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(71) Applicant and

(72) Inventor: **FIORI, Mark, Victor, Keefe** [AU/AU]; 78
Johanson Promenade, Murdoch, Western Australia 6150
(AU).

(74) Agent: **LORD, Kelvin, Ernest**; Lord and Company, 4
Douro Place, West Perth, Western Australia (AU).

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(54) Title: A CONVECTED-AIR CABINET

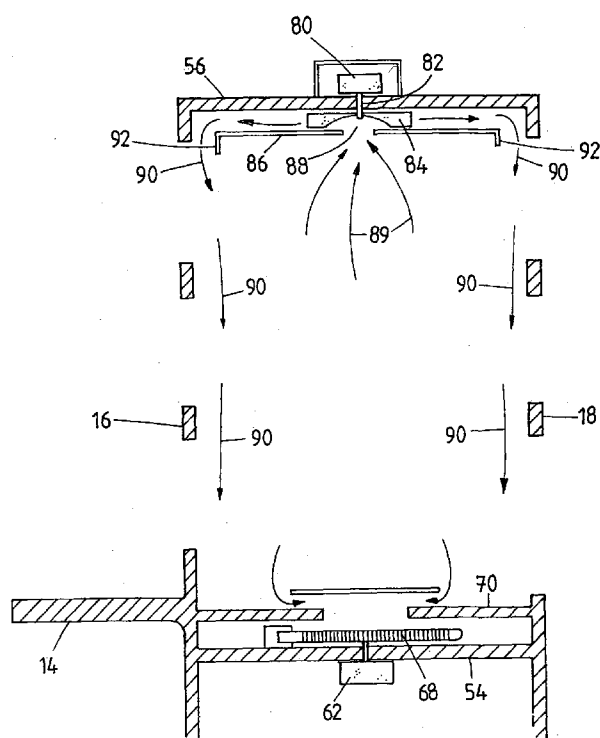


FIG. 4

(57) Abstract: A convected-air cabinet (10) for stor-
age of food has fans (62, 84) for directing air from a
lower part of the apparatus to an upper part. In par-
ticular there is an upper fan (84) mounted above an
apertured partition (86) so that air entering through an
aperture (88) in this partition (86) is directed laterally
and then downwardly to provide air curtains adjacent
food access means (20) at a front (16) and rear (18) of
the cabinet.

TITLE

“A CONVECTED-AIR CABINET”

5

FIELD OF THE INVENTION

The present invention relates to a convected-air cabinet

BACKGROUND OF THE INVENTION

In Australian Patent Number 674764 in the name of the present applicant there is
10 described and claimed a Pizza and Pasta Drive-Thru Facility. It relates to a facility for
preparing and storing pizza and pasta in a fresh condition for a relatively long period of
time.

An important component of this facility is a means for storing the cooked food and
15 maintaining it within a predetermined heat and moisture range. This enables the food to
be prepared ahead of time and stored until purchased by a customer.

It is known that in the delivery of fast food, the food for consumption is prepared in
advance of the customer's order such that it is available to them immediately. It is known
20 that some food holding cabinets contain heating elements or heated shelves which
continue to cook the food and its packaging container whilst it is being stored, rendering
it unfit for consumption after some minutes. It is also known to use moisture and heat
within the holding cabinets to keep food for longer periods but it is found that opening
these cabinets to insert and/or remove food items causes a large degree of temperature

and related humidity variation, leading to extended periods where the cabinet is not at its desired temperature and/or humidity level.

The present invention attempts to overcome at least in part the aforementioned
5 disadvantages of previous hot food holding cabinets.

SUMMARY OF THE INVENTION

In accordance with one aspect of the present invention there is provided a convected-air cabinet characterized by comprising a front side provided with food access means, an
10 opposed rear side provided with food access means, a base, a roof and spaced side walls interconnecting the front and rear sides, a plurality of regions within the cabinet for storage of food, wherein a first fan is mounted adjacent the base and is arranged beneath a laterally extending cover which extends from the front to the rear side but is spaced from each side, a second fan is mounted adjacent the roof and a laterally extending partition
15 containing an aperture is mounted below the second fan, the laterally extending partition being spaced from the front and rear sides, such that air directed around the first laterally extending cover by the first fan is conveyed within the cabinet to the aperture in the second laterally extending cover and is then directed laterally by the second fan to form air curtains extending downwardly across the front and rear sides.

