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(54) TRANSPARENT DOOR INTENDED FOR INSIDE A REFRIGERATOR

(57) The invention relates to a transparent door for inside a refrigerator, consisting of a internal transparent door (2) coupled to the shelf compartments of the refrigerator (6) by means of a hinge or equivalent (4). The door can be actuated using a knob (3) or similar in order to open the door and remove, arrange or insert food and in order to close the door until it is in the rest position, said position being secured with a stop element (5). In this way, in order to look for and remove a particular food item it is only necessary to open the compartment corresponding to said food item.

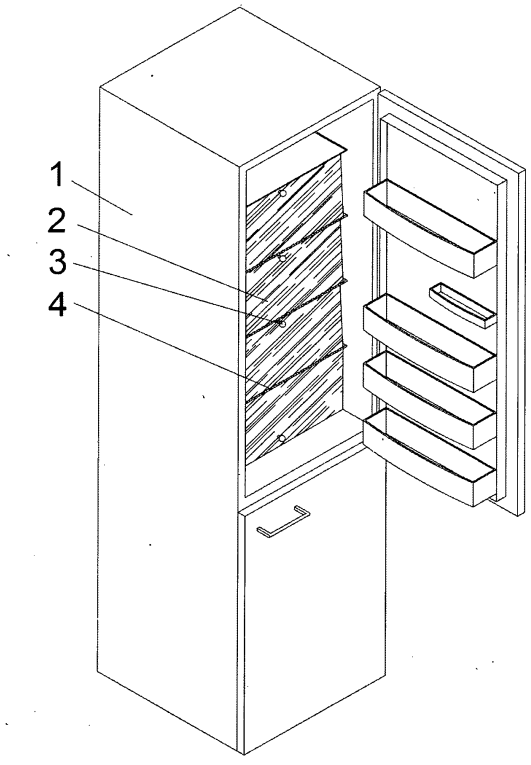

FIG. 2

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Description

OBJECT OF THE INVENTION

[0001] The present invention, as is explicitly stated in the heading of this descriptive report, consists of doors of transparent material placed in the compartments of a refrigerator and connected to the shelves of same, with the purpose of obtaining greater energy efficiency of the refrigerator and consequently significant energy savings in its operation.

[0002] The invention is based on the fact that when you open the front door of a refrigerator to deposit, sort, search, select, or take food out, much of the cold air from the inside of the fridge is exchanged with warmer air from the room or area in which the refrigerator is situated, thereby raising the temperature inside of the appliance and heating, as a result, both the food deposited in the refrigerator and the inside walls of the refrigerator itself.

[0003] The refrigerator equipped with transparent interior doors is different because the search and selection of food is performed without causing a rise in temperature of the interior of the refrigerator due to the exchange of air, and when depositing, taking out or rearranging food, temperature rise through air exchange occurs exclusively in the space corresponding to the handled shelf.

[0004] The use of these features results in not only greater performance from the refrigerator, achieving significant energy savings (estimated at approximately 30%) in the operation of the refrigerator but additionally it enhances the conservation and preservation of the foods stored inside the fridge, owing to the temperature inside remaining more constant and avoiding the thermal jumps and fluctuations which can have a deleterious effect on the quality and storage life of food kept within.

[0005] The energy efficiency of the refrigerator, using the method outlined above, results in improvement in the energy efficiency of the refrigerator of approximately one or two positions (depending on the age and model of the refrigerator) on the official energy efficiency scale.

BACKGROUND OF THE INVENTION

[0006] There are numerous means, procedures and methods that allow for the searching and selection of food in a refrigerator before taking it out, usually based on the transparency of the main door of the fridge, which undoubtedly results in energy savings with respect to a refrigerator without said means.

[0007] Nevertheless, the opening of these refrigerators, to put in, rearrange or to take out food, exposes the whole interior space of the fridge to warmer air from the environment resulting in the aforementioned rise in the interior temperature of the fridge and its contents so that in these manipulations some energy is inevitably wasted in order to return the temperature inside the fridge to its previous state.

[0008] Additionally, the fact that the front door is transparent means having the interior of the fridge and its contents exposed to view.

[0009] In most homes, the aforementioned exhibition is not aesthetic, so that it is usually avoided, unless it is a special product, or used as a display case, or refrigerated wine rack etc.

[0010] In such cases and/or when it comes to products which for some reason people are interested in having visibly exposed so that they can be seen without opening the refrigerator, (for example products on sale in shops, bars, self - service convenience stores, etc.) this system still has appeal, as transparent Interior refrigerator doors are also applicable to exhibitors and refrigerated display cases, obtaining similar, significant improvements in the performance of same.

[0011] In the same way the invention can be applied to refrigerators whose shelves are racks, simply by placing a continuous sheet of material on these racks, which also makes for easy cleaning.

DESCRIPTION OF THE INVENTION

[0012] First, the inner transparent refrigerator door has the distinction of separately compartmentalizing each of the shelves of the refrigerator, so that handling any one area or shelf does not compromise the storage temperature of the foods in the rest of the refrigerator.

[0013] The transparent door in the interior of the refrigerator is constructed using a rigid and transparent polycarbonate sheet. It may however, be fabricated from any other material such as polymethyl methacrylate, polyvinyl chloride, polyethylene, etc. provided that the material possesses the two aforementioned qualities, rigidity and transparency.

[0014] For ease of use and handling, a small knob of any rigid material may be affixed to the interior door.

[0015] This polycarbonate sheet is attached to each shelf and separated by a hinge (or any other suitable joint) making it hinged with respect to the shelf and allowing for the opening and closing of same.

[0016] The interior refrigerator door which is the object of this report could also be manipulated using a sliding system instead of hinges.

[0017] In order to ensure that inside the fridge, in general, a homogeneous temperature exists, in refrigerators that have a small fan for the distribution/circulation of the interior air, the space in which the above-mentioned fan is located is left outside the interior transparent door to facilitate this process.

[0018] A small cap, which can be of any rigid material like the knob, is used to limit the travel of the inner transparent door and set its resting position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

Figure 1 - Shows an axonometric view of an open

conventional refrigerator

Figure 2- Shows an axonometric view of an open refrigerator equipped with transparent interior doors.

Figure 3- Shows a cross section of an open refrigerator equipped with transparent interiors doors.

Figure 4- Shows an elevation of an open refrigerator equipped with transparent interior doors.

DESCRIPTION OF PREFERRED ASSEMBLY

[0020] Figures 1, 2, 3 and 4 show the key parts of the transparent inner door of the refrigerator which are identified with the following numbers; (1), (2) transparent interior door of the refrigerator, (3) knob, (4) hinge, (5) stop, (6) refrigerator shelf, (7) gaps.

[0021] As can be seen from the cited illustrations of the refrigerator, the system consists of a transparent interior door (2) inside the refrigerator, which is attached by a hinge or other similar system (4) to the refrigerator shelf (6). It may be necessary to trim the transparent interior door (2), in relation to the refrigerator shelf (6).

[0022] Interior refrigerator door (2) travel is limited by a stop (5) fixed to the refrigerator shelf (6).

[0023] The stop (5) fixes the rest position of the transparent interior door (2) from the fridge.

[0024] The operation of the interior transparent door of refrigerator (2) is made possible using the knob (3).

[0025] The panel that constitutes the interior transparent door (2) of the refrigerator, must have dimensions at the front slightly less than that of the space between consecutive shelves (6) to leave small gaps (7) between the walls of the refrigerator and the inner transparent door (2), so that food can aerate slightly and the temperature of the refrigerator is homogenized in the shortest possible time.

[0026] Figure 4 clearly illustrates these abovementioned gaps.

[0027] At the same time, as a result of this application, the conservation of fresh food is enhanced due to having less temperature loss inside the refrigerator.

[0028] Additionally, the energy consumption of the refrigerator is considerably reduced since the interior temperature is kept more constant due to the installation of this system.

Claims

1. The transparent interior refrigerator door subject of this report is **characterized by** a transparent interior door (2) which is coupled to the partitioning shelf of the refrigerator (6) by means of a hinge, joint or other equivalent mechanism (4), which can be operated using the knob (3) or similar system in order to be able to open it and take out, arrange or put in food and close it up to its rest position, a position that is fixed by the stop (5), allowing the search and selection of food, once the refrigerator is compartmentalized in several shelves with the installed interior transparent door system, by opening only the compartment corresponding to the chosen food of the refrigerator.
The panel that constitutes the interior transparent door (2) of the refrigerator, must have dimensions at the front slightly less than that of the space between consecutive shelves (6) to leave small gaps (7) between the walls of the refrigerator and the inner transparent door (2), so that food can aerate slightly and the temperature of the refrigerator is homogenized in the least possible time.

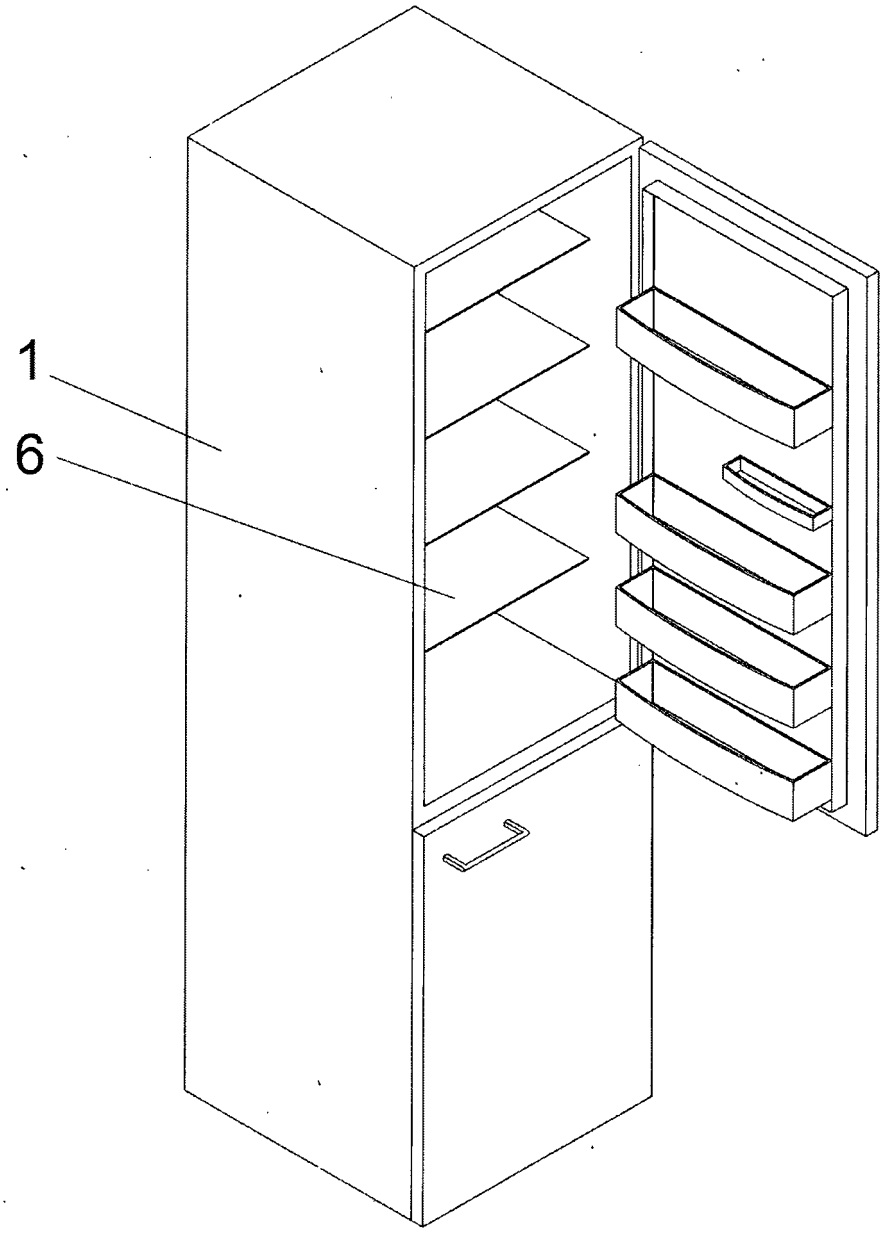

FIG. 1

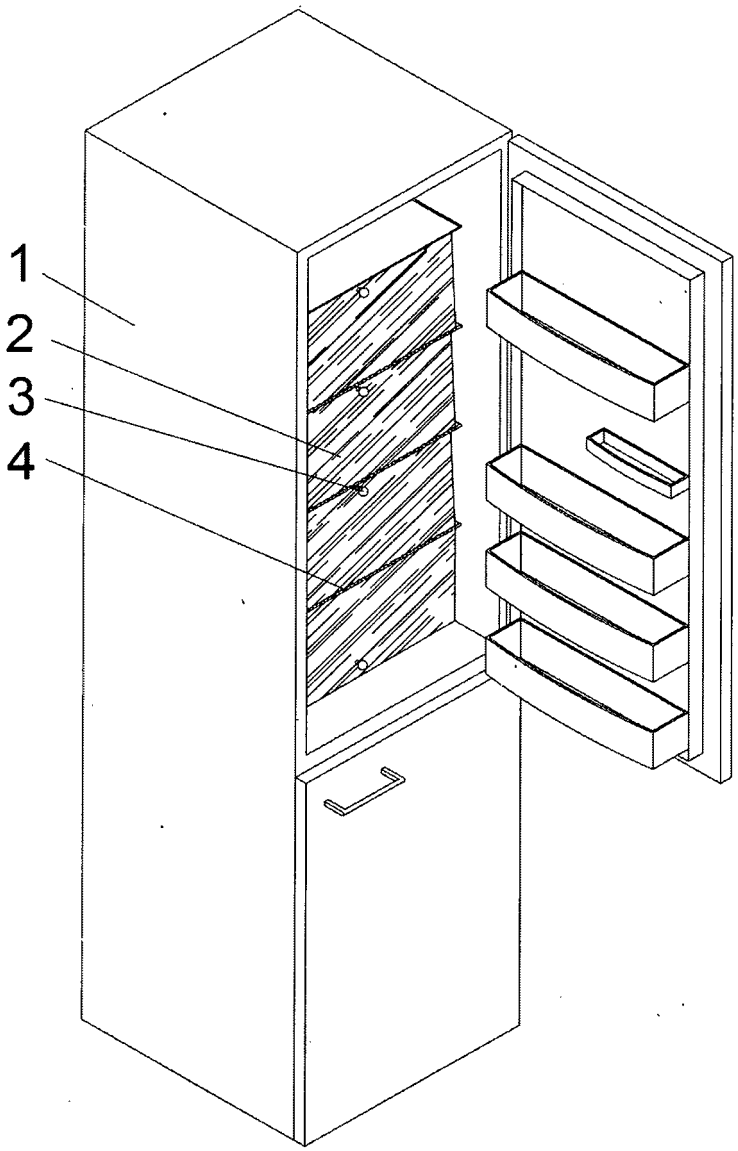

FIG. 2

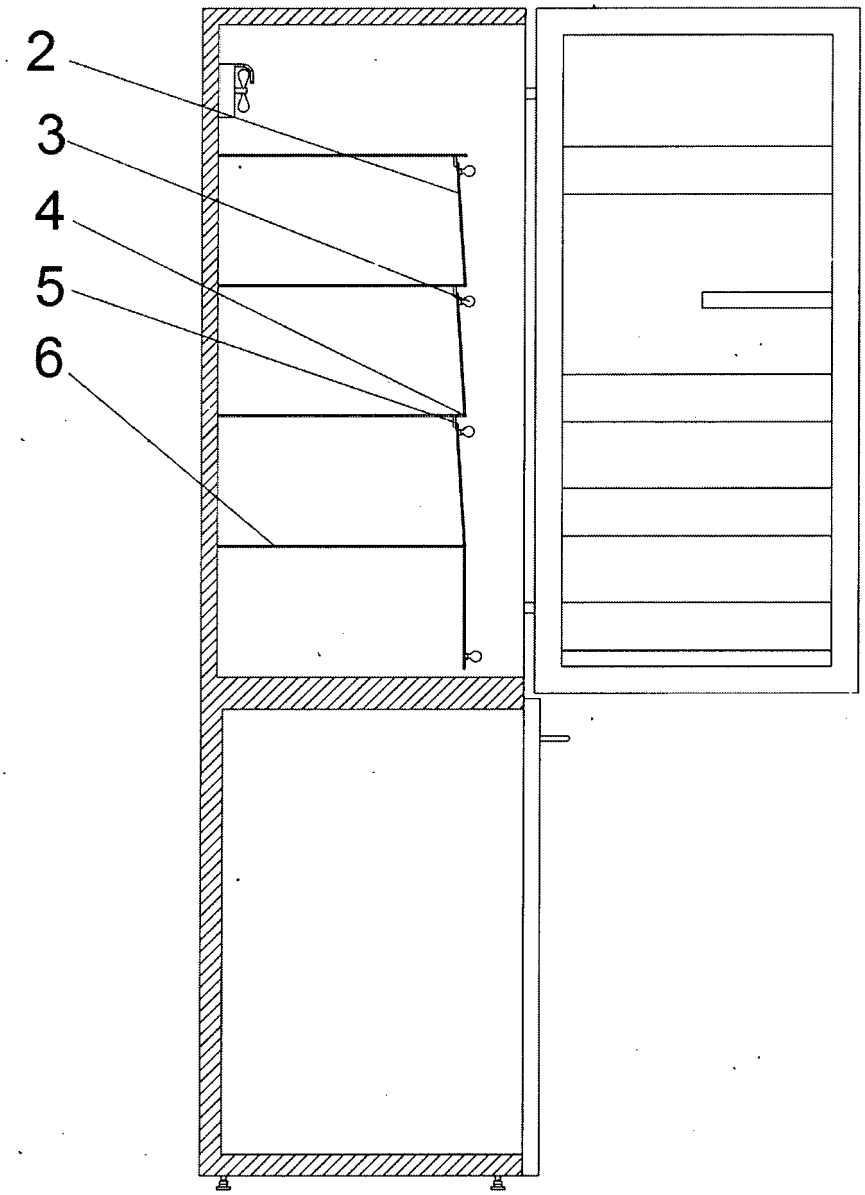

FIG. 3

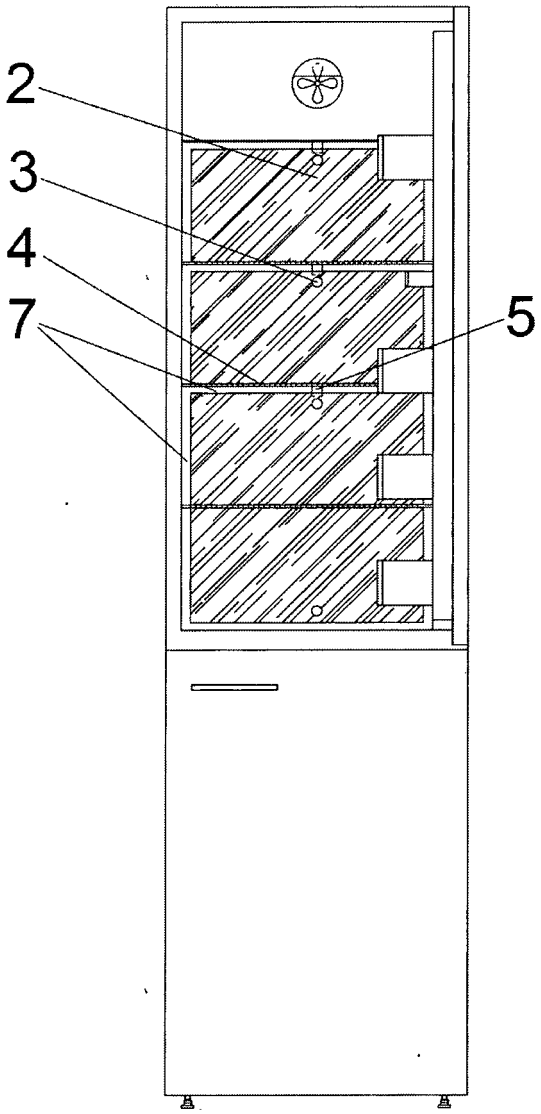

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2012/000303

A. CLASSIFICATION OF SUBJECT MATTER

F25D23/02 (2006.01)

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)
F25D

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES,WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4500147 A (REISTER RICHARD A.) 19.02.1985, the whole document in especial figures 1 and 10.	1
X	FR 1128862 (SALTZMANN CELESTIN-ALFRED; SOUVETON ROBERT-ALFRED) 11.01.1957, the whole document.	1
X	US 2062856 A (WILLIAM ARMBRUSTER JOHN) 01.12.1936, (page 1, lines 20 a 60, figure 1).	1

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance.
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure use, exhibition, or other means.
"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"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 documents , such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22/03/2013	**(02/04/2013)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer E. Albarrán Gómez Telephone No. 91 3493038

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2012/000303

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
US 4500147 A	19.02.1985	NONE	
FR 1128862 A	11.01.1957	NONE	
US 2062856 A	01.12.1936	NONE	

Form PCT/ISA/210 (patent family annex) (July 2009)