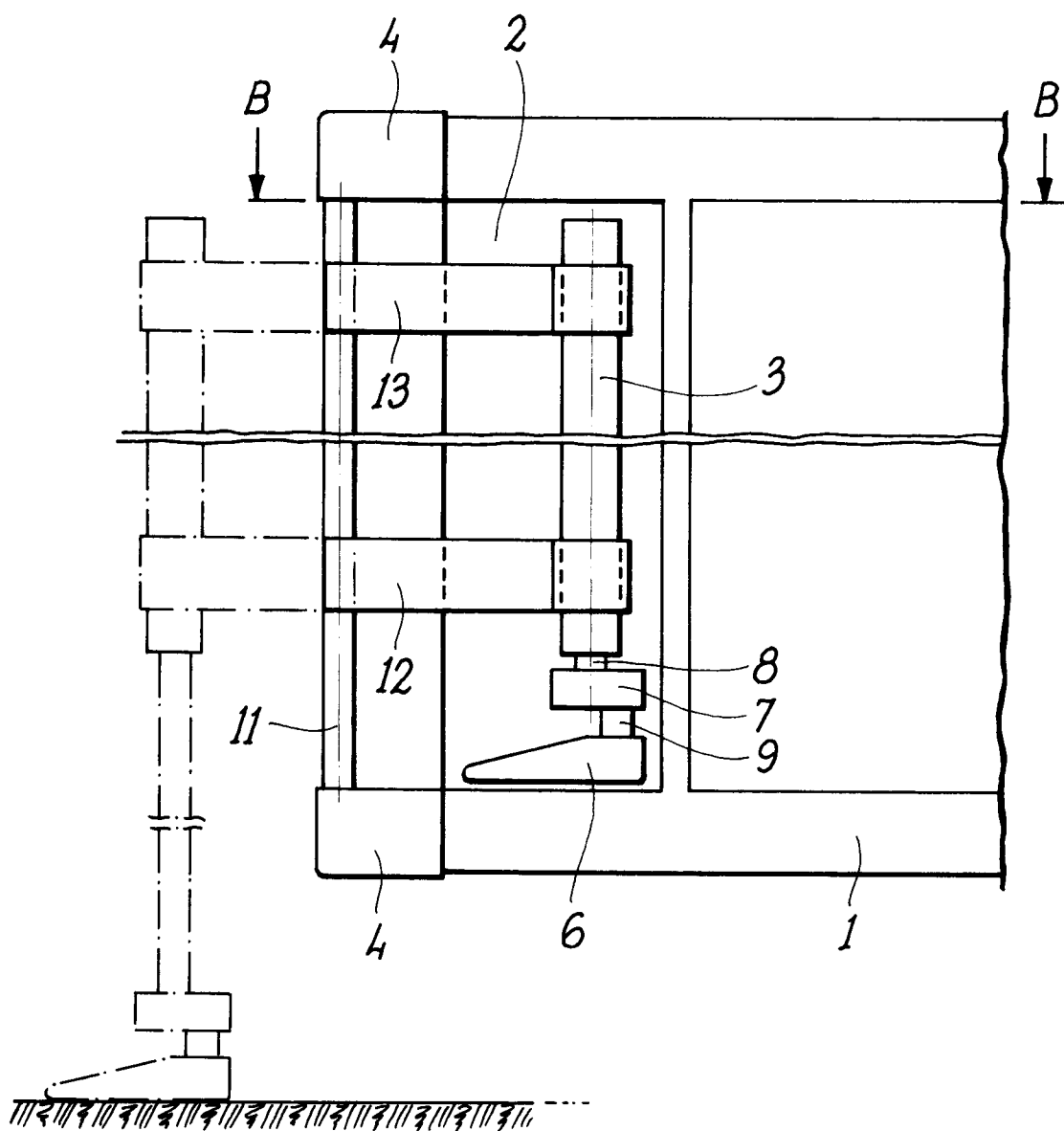


FIG. 1

The present invention generally relates to container-like cases, to tanks and the like built both according to international unified specifications, and according to other criteria - shelter type - intended to the transport of goods or to other uses, or even habitable, of the movable or emergency house type, and more particularly it relates to a built-in system for the self-lifting of such generic tanks that allows them to be easily mobilized (shifted) and spatially positioned to a very high precision.

