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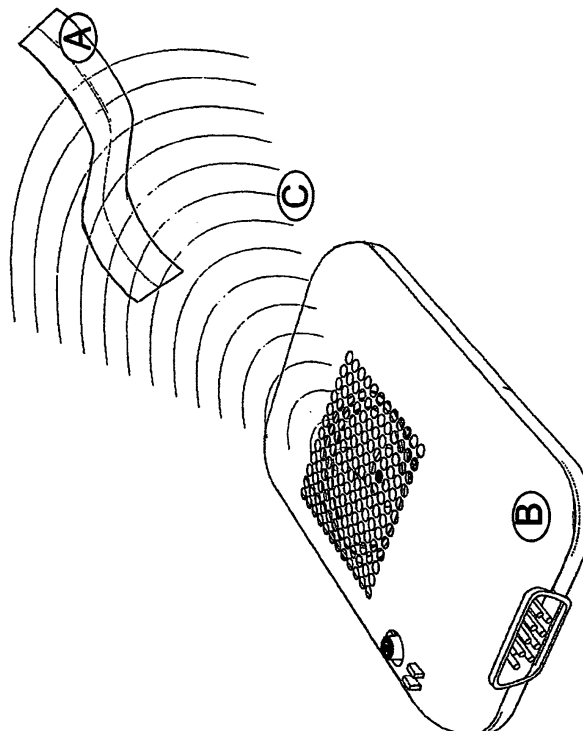
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(54) Portable device for proximity check and alarm

(57) The present invention deals with a device that is able to signal when one or more objects under surveillance go out of its operating range, in order to prevent thefts or simple distractions of the owner of such objects. The reader (B), whose sizes can be compared with those of a small cellular phone, once activated, emits radio waves (C) that energise the TAG (A). Once energised,

the TAG provides a perturbation to the radio field (B) by emitting in turn waves at a coded frequency, that the reader is programmed to recognise. The invention can be hidden in any commonly-used object. It is possible to program the reader (B) for recognising up to 50 different TAGs, and its maximum theoretical limit operating range has a substantially circular shape and a radius of about 2 meters.

FIG. 1



Description

[0001] The present invention refers to a device that is able to signal when one or more objects under surveillance go out of its operating range. In order to prevent thefts or simple distractions of the owner of such objects.

[0002] The system operation will now be briefly described, while its technical features will be explained in more detail later.

[0003] The invention, operating in radio-frequency, is composed of an active component, herein below called READER and one or more passive components, called TAG. Once activated, the reader continuously emits a probe signal that is received by the TAG which, being electro-magnetically energised, provides perturbation to the field emitted by the reader; in turn, the reader detects such perturbation, interpreting it as normal operation.

[0004] If one or more TAGS go away from the reader's operating range, this latter one will not be able any more to detect their presence and will activate an alarm.

[0005] The advantages resulting from the adoption of such device are readily clear, especially if compared with theft-preventing devices that the current art proposes.

[0006] The known art, in fact, does not provide anything that has the same purpose, apart from uncomfortable mechanical devices (small chains) that, once being clamped to a wrist, or a belt, prevent the accidental loss of goods, or their theft.

[0007] These systems, in addition to being so difficult to use that sometimes this is enough to advise against their use, do not allow efficiently protecting objects of any nature, as the present invention instead aims to do.

[0008] These objects and advantages are all obtained by the portable device for proximity check and alarm, object of the present invention, that is characterised by what is provided by the below-listed claims.

[0009] These and other characteristics will be better pointed out by the following description of some embodiments shown, merely as a non-limiting example, in the enclosed tables of drawing in which:

- figure 1 shows in a perspective view the physical appearance of the portable device for proximity check and alarm of the invention;
- figure 2 shows in more detail the components of reader B;
- figure 3 shows the circuit configuration of the device.

[0010] Describing now the prototype version of the invention, a more accurate description of its operation will also be provided.

[0011] In order to put the device into practice, micro-electronic components, that can be found on the market, have been used: the product as described can assume the smallest sizes by designing and realising dedicated electronic components with high-integration (SMD) techniques.