20

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a rear isometric view of a convected-air cabinet in accordance with the present

invention;

Figure 2 is a front elevation of the convected-air cabinet of figure 1;

Figure 3 is a schematic transverse sectional view of part of the convected-air cabinet of figure 1;

5 Figure 4 is a schematic longitudinal sectional view of part of the convected-air cabinet of figure 1;

DESCRIPTION OF THE INVENTION

In Figures 1 and 2 there is shown a convected-air cabinet 10 comprising an outer body 12
10 having mounted thereto a food preparation shelf 14.

The body 12 has a rear side 16 (see Figure 1) and a front side 18 (see Figure 2). The rear side 16 is provided with a plurality of doors 20 in a central portion thereof.

15 The doors 20 are hingedly mounted by means of respective pairs of upper hinges 22 and are provided with respective handles 24 to enable the doors 20 to be opened and closed as required. The hinges may be of a soft close or self-closing type.

As will be described, a respective food warming region is disposed behind each door 20.
20

The front side 18 is provided with a plurality of doors 26. The doors 26 are hingedly mounted on respective pairs of side hinges 28. Further, the doors 26 are provided with respective handles 30 to enable them to be opened and closed as required.

Also, the cabinet 10 further comprises a pasta warming facility 32 to one side thereof. The pasta warming facility 32 has a single rear door 34 (see Figure 1) and a single front door 36 (see Figure 2). The rear door 34 is mounted on a pair of side hinges 38 and may be opened and closed by means of a handle 40 as required. Similarly, the front door 36 is
5 mounted on a pair of side hinges 42 and may be opened and closed as required by mean of a handle 44. The pasta warming facility 32 is optional depending on the user's menu.

At the end thereof, remote from the pasta warming facility, the cabinet 10 has a storage facility 46 for pizza boxes and the like. The storage facility 46 is also optional and is
10 primarily suited to a mobile kiosk facility.

The storage facility 46 may be provided with elongate members 48 on sides thereof to cover a portion of the front and back of the storage facility 46. This is to ensure that a single stored item, such as a pizza box, may be removed at a time.

15

In figure 3, there is shown in cross section a pair of food warming regions or compartments 50 in side by side relationship forming part of the apparatus of Figures 1 and 2.

20 As can be seen in Figure 3, each compartment 50 has side walls 52, a base 54 and a roof 56. As shown on the left each compartment 50 contains a plurality of shelves 58 which are air permeable. For example the shelves 58 may be formed of metallic mesh. The shelves 58 are arranged to support items of food. Further, as shown on the left, each compartment 50 contains a basin 60 which, in use, contains water.

Further, a respective fan 62 is mounted to the base 54 at each compartment 50. The fans 62 have drive shafts 64 arranged for axial rotation and a fan blade 66 above the base 54. Each drive shaft 64 extends through the base 54 for operational connection to the fan
5 blade 66.

Further, electrical heating elements 68 are disposed on each side of each fan blade 66.

Each food warming compartment 50 may contain a thermometer, a humidity probe, and a
10 thermostat, so that temperature and humidity may be controlled at desired levels.

A cover 70 is mounted above the fan blade 66 to retain heat from the elements 68 in the region of the fan blade 66. Further the cover 70 contains an aperture 72 to allow the ingress of air to the fan blade 66. As shown, air is drawn in as indicated by arrows 74.
15

Further, heated air is expelled by the fan blade 66 around the periphery of the cover 70 into the chamber 50 as indicated by arrows 76.

As can be seen in Figure 4, each compartment 50 has a further fan 80 mounted at the top thereof. The fan 80 has an axially rotatable drive shaft 82 extending through the roof 56.
20 The shaft 82 is connected to a fan blade 84.

Further, a partition 86 is mounted below the fan blade 84. The partition 86 is spaced from the roof 56 and has a central aperture 88 therein adjacent the fan blade 64. Further,

the partition 86 extends laterally away from the fan blade 84 to positions close to the front side 18 and the rear side 16 of the cabinet 10. In use, heated air from the compartment 50 is drawn by the fan blade 84 through the aperture 88 as indicated by arrows 89 and then blown laterally as shown by arrows 90 along the roof 56 to the end of the partition 86 adjacent the front side 18 and the rear side 16. The partition 86 has downturned peripheral flanges 92 adjacent the sides 18 and 16 and upturned peripheral flanges 94 adjacent the side walls 52.