As is known, with the spreading of the use of such containers, especially those having characteristics answering national and international unification specifications, one has had to solve numerous problems connected, on a hand, with the unification exigencies themselves and, on the other hand, with the effort to exploit the actual and potential advantages, that the use of the same was able to afford, at the best.

For example, such tanks have been endowed with as much unified corner blocks or fittings and have the possibility to be mobilized, i.e. loaded, unloaded, displaced, etc. only by means of great equipments external thereto, such as cranes, loader bridges, great lifts and the like.

A first problem that has been encountered in the attempt to improve such tank cases consists in the difficulty to apply mechanical or hydraulic legs, the so-called "rams", remaining at the same time within the respective prescribed sizes.

The second problem the solution whereof has been hitherto missing is that of the practical impossibility of the shifting, out of the dragging, which requires high forces, or, anyhow, the employment of not handy contrivances, once the case has been layed down and the necessity for arranging it into position or anyhow to displace it presents itself.

Therefore, a first object that the present invention purposes is to realize a tank case of the type mentioned above, incorporating a system of mechanical or hydraulic legs to allow the self-lifting of the tank, independently of any external apparatus, so as to facilitate the loading and unloading operations on motor vehicles, railway flatcars and the like.

A further object of the invention is to realize a tank case as already mentioned, in which the self-lifting legs also allow the shifting, or, at least, the precision arrangement of the position of the tank itself with respect to the rest surface, for example on the motor vehicle or on the railway flatcar, with the force of one or two persons or, anyhow, with a manual force and without external equipments.

Further particularities and advantages of the present invention will turn out to be apparent with the continuing of the disclosure with reference to the annexed drawings in which the preferred embodiments are represented as a matter of illustration and not of limitation.

In the drawings:

Figure 1a shows a perspective schematic view of a tank prearranged according to the present invention for the mounting of the corner self-lifting legs;

Figure 1 shows a partial side vertical view of a tank according to the present invention, taken in the sense of the arrow A of Figure 1a;

Figure 1b shows an alternative way to realize the foot of the self-lifting leg;

Figure 2 shows a top view of the detail of one edge of the tank, taken along the section line B-B of Figure 1;

Figures 3a to 3e vertically show the subsequent stages of the loading of a tank from the ground up to the loading platform on a motor vehicle;

Figures 4a to 4c very schematically show, from above, various operations of precision arrangement of a tank into position.

With reference now to the drawings and particularly to Figure 1a, it is seen that the container, tank or the like, 1, of the parallelepipedon shape prescribed by the specifications, has four rooms 2 made in its longitudinal walls, at the four vertical corners of the parallelepipedon, to accommodate, during the transport, the piling, the stocking, etc., as many mechanical or hydraulic legs (ram = jacks) 3 for the self-lifting.

With reference to Figures 1 and 2, it is seen that the mechanical or hydraulic (oleodynamical) legs 3 are flagwise hinged on the axis 11 by means of at least two articulation arms 12 and 13, so that the legs 3 are able to rotate from the recessed rest position, represented with a solid line in Figures 1 and 2, to the extended or working position represented with dashed lines in the same figures.

The axes 11 are connected with the four vertically arranged pairs of corner fittings 4.

It is desired to precisely state that the legs 3 not necessarily are to be four, arranged at the vertical edges of the tank, but that they can be in a lower or in a higher number to fulfill particular exigencies: moreover, they can also be removable.

With the reference numeral 5 suitable members are indicated for locking the legs 3 to the tank case 1, when they are a permanent part thereof, fit for maintaining the legs within the contours of the prescribed sizes, or for fixing them in an external or deployed position.

At the lower extremities of the legs 3 support feet 6 of a suitable shape and size (round, square, shaped, and the like) are provided, which can also have the shape of rotatable rollers or wheels 6a, as in Figure 1b.

The axial articulated joint elements 7 that radius, by means of two bearings, preferably ball bearings (not shown), the piston 8 of the self-lifting legs 3 with the vertical axis 9 of the feet 6 or of the wheels 6a are very important to the ends of the present invention.

The bearings mentioned above are to be parallel and eccentric to each other.