[0012] In figure 1 it is possible to note the physical ap-

pearance of the prototype, reader B, whose sizes can be compared with those of a small cellular phone that, once activated, emits radio waves C at the standardised frequency of 13.56 MHz, according to harmonised standards; these waves energise TAG A, that can be found on the market with extremely reduced sizes, so that it can be hidden in any commonly-used object, even of the metal type (with particular arrangements).

[0013] The constructive technology of TAGs will not be dealt with, since they are already known in the art.

[0014] Once energised, the TAG provides perturbation to radio field C by emitting in turn waves at a coded frequency, that reader B is programmed to recognise.

[0015] It is possible to program the reader for recognising up to 50 different TAGs (in the prototype) and its maximum theoretical limit operating range has a substantially circular shape and a radius of about 2 meters.

[0016] In figure 2, it is possible to observe in more detail the components of reader B; for the technical denomination of electronic components, see figure 3, described below.

[0017] Always in figure 2, the upper cover 1 can be observed, that has holes 2, 3 for housing the supply button 15 and the serial data port 20, necessary for recharging lithium-ion batteries 4 and for programming the device, whose minimum supply voltage is 9 Volts. Beside the supply button, the status LEDs 16 and 17 can be distinguished, that point out when the system is operating and when a TAG has gone out of the reader B operating range, such event being also acoustically signalled by the buzzer 6, the integrated circuits 5, 7, 8 and 11, whose denomination and type of connection will be included in figure 3 and in the list of components.

[0018] The programming procedure is activated by button 12 and its operating cycle is signalled by LED 11. The description is completed by the antenna 9, secured to the printed circuit by a screw 13, the lower cover 19 that has securing bushes 21 for the circuit and a lip 22 along the closure to prevent dust and water from entering.

[0019] With reference to figure 3, an electric diagram will now be shown, with the related components that make up the printed circuit 18 according to a preferred embodiment:

- B1: speaker 8 ohm/0.5W;
- C1, C5, C6, C7, C8, C9: 2 μ F/25V;
- C2: 25 0.1 μ F;
- C3: 1 μ F/15V;
- C₄: 0.01 μ F;
- D1: 1N4148;
- LD1, LD2, LD3: rectangular 2.5x5 LEDs;
- R1, R2, R3: 10 Kohm;
- R4, R5, R6: 240 ohm;
- R7, R8: 1 Kohm,
- R10: 68 Kohm;
- T1: 2N3903 NPN;
- U1: L78M05CV;
- U2: Texas Instruments TIRIS Micro-reader Module

RI-STV-MRDI;

- U3: MAX232;
- V4: NE555.

[0020] The antenna ANT is chosen in compliance with specifications from the component V2 manufactured. 5

[0021] The delay time T with which the device starts operating can be computed as follows: $T = 1,1 \cdot R9 \cdot C10$.

[0022] The components R9 and C10 will then have to be chosen according to the delay value that has to be obtained. 10

[0023] The described invention is subjected to numerous modifications and variations, in addition to the described one, all falling within the scope of the same inventive concept; in the practical industrial embodiment of the invention, all components can be replaced by other ones that are technically suitable for their purpose, whose performances are better in terms of sizes and energy consumption. 15

[0024] Reader B can be conveniently integrated in the volume occupied by a portable phone battery, or integrated in the volume occupied by a compact data processor, also called PDA, or on a notebook, or electronic agenda. 20

[0025] The maximum theoretical limit operating range of reader B has a substantially circular shape and a radius of about 2 meters. 25

Claims 30

1. Portable device for proximity check and alarm, **characterised in that** it comprises at least two units, of which at least one passive component, or TAG (A), is made integral to the object on which the proximity check has to be performed, and an active component composed of a reader (B) emitting radio waves (C), whose function is detecting when any one of the above TAG (A) units, which the reader (B) is programmed to recognise, goes away from its operating range. 35 40
2. Portable device for proximity check and alarm according to claim 1, **characterised in that** the reader (B) is integrated in the volume occupied by a portable phone battery. 45
3. Portable device for proximity check and alarm according to claim 1, **characterised in that** the reader (B) is integrated in the volume occupied by a compact data processor, also called PDA, or a notebook, or an electronic agenda. 50

