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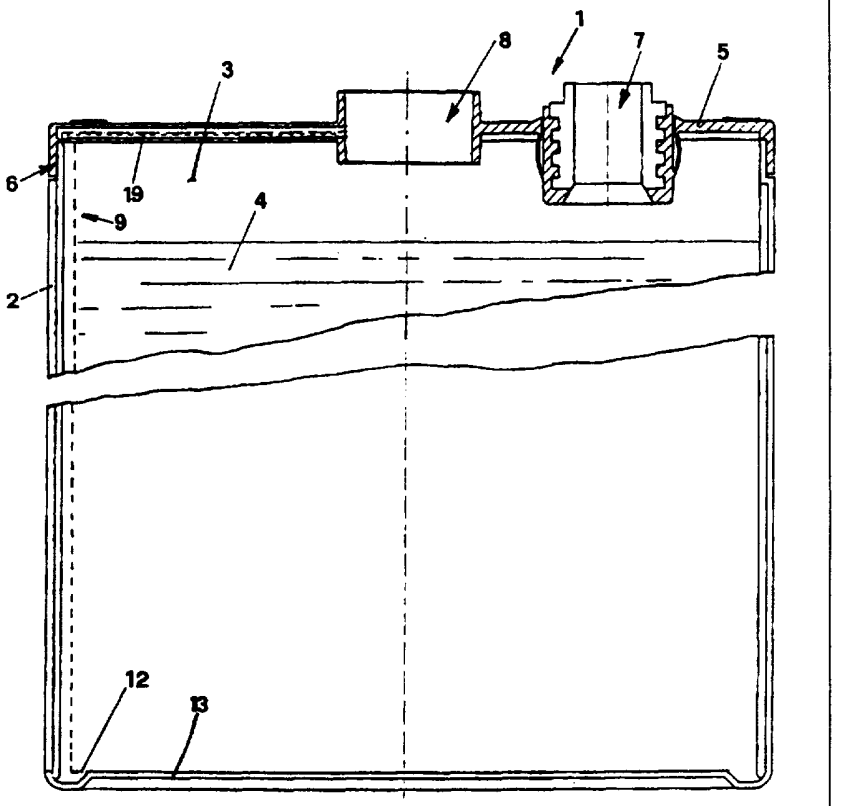
(54) Title: CASE FOR LEAD ACCUMULATORS

(57) Abstract

The invention concerns a case (1) for accumulators which comprises: a container (2; 200) wherein the elements of said accumulator are immerged; a lid (5) coupled to the perimetrical edge (6) which delimits the orifice of said container (2; 200) and at least one adduction tube (9; 90) belonging to the lateral surface of said container (2; 200) and having a first opening (20) placed next to said perimetrical edge (6) and a second opening (12; 120) communicating with the internal area of said container placed next to its bottom (13; 130). Said at least one adduction tube (9; 90) is placed externally from said container (2; 200) and is made through the blowing technique at the same time to the container (2; 200) itself whereby makes a unique body.



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CASE FOR LEAD ACCUMULATORS

The invention relates to an improved case, particularly suitable for making lead accumulators.

As known, the cases used for making accumulators generally comprise a container provided with one or more than one cell,suitable for containing an electrolyte, in which the accumulator elements and a lid, coupled with the perimetrical edge of the opening of said container, are immerged. Said lid is provided with at least one couple of holes suitable for receiving the poles connected to said elements, and at least a through hole connected to the internal of said container.

Internally or externally from said container, one or more tubes, which have an end placed close to the opening of said container, may be placed, while the opposite end communicates with the internal of the container itself through its bottom.

Such adduction tubes have a double function, because during the first charging of the accumulator they are used for the recirculation of the electrolyte, so that the charging becomes quicker, while during the following recharging made through the accumulator existence, they are used to introduce at the container bottom some air suitable for moving the electrolyte and for preventing the stratification of it.

Such adduction tubes, in the shapes of the known type, communicate with special adduction plugs of the electrolyte or of air placed in the through hole made in the lid through tubes made in the lid itself.

According to some shapes of the known type, the adduction tubes are located internally or externally from the container, which they are fixed to by glueing.

According to other making sistems suitable for obtaining a better quality of the manufacture, the adduction tubes are made enbloc with the container, directly during the moulding of it.

