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(54) Refrigerator with variable volume chamber

(57) Refrigerator with a refrigeration compartment containing a chamber for preservation at temperatures different from those of said compartment, in which in order to enable the chamber capacity to be varied, said chamber, bounded by inner walls of said compartment (2), is completed by a removable structure (5, 5'), which can be located at different heights of said compartment (2), and comprises: a) a plate (6, 7) for supporting the structure (5, 5') at the desired height on conventional support elements present in said compartment (2), said plate (6, 7) forming the roof of the chamber, and b) a front door (10; 20, 21; 20", 21") for access to the chamber and extendable according to the location of the chamber-completing structure (5, 5').

EP 1 152 201 A1

Description

[0001] The present invention relates to a refrigerator provided with a refrigeration compartment containing a chamber for preservation at temperatures different from those of the compartment.

[0002] In the refrigeration compartment of refrigerators, it is known to provide a chamber, known as a crisper, for containing vegetables, fruit or other food to be preserved at a temperature higher than that in the rest of the compartment.

[0003] Relatively frequently, this chamber has a volume insufficient to contain those vegetable and fruit quantities which satisfy the requirements of a normal family, especially during periods of particular availability and cheapness.

[0004] Even a single conventional packet of salad or spinach occupies most of the crisper so that the remaining free part is inadequate for containing other different but likewise voluminous packages (for example of carrots, courgettes, peppers, peas or aubergines), without even considering melons and water melons. It is true that to avoid excessive damaging compression within the crisper, the user can solve the problem by locating the excess packages or products on the refrigerator shelves, however in this situation they are preserved under unsuitable temperature conditions, such as to negatively affect the preservation and organoleptic characteristics of the preserved food.

[0005] From the aforegoing it is clear that under certain conditions the user requires the availability of chambers of greater capacity which are still at a temperature different from that of the refrigeration compartment and more suitable for preserving specific types of food.

[0006] The main object of the present invention is therefore to provide a refrigerator with a chamber able to satisfy the said user requirement.

[0007] This requirement is satisfied by a refrigerator in accordance with the teachings of the accompanying claims.

[0008] The invention will be more apparent from the ensuing detailed description of some preferred embodiments thereof provided by way of non-limiting example and illustrated in the accompanying drawings, in which:

Figure 1 is a schematic partly sectional view of the lower region of one embodiment of the refrigerator of the invention, this region being concerned in the invention;

Figure 2 is a more constructional perspective partial view of the aforesaid region relative to the same embodiment of the invention;

Figure 3 is a schematic transparent perspective view of the same embodiment;

Figure 4 is a view similar to that of Figure 3 but showing another embodiment of the invention;

Figures 5A and 5B are schematic views taken from different angles of the embodiment of Figure 4, shown in two different positions of use;

Figure 5 is a schematic perspective view of a third embodiment of the invention.

[0009] With reference to the first three figures, the reference numeral 1 indicates the lower part of a refrigerator.

[0010] The refrigerator comprises a conventional refrigerated preservation compartment 2, bounded by the door (not shown), by side walls 3, by a rear wall 3A, by a bottom wall 3B and by a top wall (not shown). At predetermined heights, each of its side walls 3 presents projecting support elements or supporting shelves 4A, 4B. Each projecting element of one wall 3 is, for support purposes, coplanar with one on the other opposite wall. The consecutive lowest pairs 4A, 4B of these elements concern the invention. Figure 1 shows one support element of each of these two pairs, the lower being indicated by 4A and the upper by 4B.

[0011] The invention provides a removable structure, to rest on one or the other of the pairs of support elements 4A or 4B, and indicated overall by 5 if resting on the support elements 4B, or by 5' if resting on the underlying support elements 4A.

[0012] This removable structure defines, or rather serves to delimit, together with the walls 3, 3A and 3B of the refrigerator preservation compartment 2, two chambers of different capacities, the smaller of which applies when the structure in question rests on the elements 4A.

[0013] To visualize these capacities, of which the larger incorporates the smaller, this latter is defined by dotting and the larger by crosses.

[0014] The refrigerator hence comprises a chamber of variable volume, which depends on the location of the structure.