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FIG. 1

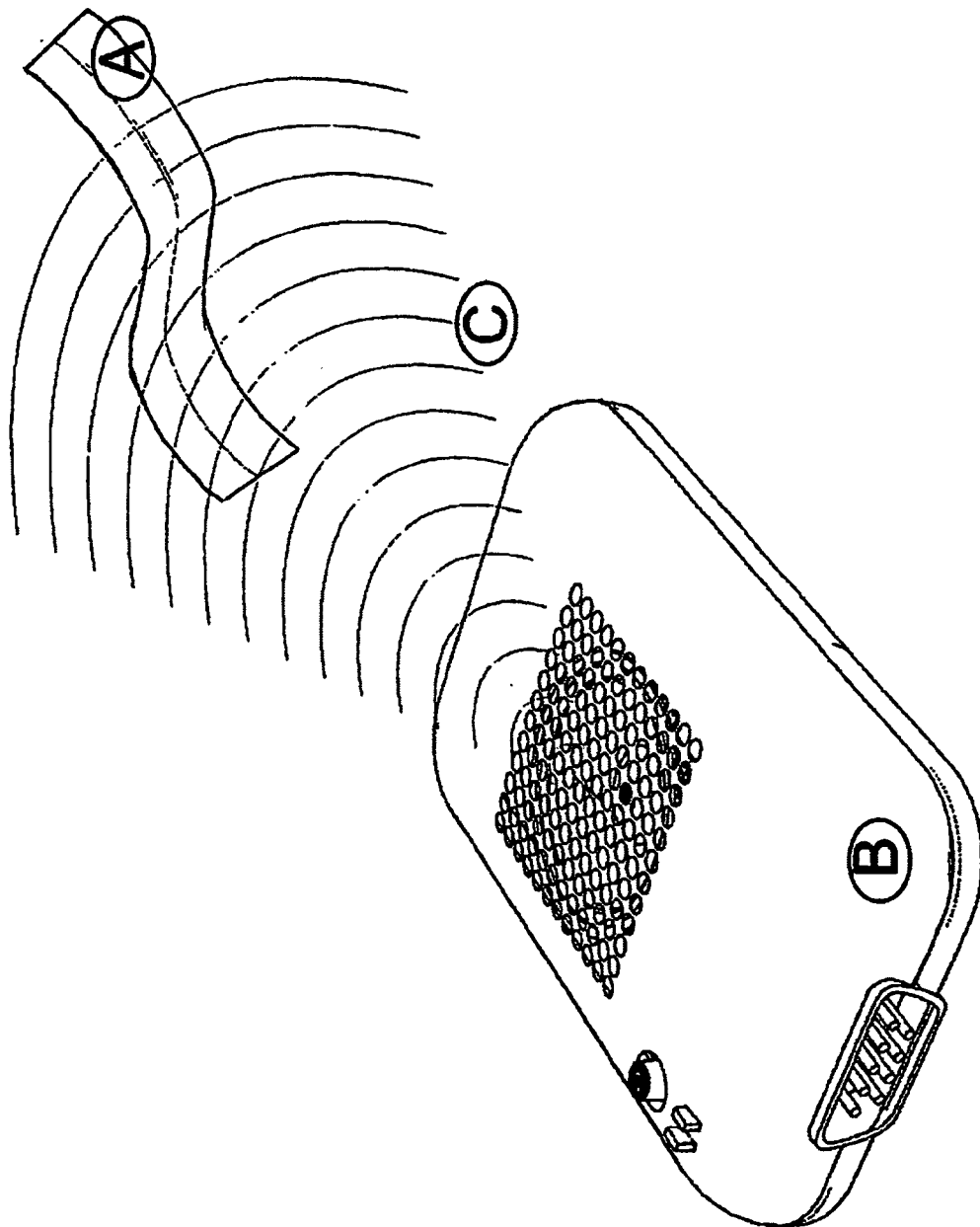
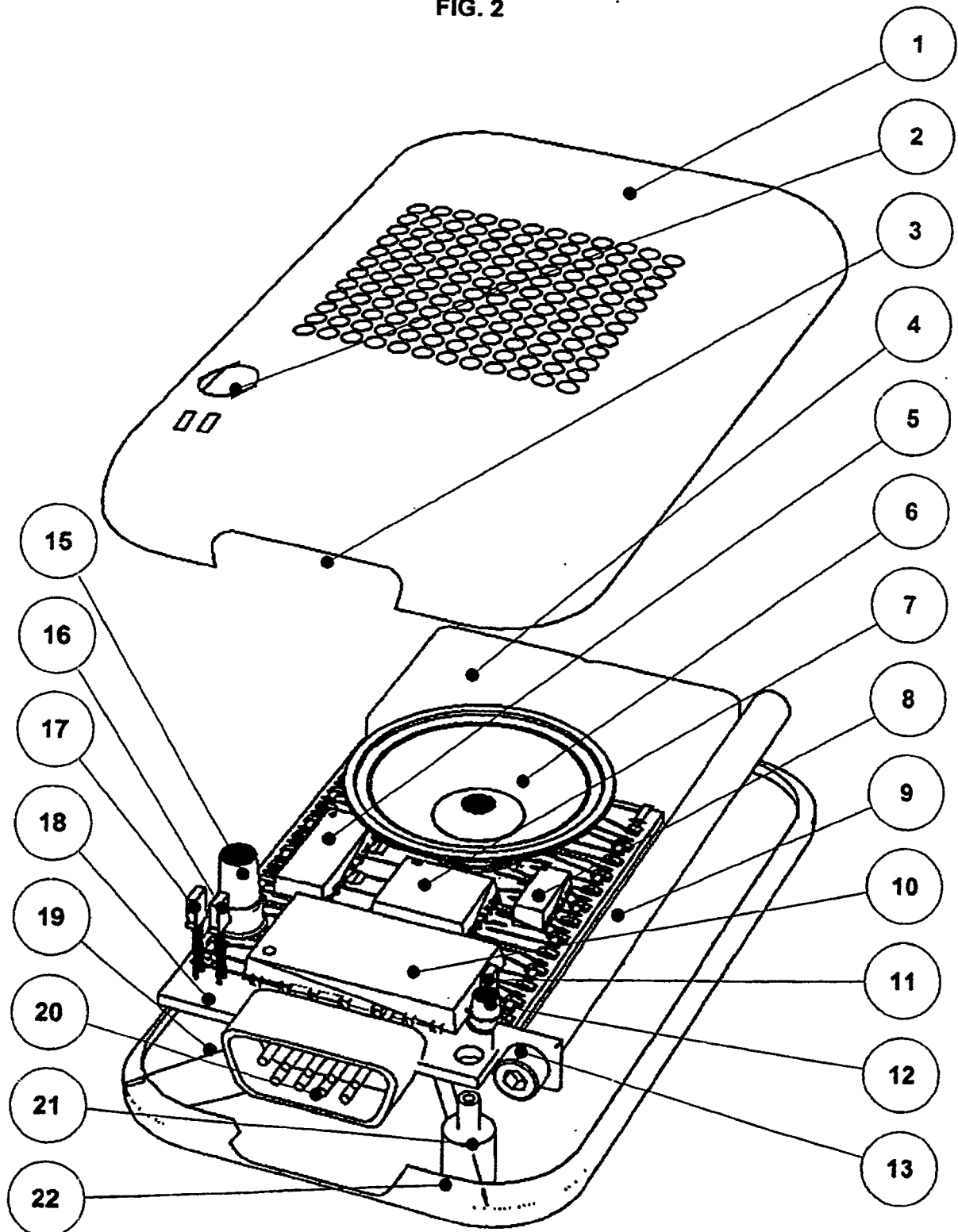
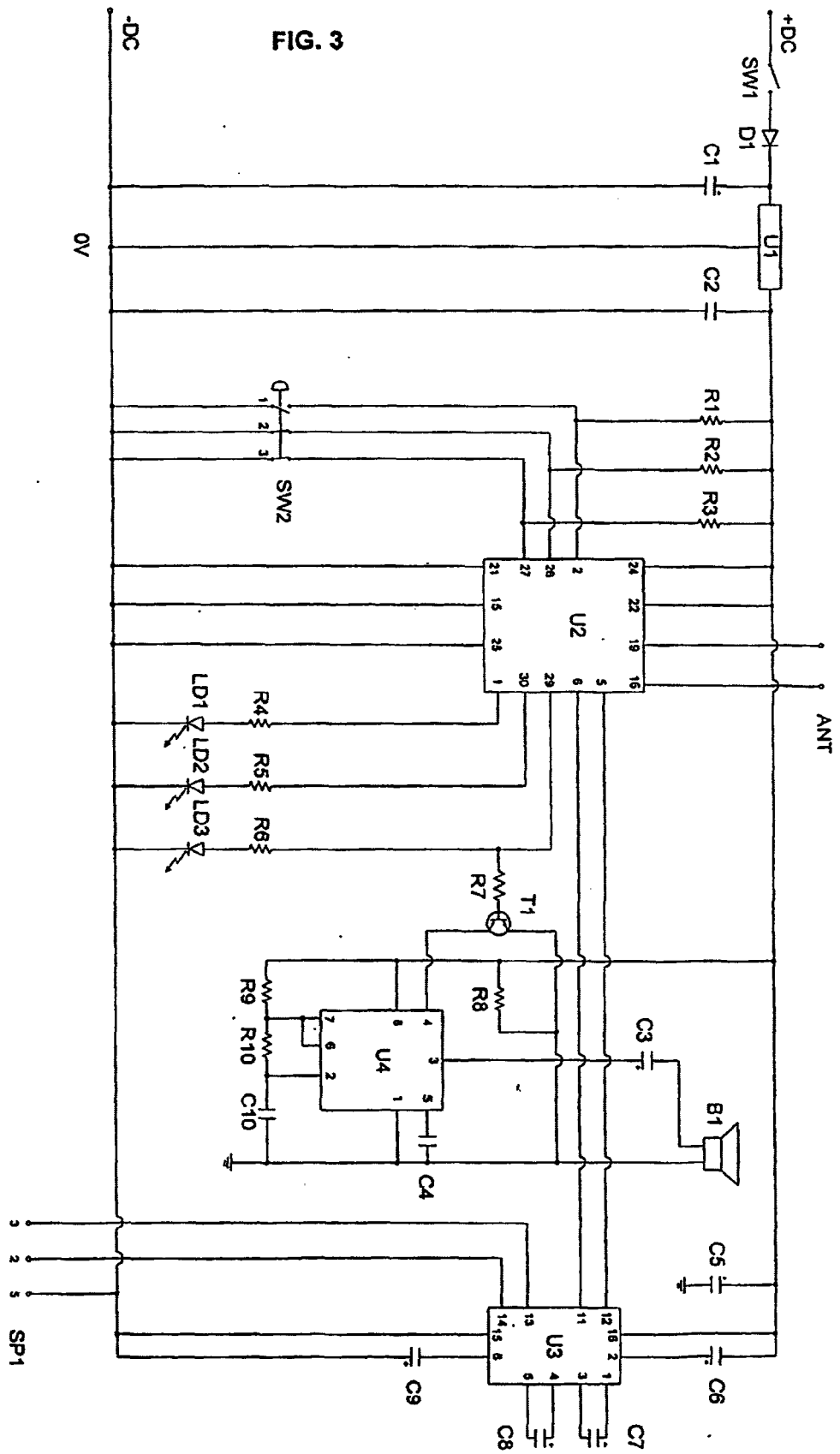


FIG. 2







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 00 2430

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A	EP 1 251 472 A (SONY INTERNATIONAL GMBH) 23 October 2002 (2002-10-23) * paragraphs [0009] - [0011] * -----	3	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 5 July 2005	Examiner Meister, 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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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