In particular, a realized method of the known type provides that the adduction tubes are made during the moulding of the container itself with gas co-injection.

Such a moulding method with gas co-injection is disadventageous because it requires the realization of a die provided with a matrix and with a punch, which is very expensive to build, especially when said adduction tubes have to be made with the presence of undercuts.

It is very important that when said adduction tubes are located externally from the container, they don't modify the outline of the container itself, and for this reason they are preferably placed at the edges of the container.

It is also to be considered that in the accumulators, which have the external measures equal, the quantity of electrolyte in a container is as bigger as the wall thickness of the container itself is less. This thickness, in the containers obtained by mould injection or gas co-injection moulding, cannot fall under a minimal value.

The present invention wants to provide a container which, compared to the containers of the known type provided with adduction tubes and having equal exter nal dimensions, could contain a bigger volume of electrolyte, while the volume of the accumulator elements immerged in the electrolyte itself is the same.

Said aims are achieved providing a case for accumulators which, according to the invention, comprises:

- a container having one or more cells suitable for containing an electrolyte in which are immerged the elements of said accumulator;
- a lid coupled to the perimetrical edge which delimitates the internal of said container;
- at least an adduction tube belonging to the lateral surface and having a first opening located next to said perimetrical edge which delimitates the inlet of said container and a second opening communicating with the internal area of the container itself located next to its bottom, and it is characterized in that at least said adduction tube is placed externally from said container and is made using the blowing technique at the same time on the container whereby makes a unique body.

Advantageously, the container of the invention enables to realize cases for accumulators with inferior costs than the techniques usually adopted, because the manufacture is quicker and also becau ome material is saved.

So advantageously said cases, compare) equivalent cases having the same features, have a bigger internal volume and so they enable to realize accumulators with a better quality and efficiency, because the relationship between the electrolyte volume and the volume of the elements immerged in said electrolyte.

Said aims and advantages will be better underlined in the description of a

preferred realized form of the invention,which has given as an indicative, but not limitating example, and represented in the accompaining drawings wherein:

- fig.1 represents a longitudinal section of the case for accumulators of the invention;
- fig.2 represents the case of fig.1 without its lid;
- fig.3 represents a high view the edge portion of the container of fig.2, wherein the adduction tube is located;
- fig.4 represents the particular of the adduction tube in fig.3, limited to its outline in the opening plane of the container;
- fig.5 represents the opening of the adduction tube, which communicates with the container internal of fig.1 in the bottom area ;
- fig.6 represents,according to another solution, the opening of the adduction tube, which communicates with the inlet container of fig.1 in the bottom area.

As it can be seen in fig.1, the case of the invention,on the whole indicated by 1,comprises:

- a container 2 having a cell 3 suitable for containing an electrolyte 4 wherein the elements of said accumulator, not seen in the figure, are located;
- a lid 5 coupled to the perimetrical edge 6 which delimits the opening of said container 2, provided with at least a couple of first holes 7, each one suitable for receiving one of the poles (not shown in the figure), connected to said elements of said accumulator and at least a second hole 8 communicating with the internal of said container 2 ;
- at least one adduction tube 9 belonging to the lateral surface of said container 2 and having a first opening 20 placed at the perimetrical edge 6 of said container 2 and a second opening 12, placed at the opposite side of the previous opening and visible in fig. 5, communicating with the internal of said cell 3 in the bottom area 13 of said container 2.

As we can see in fig.3 and 4, said adduction tube 9 is placed at the edge 14 of the container, and more precisely is provided with a rib 15 which develops for all the height of the container itself and permits the connecting of it to the plane wall 16 which chamfers the container itself at the edge 14.

In particular, fig.4 represents in a top view the outline of the adduction tube 9 which at the opening of the container 2, as it can be seen in fig. 3, joints with the body of the adduction tube 9 which is contained into the external profile

17, defined on the extension of the external surface of the lateral walls 18 of the container 2. In this way the adduction tube 9 defines, in correspondence with the edge 6 of the container 2, a recess which permits the coupling of the lid 5, avoiding the protrusion of the lid 5 from the container 2.

In particular, one or more horizontal ducts 19 are made on said lid 5.