[0015] The structure 5, 5' (shown in Figures 1, 2, 3) comprises a glass plate 6 (which always acts as the upper wall independently of its capacity) surrounded by a plastic frame 7, which on the interior of the two sides 7A, 7B by which it rests on the projecting elements presents slide guides 8 for the so-called "door" of the chamber and which in the specific example is similar to a roll shutter 10 which can consist of a plurality of bars, for example of plastic material, hinged or pivoted to each other.

[0016] The structure in question presents at its front, substantially as an extension of each side 7A, 7B, a telescopically extendable leg 9 the components of which are indicated by 9A and 9B, said slide guides 8 extending longitudinally into these components via a connection region 11, to enable the roll shutter 10 to be slid along the legs 9 and hence close the front of the chamber when in either possible capacity, or to open it by movement in the opposite direction.

[0017] To use the smaller chamber capacity, the telescopic legs 9 are set in their retracted position and the structure is placed with its framed plate 6 on the lower support elements 4A; in Figure 1 the structure is indicat-

ed with this capacity by 5'. When the user requires a larger capacity the structure is supported on the upper support elements 4B (as indicated by 5) and the legs 9 are extended.

[0018] The legs can be removably retained in their retracted position by any known releasable catches, possibly elastic (Figure 1 shows a catch operating member, indicated by 12.

[0019] Figures 4, 5A and 5B (in which equal or corresponding parts are indicated by the same reference numerals plus an apostrophe) show a refrigerator with a variable volume chamber obtained by means of a structure which differs from that of the preceding figures in that the telescopic legs 9 are lacking and the movable wall for closing and for gaining access to the interior of the chamber (which in the preceding figures is represented by the roll shutter 10) is here replaced by two panels 20, 21 of preferably transparent material, for example plastic or glass. The panel 21 is provided with a suitable surround and is hinged at 22 to the front side of the frame 7' of the cover plate 6'.

[0020] The panel 21 is provided at its sides with slide guides 23 for the panel 20.

[0021] In a manner similar to the aforestated, the removable structure is rested with its cover plate 6' on the conventional support elements, here not shown, provided on the side walls of the refrigerator.

[0022] The support elements selected are those which correspond to the capacity required by the user. Figures 4 and 5B represent the structure position for providing the larger capacity, whereas Figure 5A represents that for the smaller capacity. When in the larger capacity position, the two panels 20, 21 are both used to close the chamber, whereas when in the smaller capacity position the panel 20, by virtue of its ability to be slid along the guides 23, is superposed on the panel 21. When the user requires access to the chamber interior, he rotates the two panels 20, 21 about the hinge 22.

[0023] Figure 6, in which parts equal or corresponding to those of the preceding figures are indicated by the same reference numerals plus a double apostrophe, shows a structure similar to that of Figures 4, 5A, 5B, the only difference being that the two panels 20". 21" are hinged together at 24, in the manner of a book. When in the smaller capacity position the two panels are superposed by rotation about the hinge 24 (and can be retained thereat for example by magnets and counter-magnets or conventional temporary retention means positioned in walls forming total or partial surrounds about the two panels 20" and 21").

[0024] When in the larger capacity position the two panels are both used to close the chamber. The function of the hinge 22" is to enable the two plates to be rotated for access to the chamber, as indicated in the preceding embodiment.

[0025] The framed plate 6, 7 of the structure 5, 5' presents at one end approximately hook-shaped means 30, 30" to cooperate, for suitable longitudinal retention of the structure 5, 5', with counter-means provided at the support elements 4A, 4B, and which can be for example in the form of seats 31 (Figure 2) into which said hook-shaped means can settle.

Claims

1. A refrigerator with a refrigeration compartment containing a chamber for preservation at temperatures different from those of said compartment, **characterised in that** in order to enable the chamber capacity to be varied, said chamber, bounded by inner walls of said compartment (2), is completed by a removable structure (5, 5'), which can be located at different heights of said compartment (2), and comprises: a) a plate (6, 7) for supporting the structure (5, 5') at the desired height on conventional support elements present in said compartment (2), said plate (6, 7) forming the roof of the chamber, and b) a front door (10; 20, 21; 20", 21") for access to the chamber and extendable according to the location of the chamber-completing structure (5, 5').