As will be seen, such axial articulated joint elements 7 are essential, in combination with the flag (or brandishing) movements of the self-lifting legs 3, to render the shifting of the tanks by the push of a man possible and also handy.

A possible oleodynamical box 10 is provided which can also be internal to the tank, or external to the same to serve more tanks.

With reference to Figures 3a to 3e, a tank according to the present invention is seen in Figure 3a in its ground resting position, with the legs in their recessed position. In Figure 3b, in a second stage, the legs are rotated in an external position, in a position of prearrangement and self-lifting, for instance on a motor vehicle equipped for the transport of unified containers. In Figure 3c, the tank is self-lifted. In the subsequent stage, Figure 3d, the tank is easily centred by the push of a man, that acts upon the corner fittings, upon the anchorage connections provided on the motor vehicle, which inserts itself under the tank with its loading platform. Finally, the tank anchored on the motor vehicle with its legs recessed in its external shape, ready to be transported, is seen in Figure 3e.

With reference to Figures 4a to 4c the obviously repeatable and combinable possibilities of horizontal shifting by the push of a man in the 360°, also on not leveled grounds, are observed.

It is desired to observe that the use of roller feet or wheels, in addition to afford the possibility of an actual shifting on the ground, also imparts a greater flexibility of position arrangement, also involving a lower stress of the legs themselves.

As regards the positioning of the self-lifting legs, it is timely to precisely state that at least two of such legs are to be arranged not on a front side, but on the lateral ones, to allow the use of the relevant tank strictly abutted to another analogous tank or abutted to the cab of the transport truck, without leaving empty intermediate rooms.

As a final observation, it is finally desired to point out that the axial articulated joints provided between the legs and the feet can also be inserted into the arms of the flag hinges of the self-lifting legs.

The preferred embodiments have been disclosed and variants have been suggested in the above, but it is to be understood that other variants and modifications in the particulars, in the construction details and in the arrangements can be made by those who are skilled in the art, without so departing from the scope of protection of the present invention.

or in all, the vertical edges vertical rooms are made extending between pairs of corner fittings and housing assemblies of mechanical or oleodynamical vertical legs flagwise hinged on vertical axes extending between said pairs of corner fittings, by means of at least two articulation arms, so that the legs are able to rotate between a recessed rest position and an extended working position.

2. The improved containers, tanks and the like according to Claim 1, **wherein** support feet are provided at the lower extremities of said self-lifting legs.
3. The improved containers, tanks and the like according to Claim 2, **wherein** said feet are circular, square or shaped.
4. The improved containers, tanks and the like according to Claim 2, **wherein** said feet are made up of rollers or of small wheels.
5. The improved containers, tanks and the like according to the preceding claims, **wherein** said feet are connected with the lower extremities of the pistons of said self-lifting legs by means of axial articulated joint elements, with the interposition of bearings, preferably ball bearings, parallel and eccentric to each other.
6. The improved containers, tanks and the like according to the preceding claims, **wherein** said axial articulated joint elements are interposed in said flagwise mounting arms of the self-lifting legs.
7. The improved containers, tanks and the like according to any one of the preceding claims, and substantially as represented and disclosed.