They communicate with said first opening 20 of the adduction tube 9, placed in correspondence with the edge 6, and connect the lid to a feeding device, not shown, which is applied on the second hole 8 of the lid itself.

Such a feeding device permits the introduction of the elctrolyte during the first loading of the accumulator or the blowing in air which, entering the container 2 through the second opening 12 made at the bottom, prevents the stratification of the electrolyte during the following loadings.

It is very important to specify that the thicknesses of the container walls 2 and of the adduction tube 9 are thin because the adduction tube and the container are both obtained during the blowhole molding of the container 2 and thus realize an enbloc.

The housing of the adduction tube 9, in correspondence with the external edge of the container 2 and their realization with thin walls obtained with the blowhole method, permits to obtain a container which, with equal external conditions, has an internal volume bigger than the containers of the known type.

Consequently, the container is able to contain a greater volume of electrolyte, thus realizing a better relationship between the electrolyte volume and the volume of the elements contained in said container.

The accumulator realized using the case of the invention presents, compared to other accumulators of the known type equivalent to it and having the same external measures, a better quality and efficiency.

According to an executive variant represented in fig.6, the second opening 120 of the adduction tube 90 communicating with the entire container 200 is placed at the lateral wall next to the bottom 130.

It is obvious that during the executive phase any other adduction tube could be applied to the external side of the container and it could be realized even in a position different from the angular position.

In other realized shapes the container could be provided with any quantity of adduction tubes, however well-shaped and placed.

The above-mentioned and other possible variants which in the executive phase could be made on the invention, however, are all protected in this patent.

CLAIMS

1) Case (1) for accumulators comprising:

- a container (2; 200) having one or more cells (3) suitable to contain an electrolyte (4) wherein the elements of said accumulator are immerged;
- a lid (5) coupled to the perimetrical edge (6) which delimits the orifice of said container(2; 200);
- at least one adduction tube (9; 90) belonging to the lateral surface of said container (2; 200) and having a first opening (20) placed next to said perimetrical edge (6) which delimits said orifice of said container (2) and a second opening (12;120) communicating with the internal area of said container (2; 200), placed next to its bottom (13; 130), characterized in that said at least one

adduction tube (9; 90) is placed externally from said container (2; 200) and is made through the blowing technique at the same time to the container (2; 200) itself whereby makes a unique body.

2) Case (1) for accumulators according to claim 1), characterized in that said at least one adduction tube (9; 90) is placed at the edge (14) of said container (2; 200).

3) Case (1) for accumulators according to claim 1), characterized in that said second opening (12) which communicates with the internal of said container (2) is realized on the bottom (13) of the container itself.

4) Case (1) for accumulators according to claim 1), characterized in that said sacond opening (120) which communicates with the internal of said container (200), is realized on the lateral wall of said container next to its bottom (130).