2. A refrigerator as claimed in claim 1, wherein said door (10) is flexible and is mounted slidable along guides (8).

3. A refrigerator as claimed in claim 2, wherein said door (10) is constructionally similar to a roll shutter.

4. A refrigerator as claimed in claim 2 or claims 2 and 3, wherein said door (10) is constructed from slats hinged together.

5. A refrigerator as claimed in at least one of the preceding claims, wherein the guides (8) extend into the support plate (6, 7) and into telescopic legs (9) connected at their front to said plate.

6. A refrigerator as claimed in claim 1, wherein the door (20, 21; 20", 21") is formed from a pair of panels movable one relative to the other.

7. A refrigerator as claimed in claim 6, wherein one panel (20) is mounted slidable in guides (23) rigid with the other panel (24).

8. A refrigerator as claimed in claim 6, wherein the two panels (20", 21") are hinged together (at 24).

9. A refrigerator as claimed in claims 6, 7 or 6, 8, wherein the two panels (20, 21; 20", 21") are hinged (at 22, 22") by means of one of them (21, 21"), to the plate (6, 7; 6", 7").

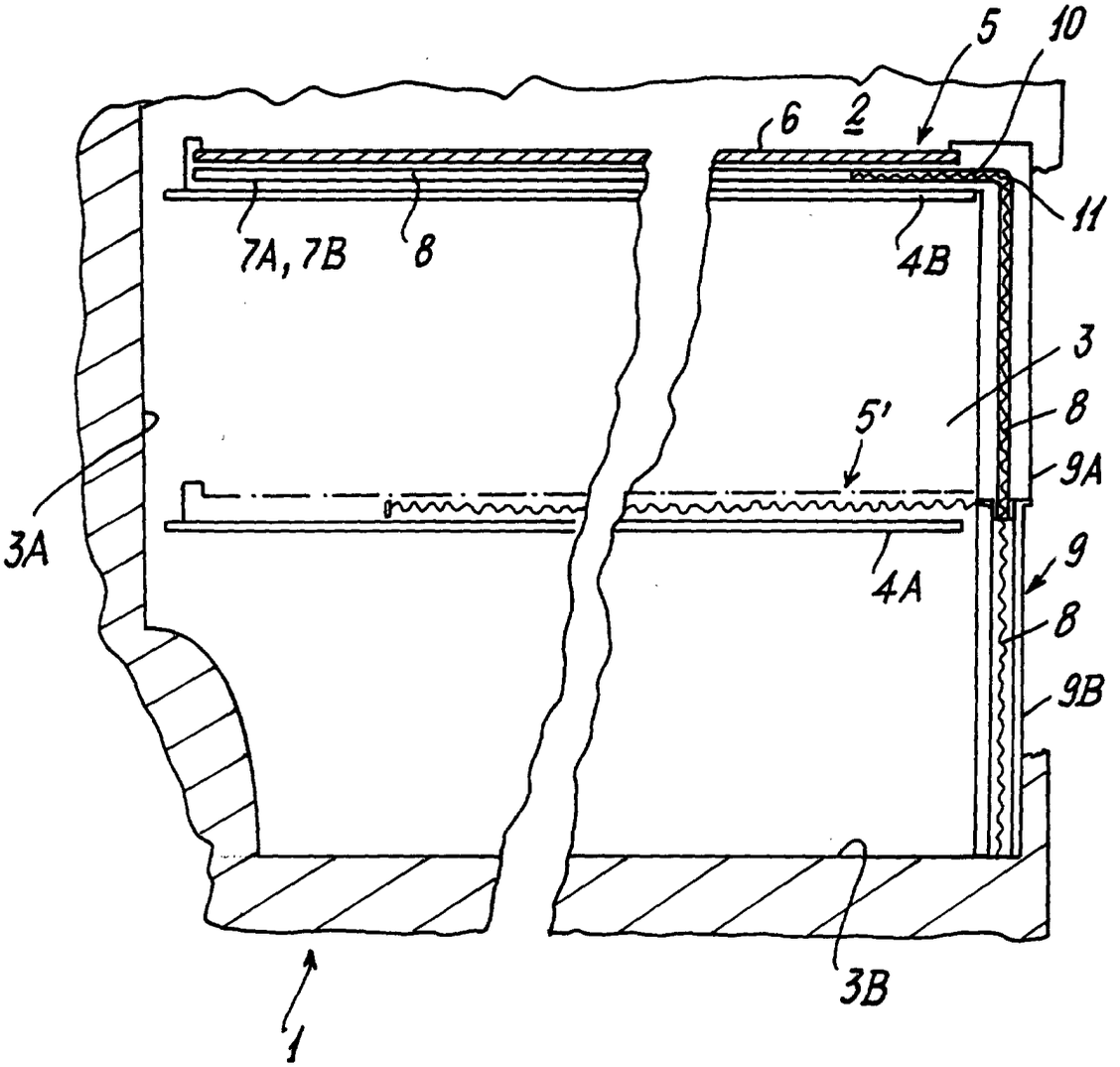

FIG. 1

