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(71) Applicant: **S.A. DE FABRICANTES DE ELECTRODOMESTICOS (SAFEL)**
Apartado 68
E-31080 Pamplona(ES)

(72) Inventor: **GARCIA SANTAMARIA, Salvador**
Bartolomé de Carranza 18
E-31008 Pamplona(ES)

(74) Representative: **Ungria Lopez, Javier et al**
Avda. Ramon y Cajal, 78
E-28043 Madrid (ES)

(54) **REINFORCEMENT PART APPLICABLE TO REFRIGERATOR DOORS.**

(57) Such parts are intended to be situated at the corners of the door of the refrigerator between the external metal panel and the inner plastic door, during the fabrication of the door when proceeding to the injection of insulating material. Their function is to obturate the slits formed at the corners and to solve the problem of guidance of the hinge axis. They have a prismatic shape with triangular base with a perimetral flange (2) which is applied against the walls, and which has two housings (3) for mounting a bushing (4) for rotation of the hinge axis, on the side where the hinges are arranged. The housings (3) communicate with each other and the bottom membrane (12) of the housing (3) unoccupied by the bushing (4) is previously ruptured to let the air inside the door come out during the injection of insulating material.

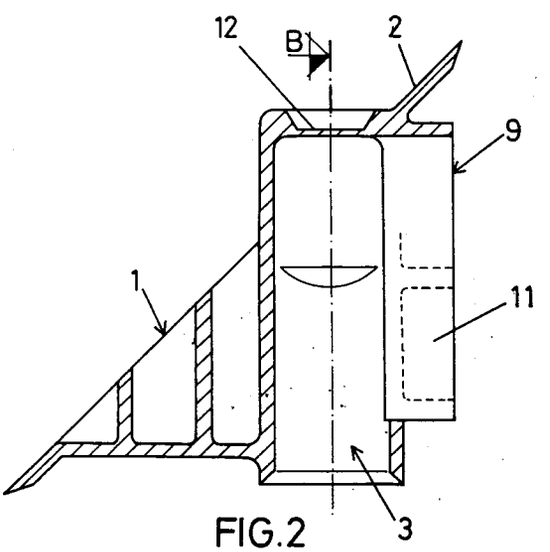

FIG.2
A-A

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OBJECT OF THE INVENTION

As is expressed in the title of this specification, the present invention refers to a reinforcement piece applicable to refrigerator doors, which has been conceived and developed for placement in the inside corners of refrigerator doors.

In the manufacturing process of refrigerator doors, one starts with a metal panel that has its edges folded over for the purpose of forming a type of open box in which the plastic inside portion of the door is incorporated. Between the panel of the door and the plastic inside portion of the door there is an injected insulating material.

Since the edges of the metal panel, in this part of the corners of the door, are not joined in a leak-proof manner, in the injection of the insulating material this material inevitably passes through the slots that remain and subsequently this material must be removed.

Besides, the rotation axis of the hinges presently has problems of assembly since it is possible that it does not remain centered enough since the injected material offers resistance, when this rotation axis is incorporated in the door.

The injected material also comes out through this area as the drilled holes of the panel through which the rotation axes of the hinges protrude are not plugged up adequately.

DESCRIPTION OF THE INVENTION

The reinforcement piece that the invention proposes, permits in the first place, plugging the slots of the corners for the purpose of preventing the injected material from coming through. Secondly, it also resolves the problem of guiding of the axis of the hinge,so that offcentering is not produced. It also prevents the insulating material to come out through the holes provided for said hinge shafts to come out through.

Therefore, the refrigerator door has four reinforcement pieces, one in each corner and incorporated at the inner surface of the metal panel, before assemblying the plastic inner portion of the door. Only two of these reinforcement pieces are the ones that are used to assemble the hinge shafts, depending on whether the door opens to the left or to the right.

Each one of these reinforcement pieces has two recesses for the selective coupling in only one of them, of a rotation bushing of the shaft of the respective hinge. The rotation bushing will be inserted in either recess depending on whether the door opens to the left or to the right, as well as whether the piece is at the top or bottom of the door.