The air then is directed downwardly along the front and rear sides 18 and 16. In this way the air from the fan blade 84 produces an air curtain adjacent the doors 20 and 26. Thus when the doors are opened as described hereinbefore to place food on the shelves or remove food therefrom the overall internal temperature and humidity of the compartment 50 is maintained close to the desired levels so as to reduce food spoilage.

Further, it is noted that the presence of the basins 60, with water therein, ensures that the heated air distributed into the compartments 50 have a substantial moisture content. This is important as it removes any tendency of the stored food to dry out. Further, the heating elements 68 are preferably arranged such that whilst the air is heated it is not heated to a temperature sufficient to cause further cooking of the stored food.

20

The cabinet of the present invention is particularly intended for use in the hospitality industry, fast food outlets, mobile kiosks, transportable kitchens and truck semi-trailer applications.

As shown, the cabinet of the present invention may be made to have a large size with a number of compartments 50 so as to be able to supply customer needs continuously even at peak sales periods.

- 5 The cabinet of the present invention is particularly intended for storage of cooked pizza but it is applicable to storage of foods such as pasta, as described above.

Modifications and variations as would be apparent to a skilled addressee are deemed to be within the scope of the present invention.

CLAIMS

1. A convected-air cabinet characterized by comprising a front side provided with food access means, an opposed rear side provided with food access means, a base,
5 a roof and spaced side walls interconnecting the front and rear sides, a plurality of regions within the cabinet for storage of food, wherein a first fan is mounted adjacent the base and is arranged beneath a laterally extending cover which extends from the front to the rear side but is spaced from each side, a second fan is mounted adjacent the roof and a laterally extending partition containing an
0 aperture is mounted below the second fan, the laterally extending partition being spaced from the front and rear sides, such that air directed around the first laterally extending cover by the first fan is conveyed within the cabinet to the aperture in the second laterally extending cover and is then directed laterally by the second fan to form air curtains extending downwardly across the front and
5 rear sides.
2. A convected-air cabinet according to claim 1, characterised in that the laterally extending cover is apertured for ingress of air to the first fan.
3. A convected-air cabinet according to claim 1 or 2, characterized in that air heating means is provided adjacent the first fan so as to heat air directed laterally by the
10 first fan.
4. A convected-air cabinet according to any one of claims 1 to 3, characterized in that the laterally extending cover is spaced from each side by gaps but engages with the side walls.
5. A convected-air cabinet according to any one of the preceding claims,

characterized in that the aperture in the laterally extending partition is disposed adjacent the second fan.

6. A convected-air cabinet according to claim 5, characterized in that the laterally extending partition has downwardly turned peripheral flanges adjacent the front and rear sides.

7. A convected-air cabinet according to claim 5 or 6, characterized in that the laterally extending partition has upwardly turned peripheral flanges adjacent the side walls.

8. A convected-air cabinet according to any one of the preceding claims, characterized in that the cabinet contains a basin arranged to contain water, in use, so as to humidify air in the cabinet.

9. A convected-air cabinet according to any one of the preceding claims, characterized in that the front and rear sides are provided with doors which are arranged to be opened and closed to permit loading and unloading of food to and from the cabinet.

10. A convected-air cabinet according to any one of the preceding claims, characterized in that the cabinet contains a plurality of substantially horizontally disposed air permeable shelves arranged to support items of food.