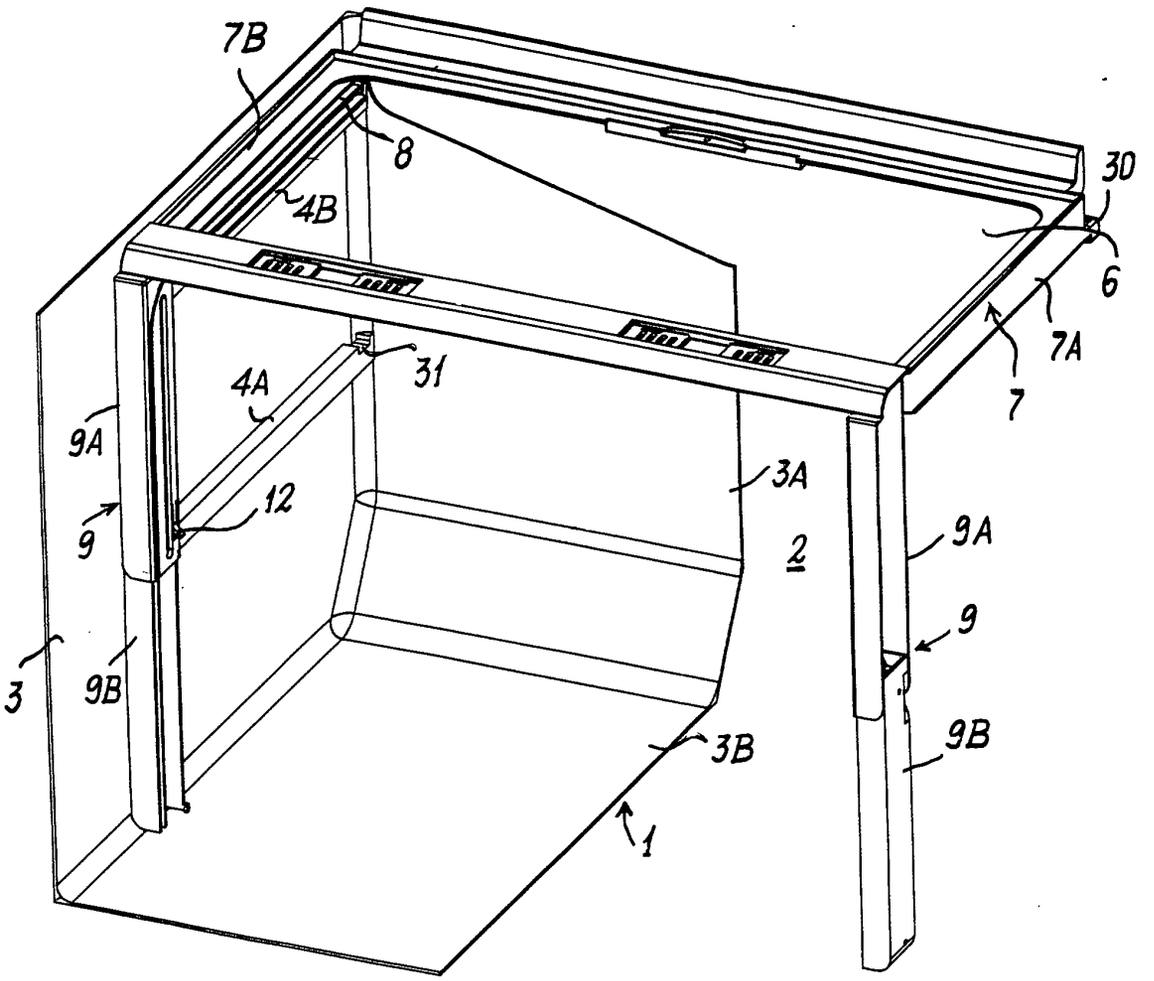

FIG. 2

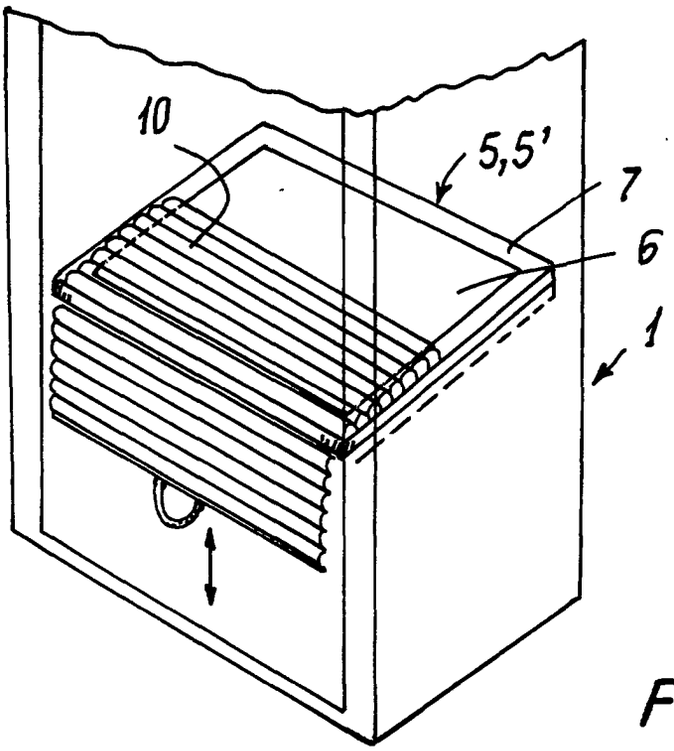

FIG. 3

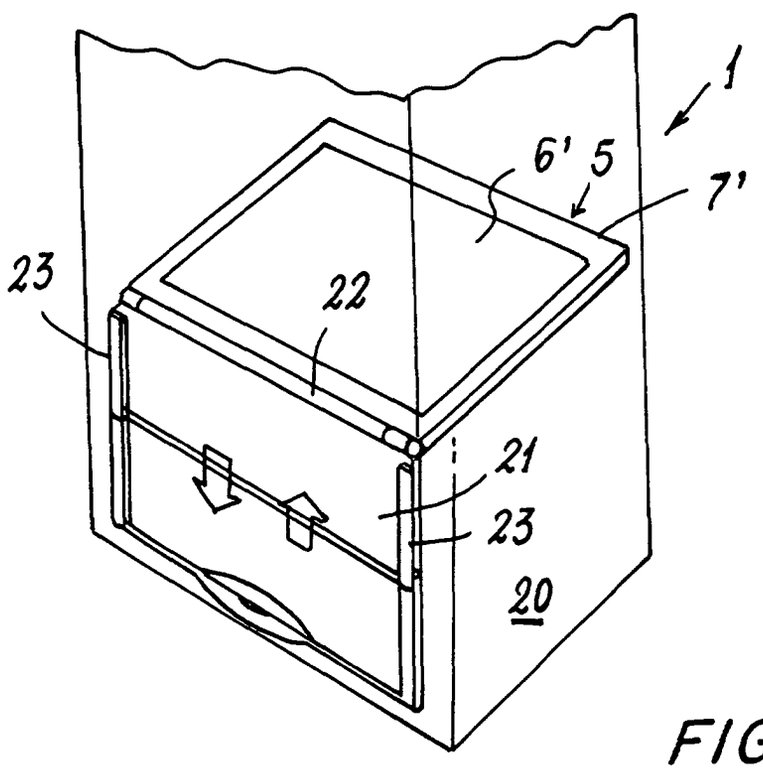

FIG. 4

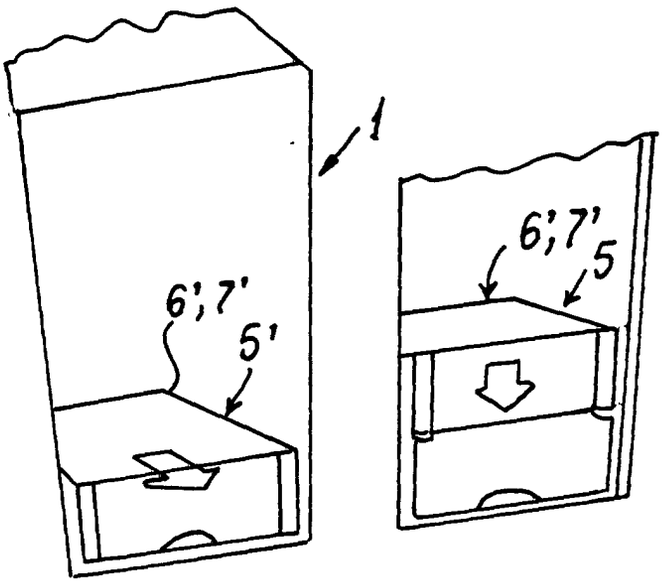

FIG. 5B

FIG. 5A

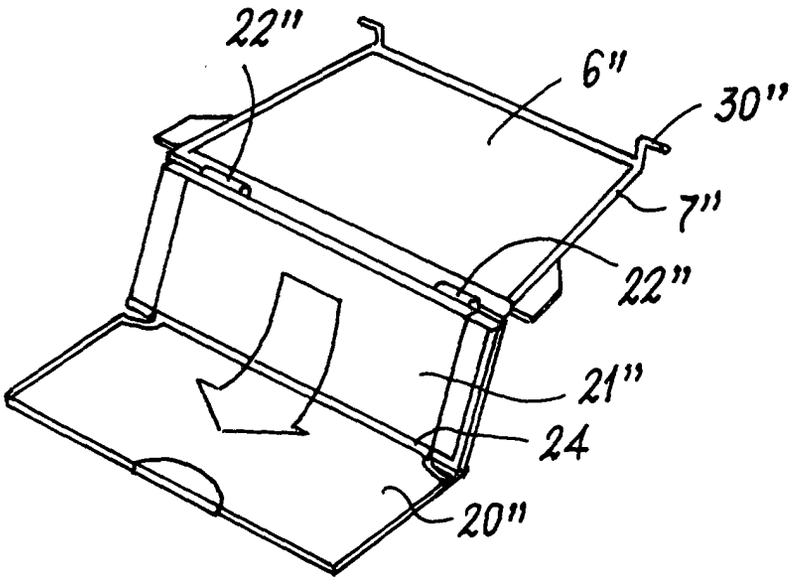

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 01 10 6734

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.7)
Y	FR 2 579 734 A (SELNOR) 3 October 1986 (1986-10-03) * page 3, line 4 - page 4, line 11; figure 1 *	1-3	F25D23/06 F25D11/02
Y	US 4 793 145 A (HWANG JAE S ET AL) 27 December 1988 (1988-12-27) * column 2, line 8 - line 56; figure 1 *	1-3	
A	GB 2 072 822 A (KENWOOD MFG CO LTD) 7 October 1981 (1981-10-07) * page 1, line 84 - line 120; figure 1 *	1	
A	DE 195 05 067 A (ANGERMANN ANJA) 22 August 1996 (1996-08-22) * column 1, line 1 - column 2, line 18; figure 3 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7) F25D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13 June 2001	Jessen, F

CATEGORY OF CITED DOCUMENTS

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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13-06-2001

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82