Claims

1. An improvement to containers, tanks and the like of a parallelepipedon shape, **wherein** in some of,

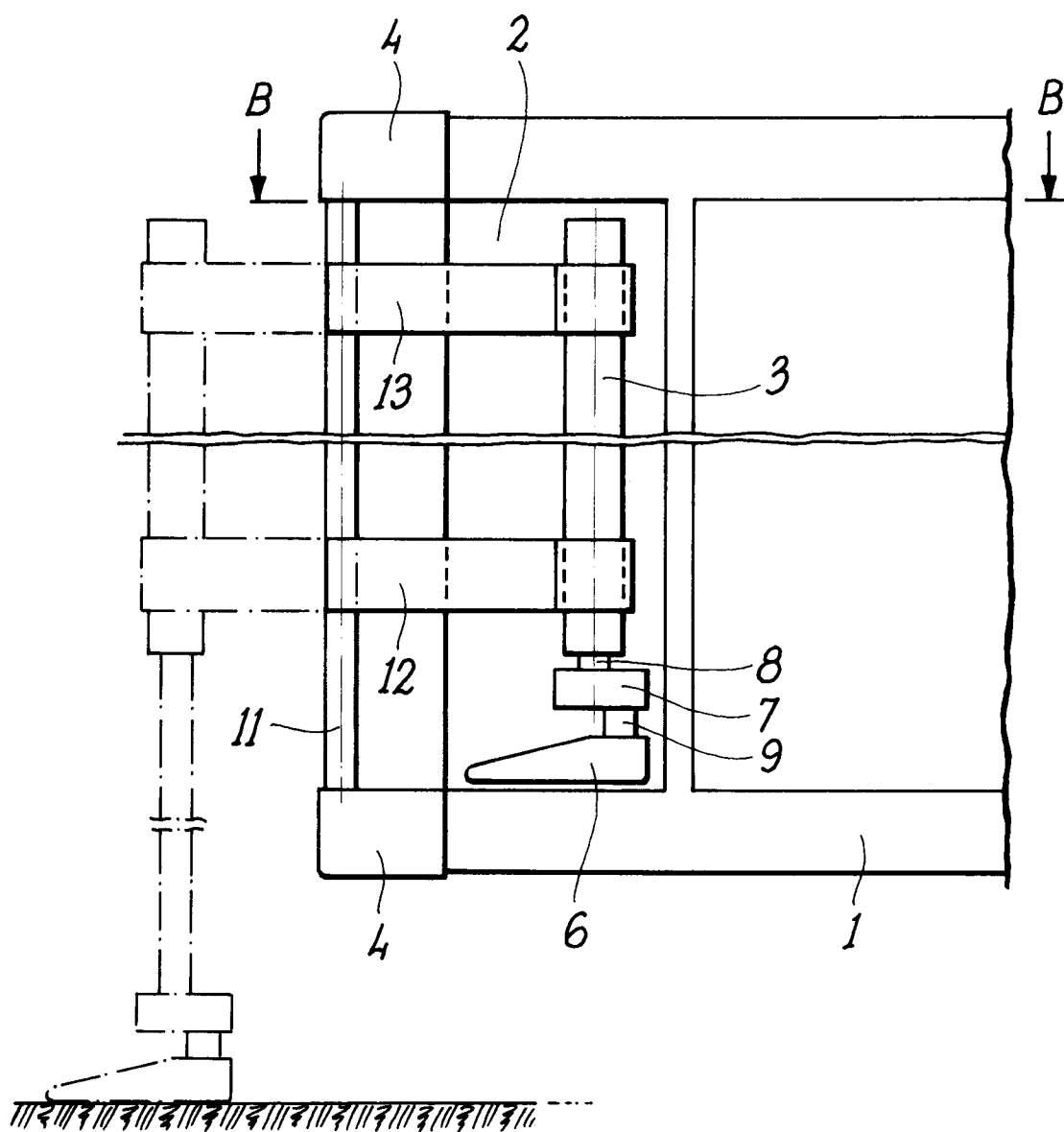


FIG. 1

FIG. 1a

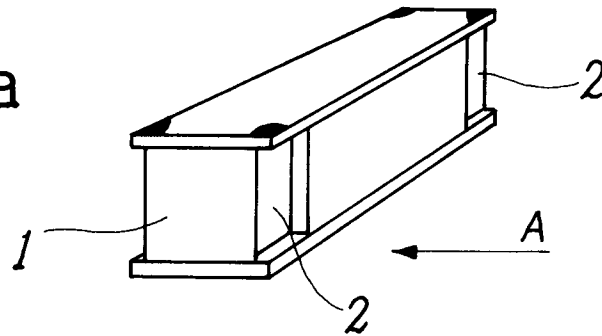


FIG. 1b

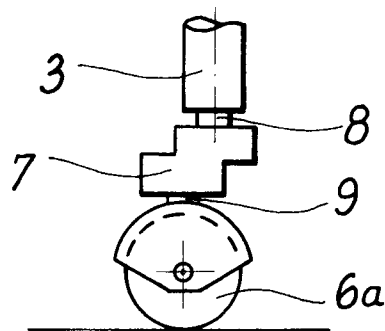


FIG. 2

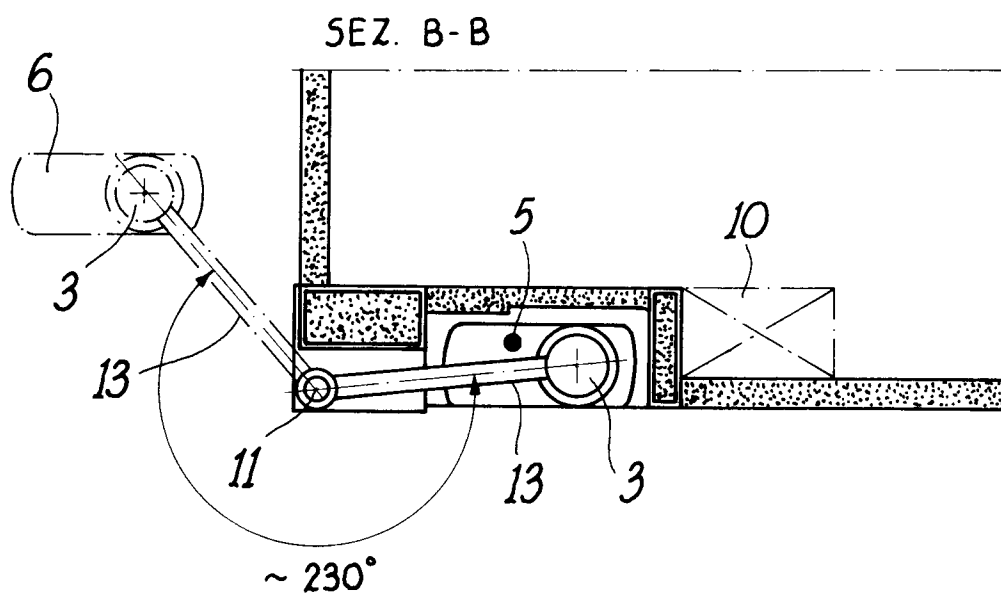


FIG. 3a

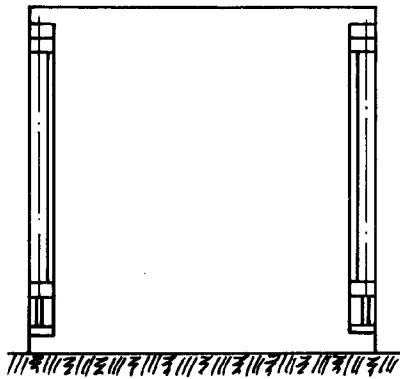


FIG. 3b

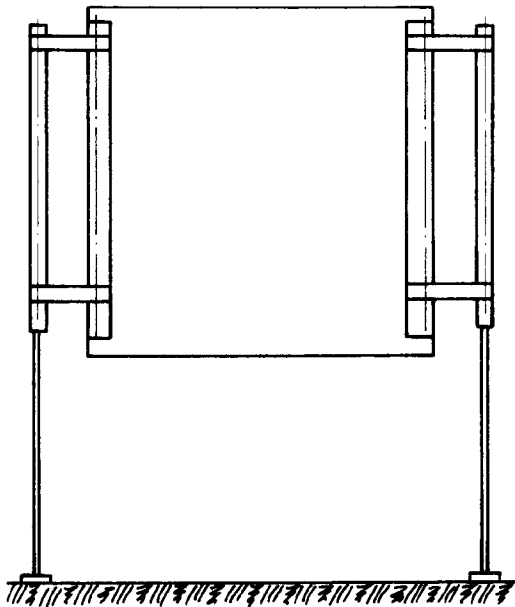
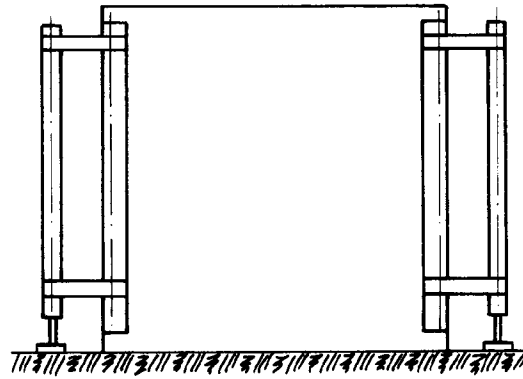