In order to facilitate the understanding of the features of the invention and forming an integral part of this specification, some sheets of drawings, in whose figures, with an illustrative non-restrictive character the following has been represented, are attached hereto:

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1.- It is a bottom plan view of the reinforcement piece applicable to refrigerator doors, object of the invention.

Figure 2.- It is a section along cutting line A-A of figure 1.

Figure 3.- It is a top plan view of what is shown in the above cited figures.

Figure 4.- It is a section along the cutting line B of figure 2.

Figure 5.- It is a side raised view of what is shown in figure 2.

Figure 6.- It is a section along cutting line C of figure 5.

Figures 7, 8 and 9.- They are respective raised views with a sectioned side raised portion with a sectioned quadrant and bottom plan, of one of the rotation bushings.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Making reference to the numbering that is indicated in the figures, we can see that the reinforcement piece applicable to refrigerator doors, that the invention proposes, has a general prismatic shape with a triangular base and is made of injected plastic material. Its geometry can be seen in figures 1 to 6. The base of this prismatic shape is a right-angled triangle whose side surface corresponding to the hypotenuse is the one that is to be parallel to the edge corresponding to the edge of the door, this edge being determined by the folded edges of the metal panel that the refrigerator door is made out of. This surface forms a perimetric wing that slightly exceeds the prismatic volume, this wing also being beveled in order to facilitate pressure contact by the thrust that the expansion of the insulating material that is injected in the door produces, once the metal panel receives the plastic inner portion of the door. This larger side surface has been referred to as number 1 and the beveled edge of the perimetric wing is referred to as number 2.

The reinforcement piece includes a pair of identical generally cylindric-shaped recesses (3). In each one of them a rotation bushing generally referred to as number 4 can be mounted in each one of them. The design geometry thereof can be seen in figures 7 to 9. In the inside of this rotation

bushing (4) the shaft or pin of the corresponding hinge moves. Depending on whether the opening of the door is to the left or to the right, as well as whether the reinforcement piece is at the top or bottom of the hinging shaft of the door, either one of the recesses (3) will be used for insertion of the rotation bushing (4.)

Each one of the recesses (3) of the reinforcement piece has an outer cylindric piece and towards the inside they are finished in a flat manner in order to define nonrotating means of the bushing (4), upon the latter being formed by a cylindric portion (5) and another narrow one (6) with sections equivalent to those of recess (3.) The cylindric portion (5) of the rotation bushing (4) is finished in a flange (7) and the free end of the narrow portion (6) has a diametric notch (8.)

The recesses (3), as clearly seen in figure 2, also open towards one of the side walls (9) of the former general prismatic-triangular shape according to longitudinal grooves (10) flanked by partition walls (11.) The longitudinal partion walls (11) are joined by the end corresponding to the blind base (12) of the recess (3), while they are separated at the other end and form an opening at the bottom part of figure 2.

Upon effecting the assembly of the door, the walls (12) corresponding to the recesses (3) in which the rotation bushing (4) does not go and only in the pieces (1) of the side of the hinging, are pierced through, operation which is easy since this wall (12) is very thin for this purpose, defining an easily removeable membrane.

Now then, since the recesses (3) of a single reinforcement piece are joined, if one of them is used to insert the rotation bushing (4), in which case the reinforcement piece would be located at the hinging side of the refrigerator door, in the injecting process of the insulating material upon the foam increasing in volume, an air outlet is produced precisely by the hole formed upon piercing through the membrane (12), from the free recess (3) of the rotation bushing (4) towards the enclosure formed by the piece and the walls of the door and from there to the recess (3) occupied by said bushing and since the latter is of a tubular structure, by its axial recess the air that the injected insulating material vacates comes out, without the injected material coming out, since the foam acquires enough consistency before coming outside.

The rotation bushing (4) is introduced through the hole (4) made in the edge of the door, in correspondence with the recess and though the inside edge reaches the bottom (12) of the recess, there is a radial or side passage due to the diametric notch (8.) The notch (8) is diametric so that the rotation bushing (4) can be inserted in any position.