FIG.1

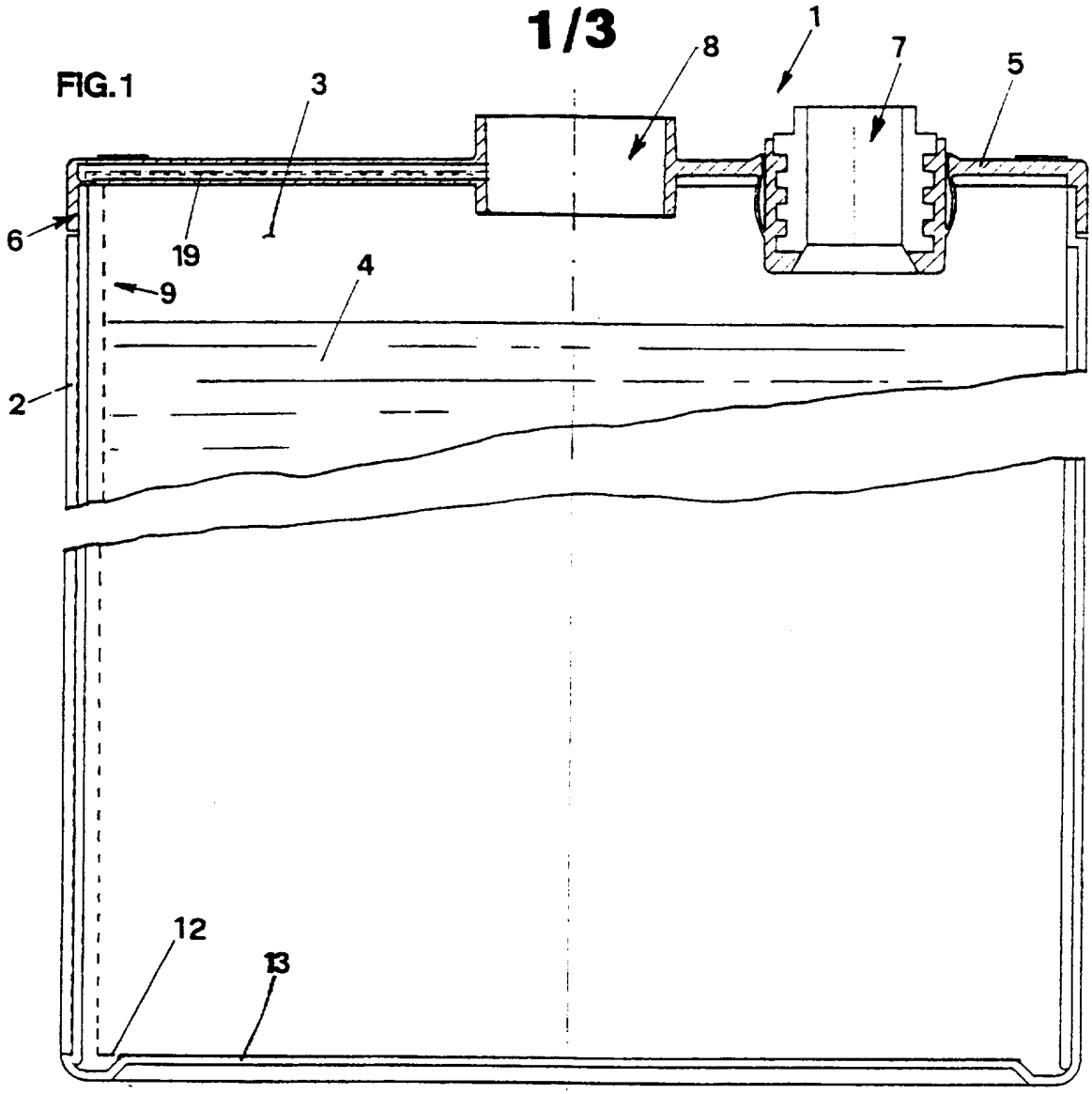
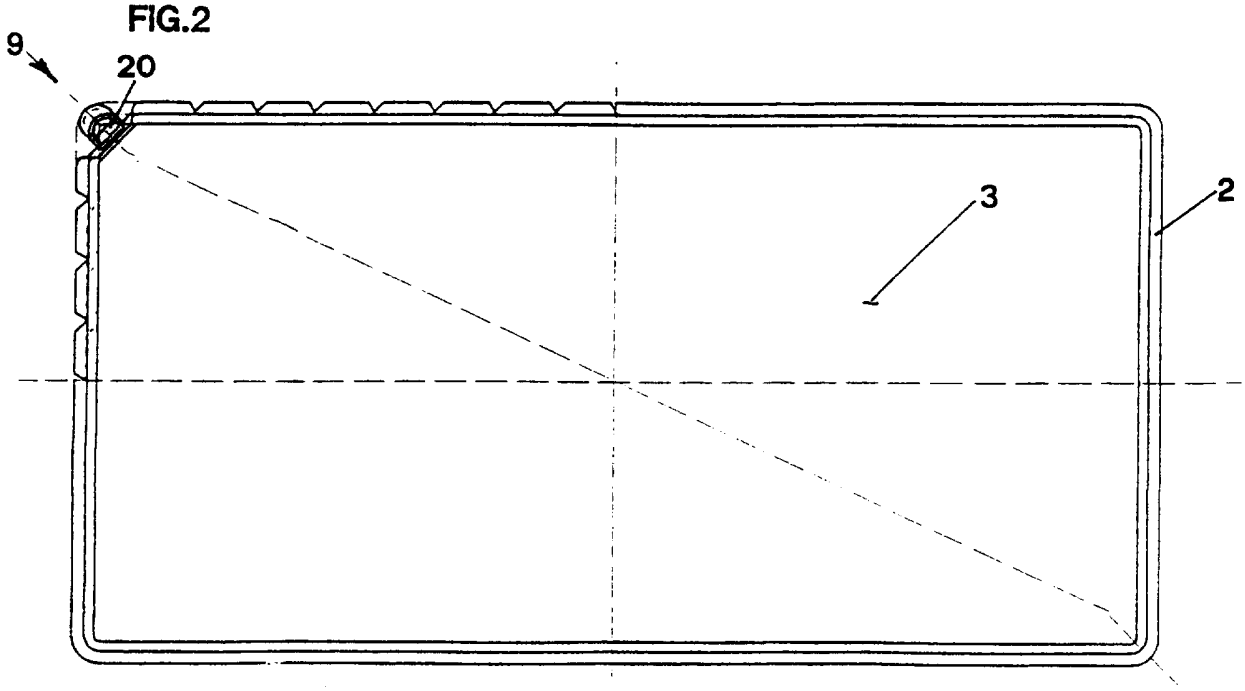


FIG.2



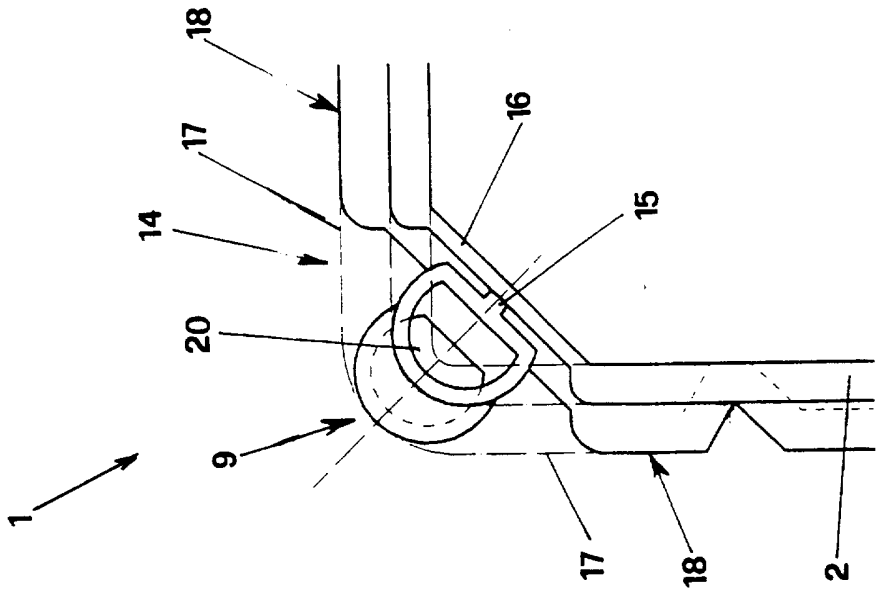


FIG.3

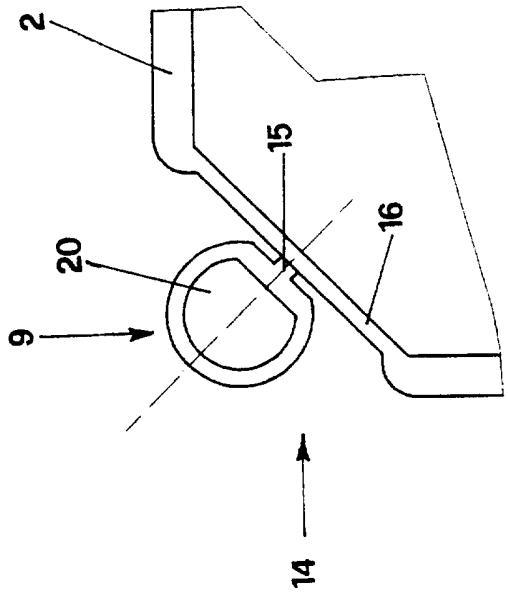


FIG.4

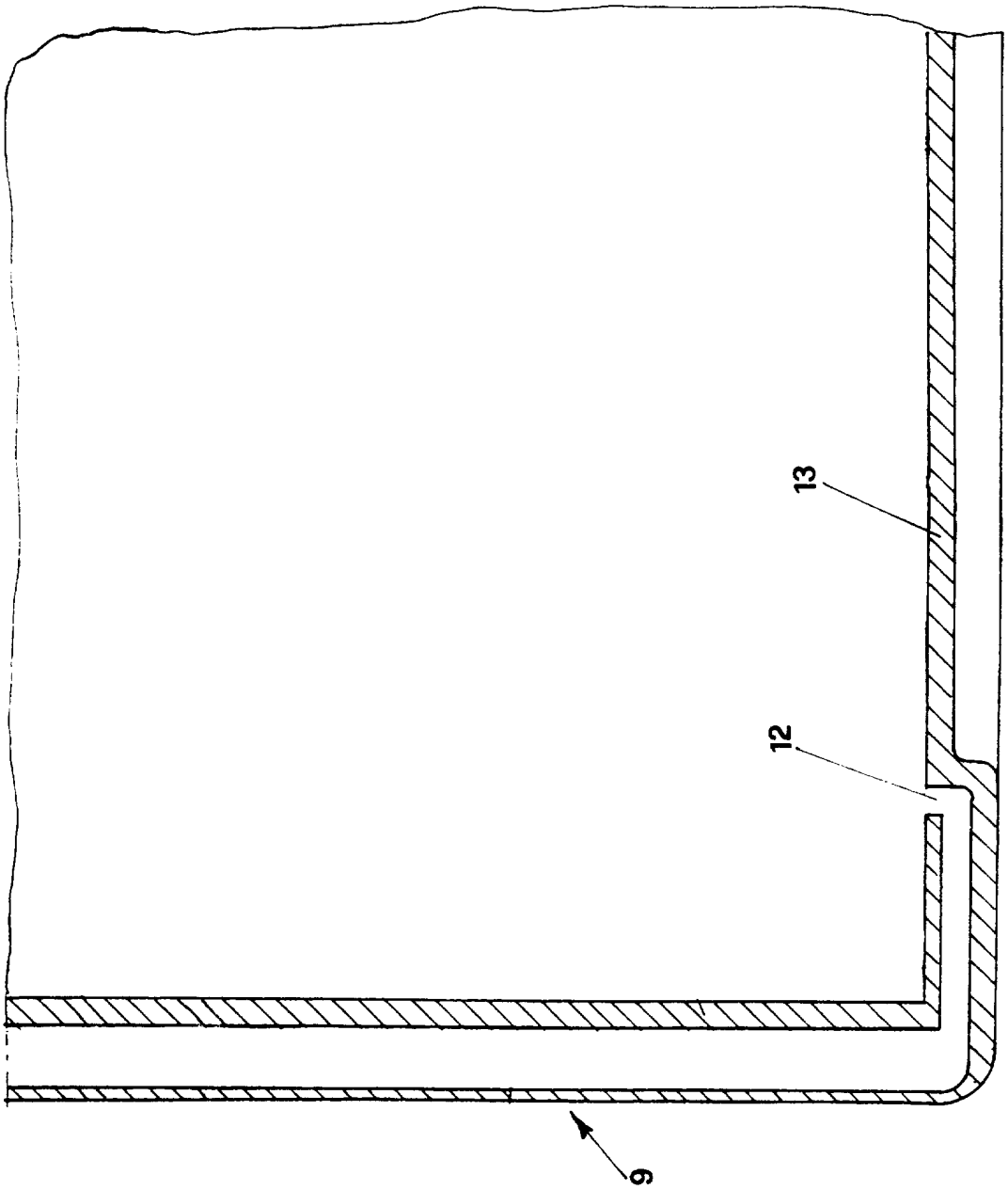


FIG.5

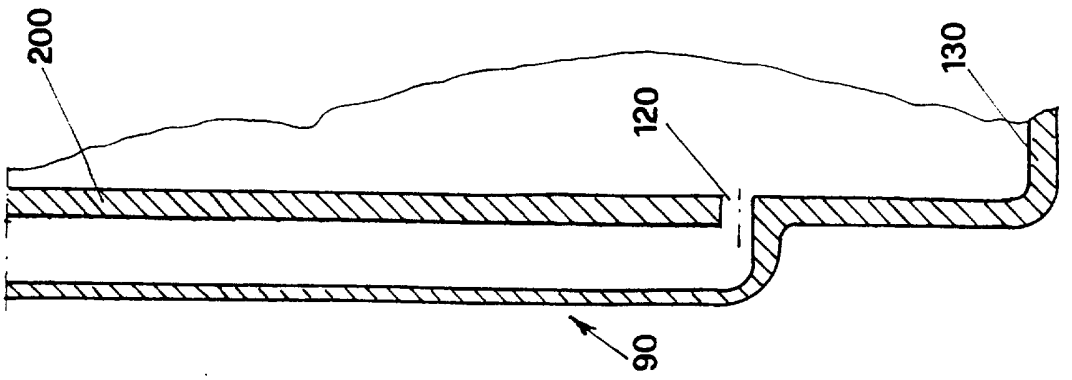


FIG.6

INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/EP 97/01824

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H01M2/02 H01M2/36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H01M B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 94 29907 A (STOCCHIERO OLIMPIO) 22 December 1994 see claims 5,6; figure 1 ---	1
A	WO 94 20994 A (STOCCHIERO OLIMPIO) 15 September 1994 see claim 7; figures 1,4 ---	
A	GB 694 432 A (THE WOLF SAFETY LAMP COMPANY) 22 July 1953 see page 2, line 13 - line 19; figure 6 ---	
A	PATENT ABSTRACTS OF JAPAN vol. 009, no. 189 (E-333), 6 August 1985 & JP 60 056364 A (YUASA DENCHI KK), 1 April 1985, see abstract ---	

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[X] Further documents are listed in the continuation of box C. [X] Patent family members are listed in annex.

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A	US 5 064 101 A (RICHTER SIMON J ET AL) 12 November 1991 see column 3, line 16 - line 19; figures 2,3	
A	US 5 307 956 A (RICHTER SIMON J ET AL) 3 May 1994 see column 5, line 11 - line 14; figure 1	
A	US 3 843 025 A (HOLT W) 22 October 1974 see column 4, line 12 - line 25; figures 7,8	

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter nal Application No
PCT/EP 97/01824

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9429907 A	22-12-94	AT 137611 T	15-05-96
		CA 2139938 A	22-12-94
		CN 1110490 A	18-10-95
		CZ 9500240 A	12-07-95
		DE 69400169 D	05-06-96
		DE 69400169 T	02-01-97
		EP 0654180 A	24-05-95
		ES 2088321 T	01-08-96
		HU 76223 A	28-07-97
		JP 7508854 T	28-09-95
		NO 950454 A	08-02-95
		PL 307356 A	15-05-95
		SI 9420003 A	31-12-95
		SK 14795 A	09-08-95
		US 5498488 A	12-03-96
WO 9420994 A	15-09-94	IT VI930033 A	09-09-94
		BG 99991 A	29-03-96
		CA 2156062 A	15-09-94
		CN 1119051 A	20-03-96
		CZ 9502222 A	14-02-96
		HU 76204 A	28-07-97
		JP 8506213 T	02-07-96
		PL 310522 A	27-12-95
		SK 109895 A	06-12-95
GB 694432 A		FR 1031259 A	18-06-53
US 5064101 A	12-11-91	AU 631032 B	12-11-92
		AU 6742890 A	31-05-91
		CA 2044140 A	01-05-91
		EP 0451259 A	16-10-91
		JP 4502604 T	14-05-92
		WO 9106503 A	16-05-91
		US 5307956 A	03-05-94
US 5307956 A	03-05-94	US 5064101 A	12-11-91
		AU 631032 B	12-11-92
		AU 6742890 A	31-05-91
		CA 2044140 A	01-05-91

INTERNATIONAL SEARCH REPORT

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PCT/EP 97/01824

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5307956 A		EP 0451259 A	16-10-91
		JP 4502604 T	14-05-92
		WO 9106503 A	16-05-91
US 3843025 A	22-10-74	AR 208289 A	20-12-76
		AU 7033574 A	08-01-76
		BE 815949 A	30-09-74
		DE 2429351 A	16-01-75
		FR 2234200 A	17-01-75
		GB 1430336 A	31-03-76
		JP 50042973 A	18-04-75
		NL 7408216 A	24-12-74
		SE 7408115 A	23-12-74