FIG. 3c

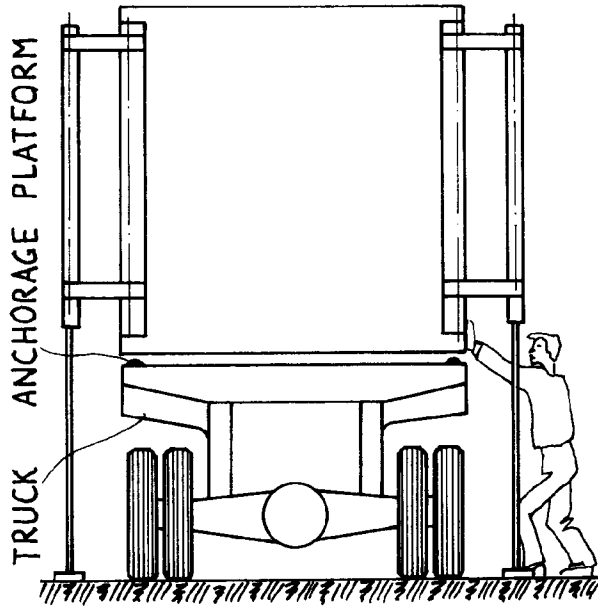
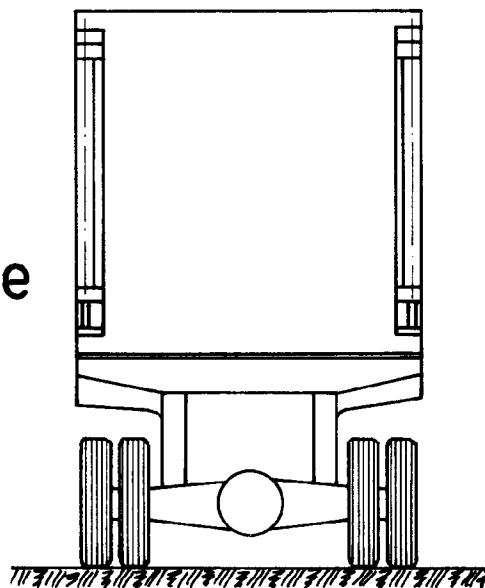


FIG. 3d

FIG. 3e



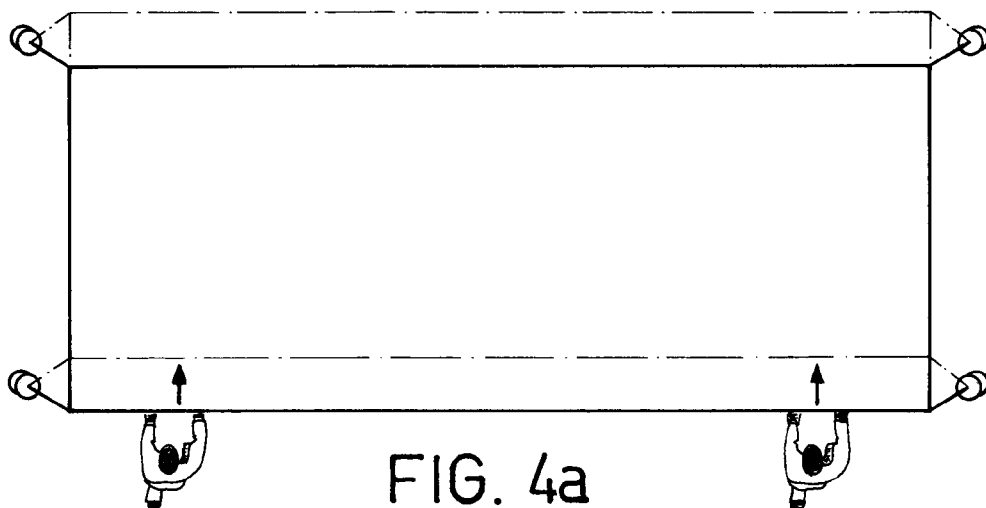


FIG. 4a

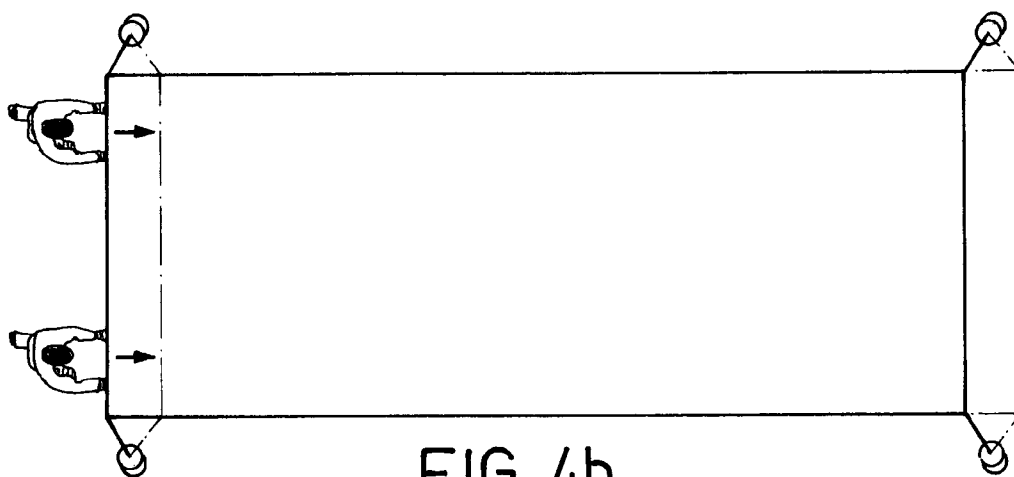


FIG. 4b

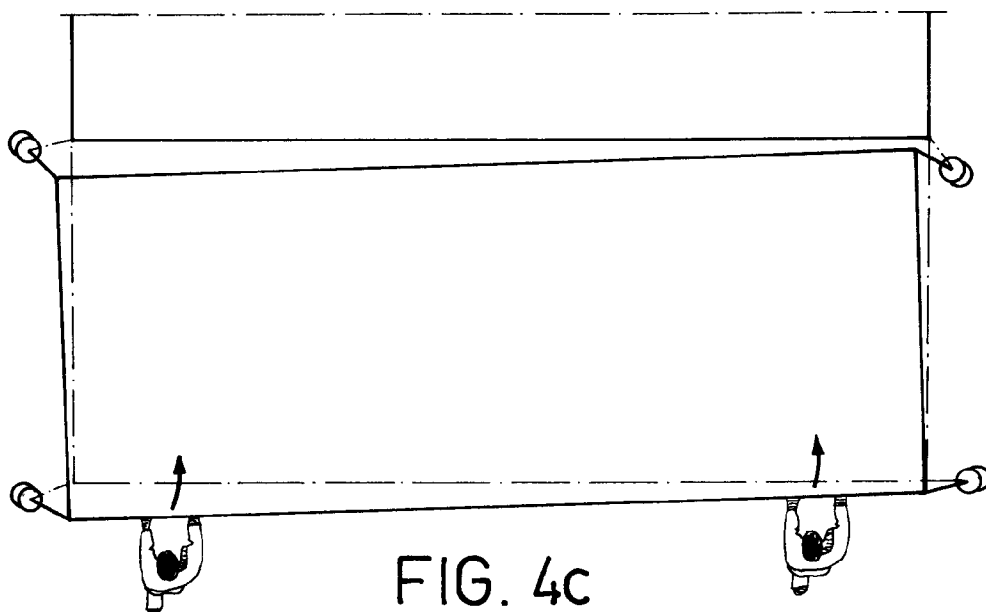


FIG. 4c



European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 92 83 0103

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)
X	CH-A-348 108 (LION) * the whole document *	1-7	B65D90/14

X	DE-A-3 007 730 (BADE, WOLF E.) * the whole document *	1-3	

X	FR-A-2 576 289 (ARIS SPA) * the whole document *	1-3	

X	US-A-4 010 990 (ROBERT JOHN ROWLEY) * the whole document *	1-3	

A	GB-A-820 391 (LION) * the whole document *	1-5	

The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5) B65D B65G
Place of search THE HAGUE		Date of completion of the search 26 MAY 1992	Examiner OSTYN T. J. M.
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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