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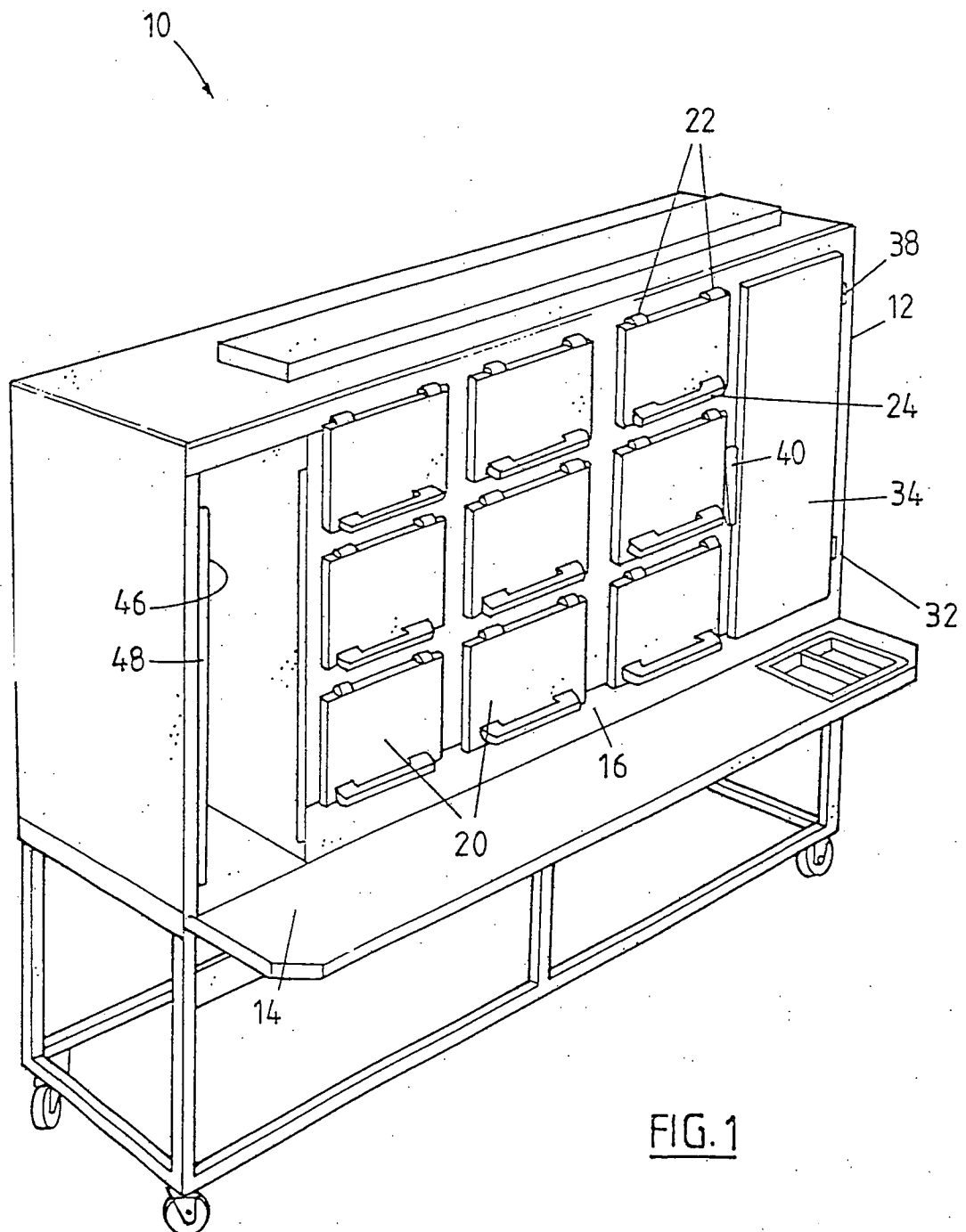
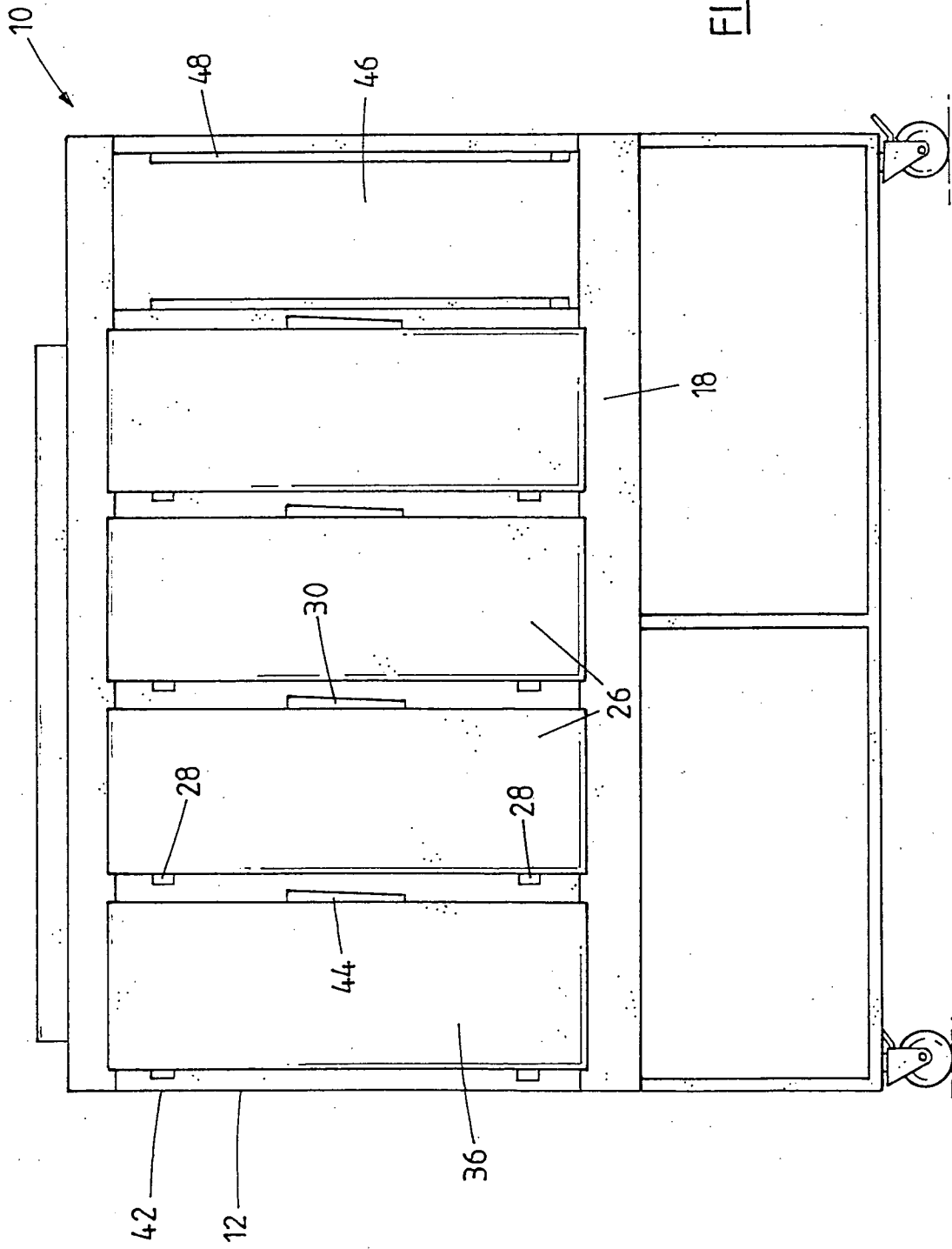