Claims

1. Reinforcement piece applicable to refrigerator doors, which having been conceived to be placed in the corners, between the folded edges of the metal panel that forms the outside of the door and the plastic inner portion of the door that is received between said edges, the inside of the door being filled by an injected insulating material, said piece having the purpose of establishing the sealing of the openings formed between said edges of the metal panel, as well as being the carrier of the rotation axes of the hinges, characterized because it has a general prismatic form with a right-angled triangle base whose larger surface (1) corresponding to the hypotenuse, defines a slightly flanged perimetric flange (2), that is applied under pressure against the inner walls of the panel, also including two recesses (3) for selective coupling of the corresponding rotation bushing (4) in which the hinge shaft moves, depending on whether the door opens to the right or to the left.

2. Reinforcement piece applicable to refrigerator doors, according to claim 1, in which the cited recesses (3), are initially cylindric and end in a flat narrowing, both having longitudinal windows (10) flanked by parallel partition walls (11) and the rotation bushings (4) having an outer equivalent shape, also being provided with an outer flange (7) in the cylindric end thereof and a diametric notch (8) in the opposite one.

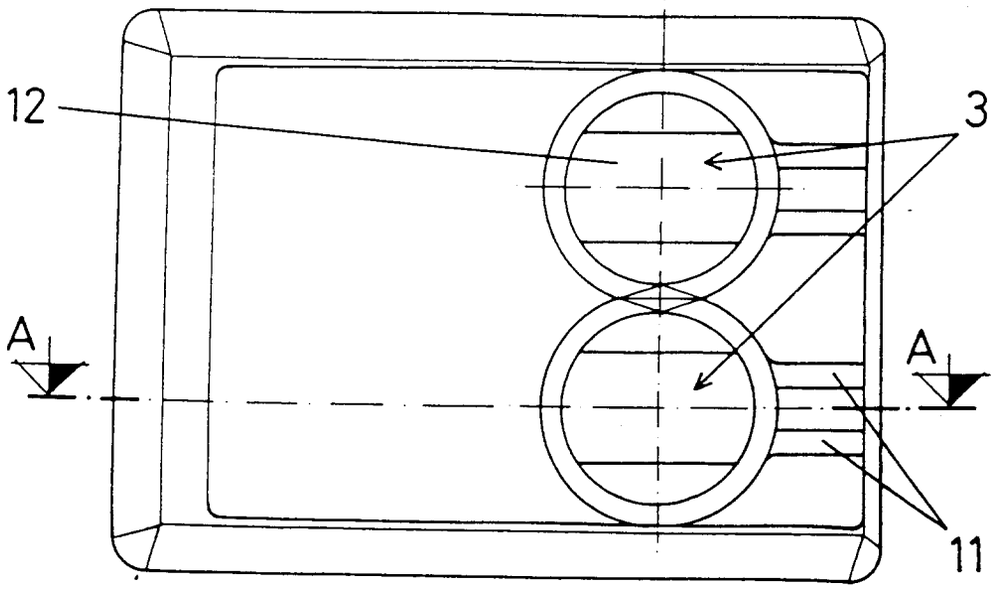

FIG.1

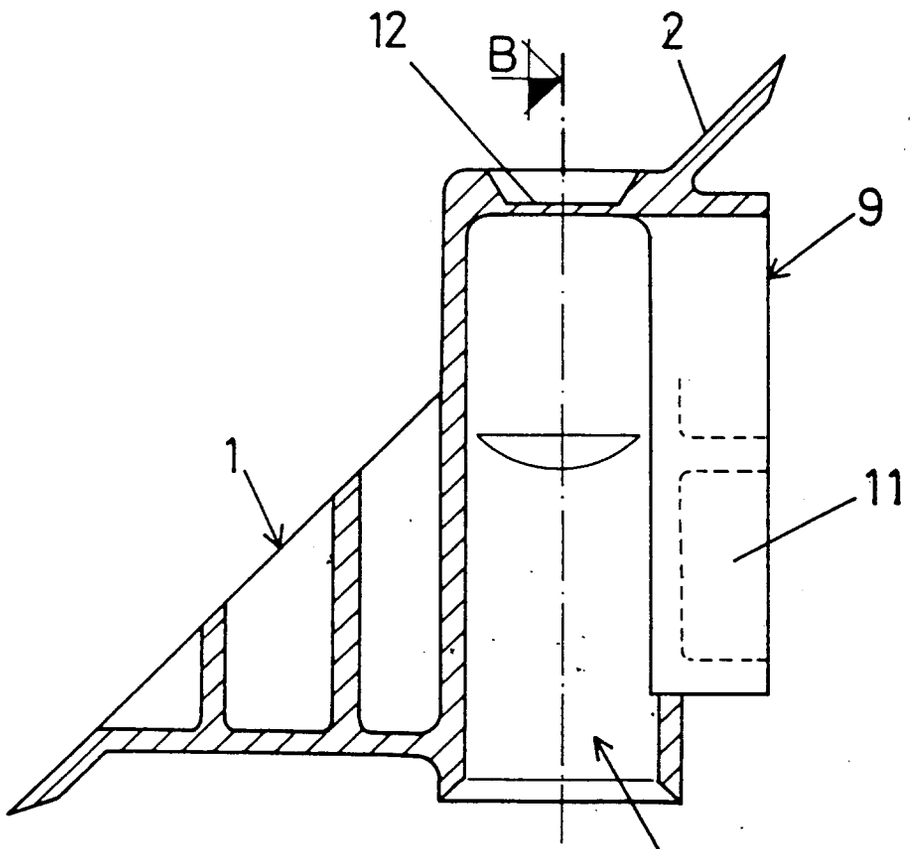

FIG.2

A-A

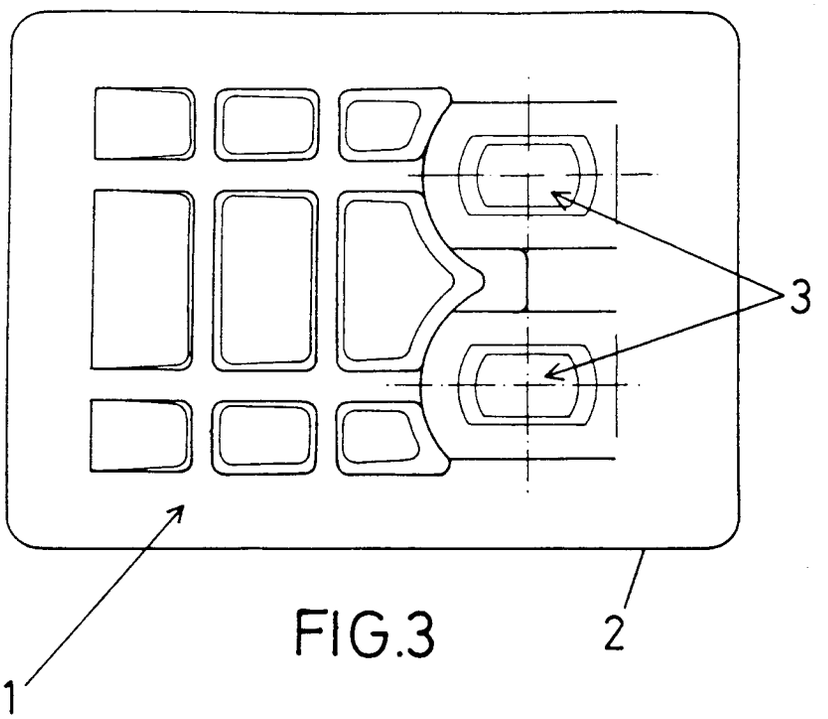

FIG.3

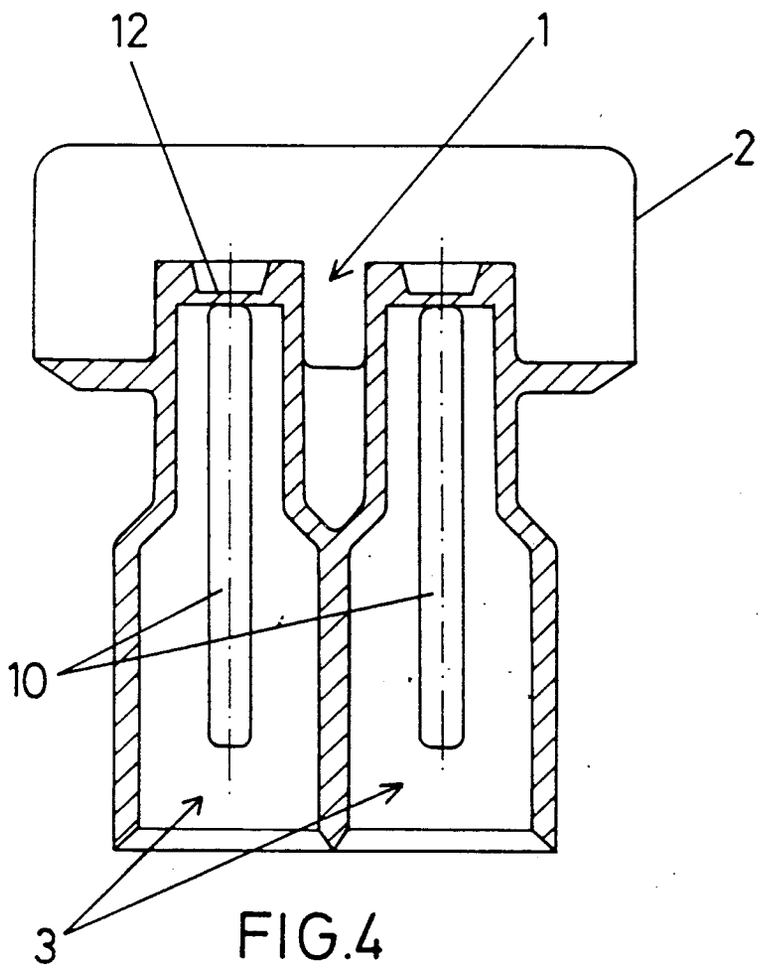

FIG.4
B

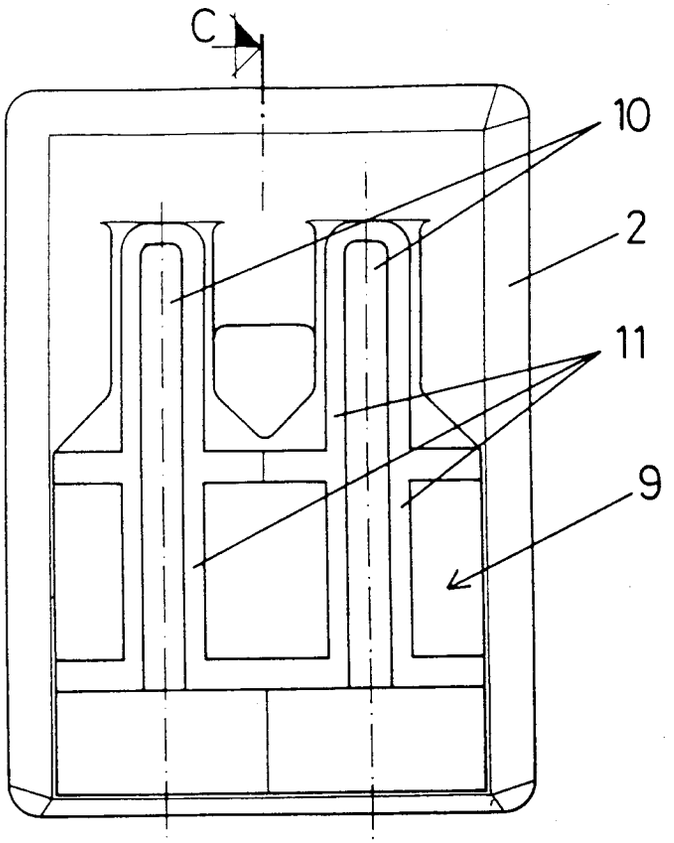

FIG.5

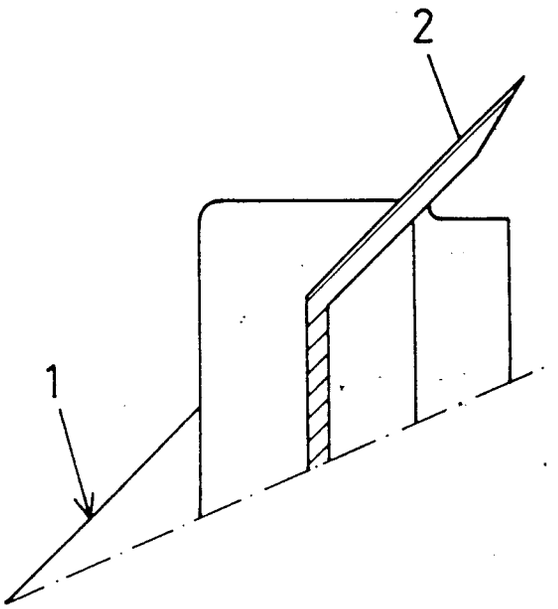

FIG.6
C

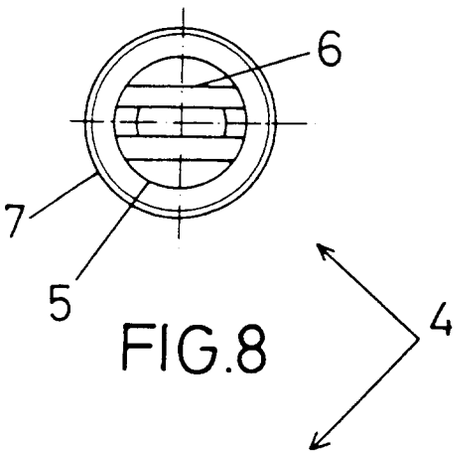

FIG.8

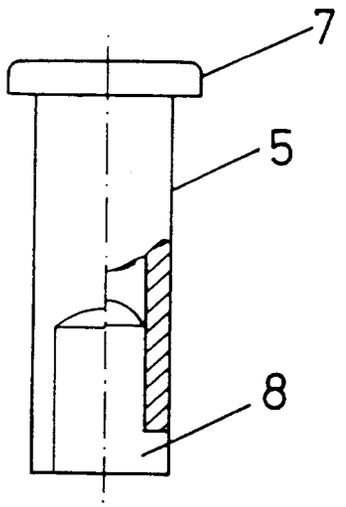

FIG.7

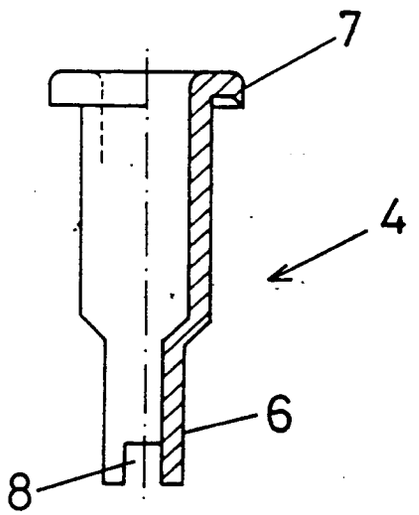

FIG.9

INTERNATIONAL SEARCH REPORT

International Application No PCT/ES 92/00002

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [5]

According to International Patent Classification (IPC) or to both National Classification and IPC

CIF.5 F 25 D 23/02 E 05 D 7/08 E 06 B 3/96

II FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
CIF.5	F 25 D E 05 D E 06 B

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category [10]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
A	DE,U,7511148 (LICENTIA) 14 August 1975, see page 6, paragraph 4 - page 7, paragraph 1; figures 1-3	1
A	US,A,3107758 (BENHAM) 22 October 1963, see column 13, line 30 - column 18, line 62; figures 3-37	1
A	GB,A,2024903 (ONI-METALLWARENFABRIKEN GÜNTER & CO.) 16 January 1980, see page 1, line 95 - page 2, line 26; figures 1-11	1
A	US,A,3766599 (ULLMAN) 23 October 1973, see column 3, line 29 - column 7, line 19; figures 1-7	2
A	US,A,3863391 (HORVAY) 4 February 1975	

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* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
24 June 1992 (24.06.1992)	10 August 1992 (10.08. 1992)
International Searching Authority	**Signature of Authorized Officer**
European Patent Office	

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	US, A,4238908 (BUNCE) 16 December 1980 ---	
A	GB,A,2031547 (FISCHER & PAYKEL) 23 April 1980 -----	