FIG. 2



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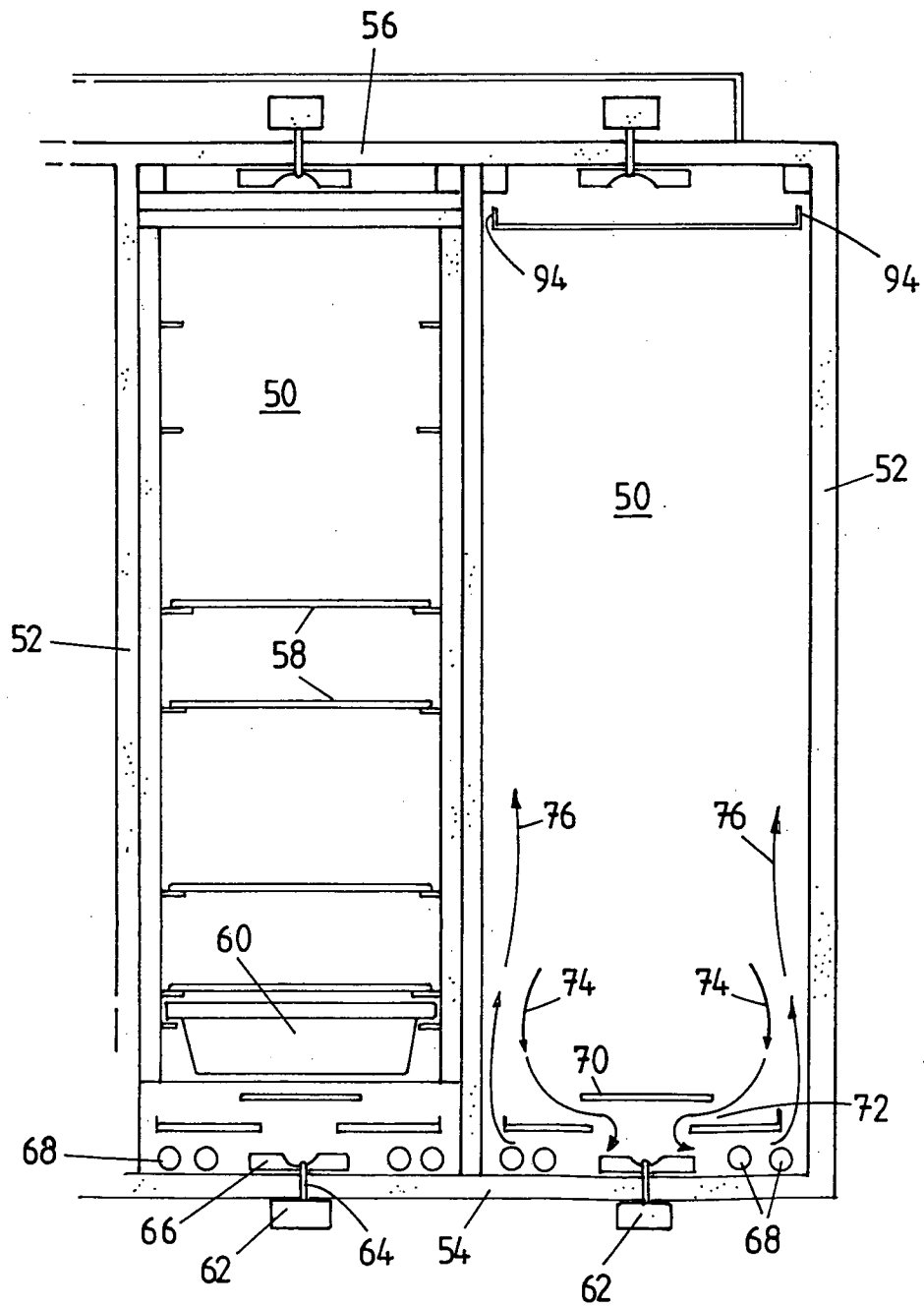


FIG. 3

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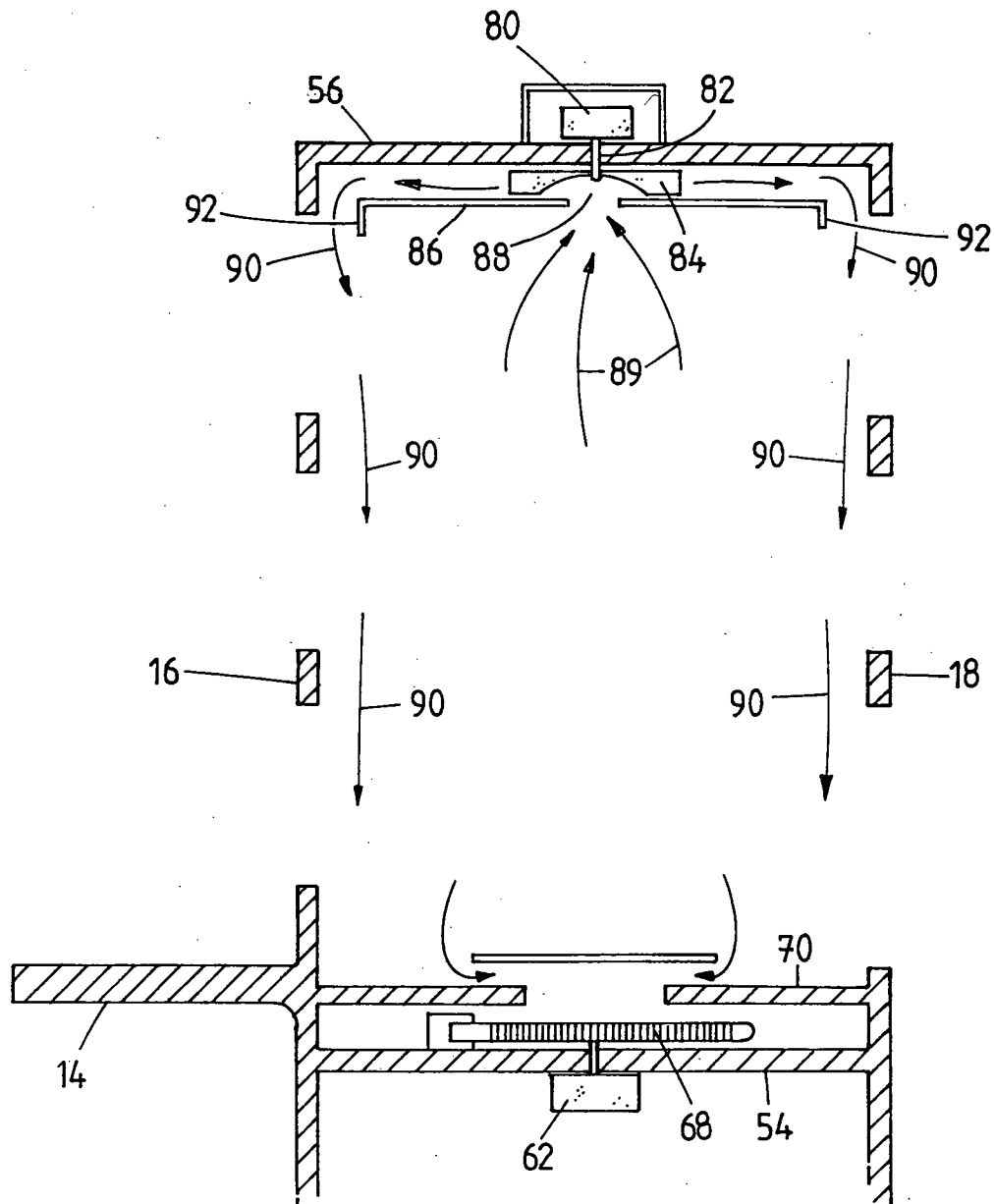


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2008/001111

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. *A47J 39/00* (2006.01) *A47J 39/02* (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)

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)

DWPI: *A47J 39/00*, *39/02*; (AIR+ AND CURTAIN+) AND (CUPBOARD+ OR CABINET+ OR CLOSET+ OR STOR+);
A47J/IC AND *A47B/IC* AND FAN+ AND (CIRCULAT+ OR CONVECT+)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Derwent Abstract Accession No. 97-198153/18, Class X27, JP 09053875 A (NAKANO REIKI KK.) 25 February 1997. See entire abstract.	
A	WO 2007 067173 A (CARRIER COMMERCIAL REFRIGERATION INC.) 14 June 2007. See page 4 and figure 1.	
A	WO 1997 009575 A (GRANDI) 13 March 1997. See pages 7 and 8 and figure 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	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

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Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. +61 2 6283 7999	Authorized officer RON WEBER AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No : +61 2 6283 2546

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2008/001111

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 4325227 A (IBRAHIM) 20 April 1982. See columns 7 to 10 and figures 1, 2, 6, 7 and 8.	
A	US 6894252 B (PALLER ET AL) 17 May 2005. See columns 3 and 4 and figure 1.	
A	EP 1367008 B (KONGO KABUSHIKI KAISHA) 3 December 2003. See column 4 and figure 1.	
A	EP 132475 B (LAURENT) 17 April 1991. See columns 1 and 2 and figure 3.	
A	Derwent Abstract Accession No. 2001-525725/58, Class X27, JP 2001197943 A (MATSUSHITA ELECTRIC WORKS LTD.) 24 July 2001. See entire abstract.	
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A	WO 2000 36958 A (ALAN NUTTALL LIMITED) 29 June 2000. See page 10 and figure 2.	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2008/001111

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2008/001111

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		GB	2348697				

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX