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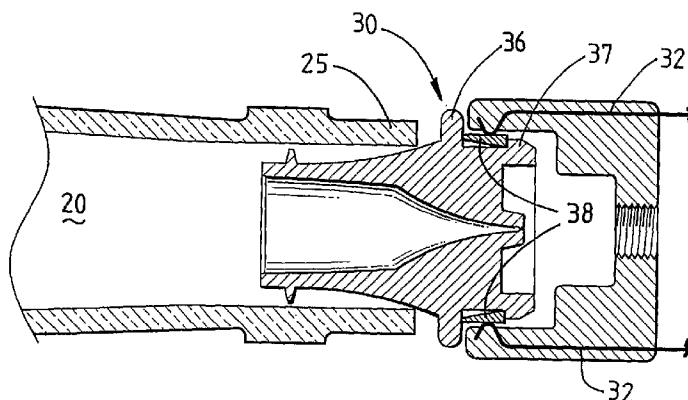
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(54) Title: BOTTLE AIR EVACUATION SYSTEM WITH STOPPER AND VACUUM PUMP



(57) Abstract: A bottle air evacuation system which includes a stopper (30) for a bottle, which stopper has a valve component (35) associated with a central aperture through the stopper, and means (38) associated with an upper portion of the stopper to actuate a vacuum pump device (11) when the stopper is placed in a fixed receptor (16) in a housing (14) associated with the vacuum pump. The stopper acts to trigger one electrical sensor in the receptor and the housing is located within a wine storage facility which can be a storage cabinet (10). The means to actuate the vacuum pump may be an inductive or a conductive device and the stopper can be a resiliently compressible material. The conductive device (38) is a metallic strip located about the exterior periphery of the stopper above the shoulder. The vacuum pump and the wine storage cabinet or freezer or refrigerator share a common power supply.

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BOTTLE AIR EVACUATION SYSTEM WITH STOPPER AND VACUUM PUMP**Technical area:**

This invention relates to the area of beverage storage and in particular to the area of storing and preserving the quality of wines in incompletely filled wine bottles, such as occurs after partial use, such that deterioration of the contents due to oxidation is either avoided or is minimal.

Background to the invention:

It is well known that wine requires the correct temperature and humidity to be stored correctly and to facilitate this process cooled cabinets are often used to store unopened wines. Once wine bottles have been opened however it is common for the unconsumed portion of an open bottle of wine to become oxidised with storage whether in a chilled facility or otherwise.

One means of preserving opened wines has been the removal of air in a bottle with insertion of an inert gas into the wine bottle, and resealing in some manner, however such methods have proven to be difficult to effect easily. Alternate means have included the removal of air by means of either electrical or hand operated air evacuation devices.

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With these devices a specially adapted stopper with a valve is inserted into the mouth of a bottle and a vacuum pump device applied to the stopper such that air is largely removed from the bottle. These devices however have drawbacks such as excessive time and effort to actuate, in the case of hand held devices, and high cost and complexity in the case of electrically powered units which also have excessive space requirements.

In a standard embodiment of this type of operation the apparatus is mounted on a bench top or the like so that a bottle can be brought into proximity with the apparatus and engaged with it without requiring any particular manipulation of the bottle.

This stand alone type of apparatus is of course bulky and requires a particular area to be put aside for its specific purpose.

In addition these means of preserving the quality of opened bottles of wine do not address the problems associated with storing the wine which can only be adequately stored using specific purpose wine storage cabinets to avoid the problems associated with variable temperature and humidity.

Air evacuation from wine bottles is however an effective way of preserving wine in opened bottles and the use of a one way valve in a wine bottle stopper is desirable as a vacuum in the bottle is maintained for an appreciable period of time. It is however preferred that improved means of effecting this air evacuation be provided.

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Outline of the Invention

A first object of the invention is to ameliorate the problems associated with providing separate air evacuation means and appropriate wine storage means.

A second object of the invention is to provide alternative and improved means of, effecting such air evacuation from bottles.

While the invention is discussed herein in terms of evacuating excess air from wine bottles it is understood that the concepts of the invention can be applied to any air evacuating equipment.

The invention is a bottle air evacuation system which includes a stopper for a bottle, which stopper has a valve component associated with a central aperture through the stopper, and means associated with an upper portion of the stopper to actuate a vacuum pump device when the stopper is placed in a fixed receptor in a housing associated with the vacuum pump.

It is preferred that the means for actuating the vacuum pump is that the stopper acts to trigger at least one electrical sensor in the receptor.

It is also preferred that the housing be located within a wine storage facility and that this facility be a wine storage cabinet.

It is preferred that the means to actuate the vacuum pump be a conductive device or alternately an inductive device.

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It is preferred that the stopper be generally of a resiliently compressible material.

It is also preferred that the stopper be provided with a peripheral shoulder which can locate above a bottle rim.

It is further preferred that a conductive device which is a metallic strip be located about the exterior periphery of the stopper above the shoulder.

While any appropriate valve member may be used it is preferred that a simple elongate opening be provided in an upper interior surface of the stopper such that the opening seals in the absence of vacuum pump actuation and opens when a vacuum pump device is actuated.

It is further preferred that this aperture be reinforced.

For convenience sake it is preferred that the vacuum pump device be located within a wine storage cabinet or other existent wine storage facility.

It may be preferred that the vacuum pump be located in the rear of a cooled cabinet and utilise its compressor or the vacuum pump may be located inside the cooled cabinet.

While it may be preferred that the wine storage facility be a specific purpose wine storage cabinet it may also be a unit combined with a freezer or refrigerator which is adapted for the storage conditions required or it may simply be associated with a standard refrigerator with no specific wine storage area.

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In order that the invention may be more readily understood we shall describe by way of non limiting example a specific embodiment thereof with reference to the accompanying drawings.

Brief Description of the Drawing Figures

- Fig. 1 Shows a wine cabinet and vacuum pump assembly;
- Fig. 2 Shows cross-sections through the preferred stopper of the invention;
- Fig. 3 Shows side and perspective views of the stopper of the invention;
- Fig. 4 Shows the stopper inserted in a partly filled bottle;
- Fig. 5 Shows the neck of a wine bottle and stopper inserted into the vacuum pump receptor;

Description of an Embodiment of the Invention

The invention relates to a means for removing air from a bottle of wine, which is normally stored in a wine cabinet, from which bottle the wine has been at least partially removed. When the neck of a bottle is inserted into a receptor in the wine cabinet, interaction between a stopper and contacts in an adaptor or signal converter in the receptor causes air to flow from the bottle to the pump until a preset pressure is reached and a pressure switch stops the pump.

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By this means a fast and repeatable vacuum may be obtained for multiple bottles of wine and after evacuation of the air the bottle of wine may be stored in the cabinet.

In one embodiment of the invention a cooled cabinet 10 is fitted with a vacuum pump 11 located adjacent a convenient part of the cabinet, in the case shown in Figure 1 being the top, although the rear or anywhere chosen on the wine cabinet could be preferred. This vacuum pump 11 is connected by tube 12 to an internal receptor 16 in housing 14.

A custom designed stopper 30 is provided for a wine bottle 20 which stopper is adapted to cooperate with receptor 16 in the wine cabinet 10 such that when the stopper in the top of a bottle enters the housing 14 the pump 11 is actuated and air is evacuated from the bottle.

The vacuum pump is preferably powered from the same source as the cooled cabinet and a transformer ensures that the current through the receptor contacts is low. The source of power to the pump is however not restricted in the invention.

The means to activate the pump, and its interaction with the stopper, is also not restricted in the invention however a preferred embodiment will be described as follows.

In this embodiment of the invention actuation of the pump is effected by conductive means.

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The stopper 30 is manufactured from a generally resilient material and has a central aperture 31 therethrough and has a valve component 35 in an upper surface 34 of the stopper surmounting this central aperture. The valve 35 takes the form of an elongate slit in this upper surface 34 and upon actuation of the vacuum pump 11 air is drawn through this valve and from the bottle

The stopper is provided with a peripheral shoulder which surmounts the upper rim 25 of the bottle. A neck 37 extends above the shoulder 36 and a metallic conductive ring 38 surrounds the outer periphery of this neck.

When the bottle neck and stopper are inserted into the housing 14 contact between of conductive ring 38 and contacts in the sides of receptor 16 in the housing causes a current to flow along conductors 32 which activates the vacuum pump 11. The precise switching means used to control the timing of the pump action is not restricted in the invention however it is preferred that the pump switch off when the desired pressure has been reached.

At this time the bottle and stopper can be removed and a seal effected and the bottle may be stored in the cabinet.

Alternate means may be used to actuate the pump and these may include such things as a push button or perhaps opening the cabinet door, this could also be effected by quickly opening and closing the door. Similarly, should the pressure switch not act in a given time a timer may be used to turn off the pump.

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It may also be preferred that a proximity sensor determine when the stopper is adjacent the adaptor and actuate the pump.

While the embodiment of the invention described is preferred alternative embodiments of the invention could include the following.

In one embodiment of the invention the stopper can be manufactured from an electrically conductive material such as a plastic polymer with a suitable conductive filler. The adaptor is made of non conductive material and fitted with two electrical contacts.

When the stopper is brought in close proximity with the adaptor and the conductive stopper touches the isolated contacts an electrical circuit is made.

By means of a sensitive relay the small electrical current flowing through the stopper may be used to initiate operation of the pump. After the pump runs it continues to do so until a pressure sensitive switch, or other such device, indicates that the desired bottle pressure has been reached. It is however preferable that direct electrical contact not be made.

The concept of the invention is not restricted to the configuration of the apparatus herein described and therefore, whilst we have described here an embodiment of the invention incorporating an air evacuation device in association with a wine storage device or the like, and also various means of actuating the air evacuation device, it is envisaged that other embodiments of the invention will exhibit any number of and any combination of the features previously described. It is further to

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be understood that variations and modifications in this can be made without departing from the spirit and scope of the invention.

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The claims defining the invention are as follows:

1. A bottle air evacuation system which includes a stopper for a bottle, which stopper has a valve component associated with a central aperture through the stopper, and means associated with an upper portion of the stopper to actuate a vacuum pump device when the stopper is placed in a fixed receptor in a housing associated with the vacuum pump.
2. A bottle air evacuation system as claimed in claim 1 wherein the stopper acts to trigger at least one electrical sensor in the receptor.
3. A bottle air evacuation system as claimed in claim 2 wherein the housing is located within a wine storage facility.
4. A bottle air evacuation system as claimed in claim 3 wherein the wine storage facility is a wine storage cabinet.
5. A bottle air evacuation system as claimed in claim 4 wherein the means to actuate the vacuum pump is an inductive device.
6. A bottle air evacuation system as claimed in claim 4 wherein the means to actuate the vacuum pump is a conductive device.
7. A bottle air evacuation system as claimed in claim 5 or claim 6 wherein the stopper is of a generally resiliently compressible material.

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8. A bottle air evacuation system as claimed in claim 7 wherein the stopper is provided with a peripheral shoulder located above a bottle rim.
9. A bottle air evacuation system as claimed in claim 8 wherein the conductive device is a metallic strip located about the exterior periphery of the stopper above the shoulder.
10. A bottle air evacuation system as claimed in claim 9 wherein the valve member is a simple elongate opening provided in an upper interior surface of the stopper such that the opening seals in the absence of vacuum pump actuation and opens when a vacuum pump device is actuated.
11. A bottle air evacuation system as claimed in claim 10 wherein the vacuum pump device is located within a wine storage cabinet or other existent wine storage facility.
12. A bottle air evacuation system as claimed in claim 11 wherein the vacuum pump is located in a wine storage cabinet or freezer or refrigerator which is adapted for wine storage.
13. A bottle air evacuation system as claimed in claim 12 wherein the vacuum pump and the wine storage cabinet or freezer or refrigerator share a common power supply.

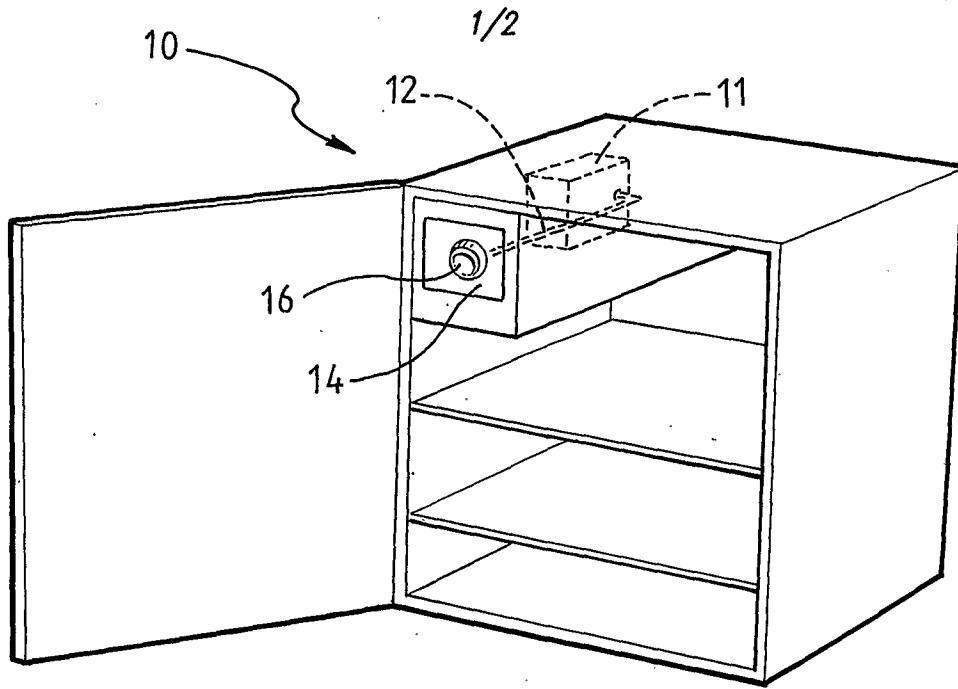


FIG. 1

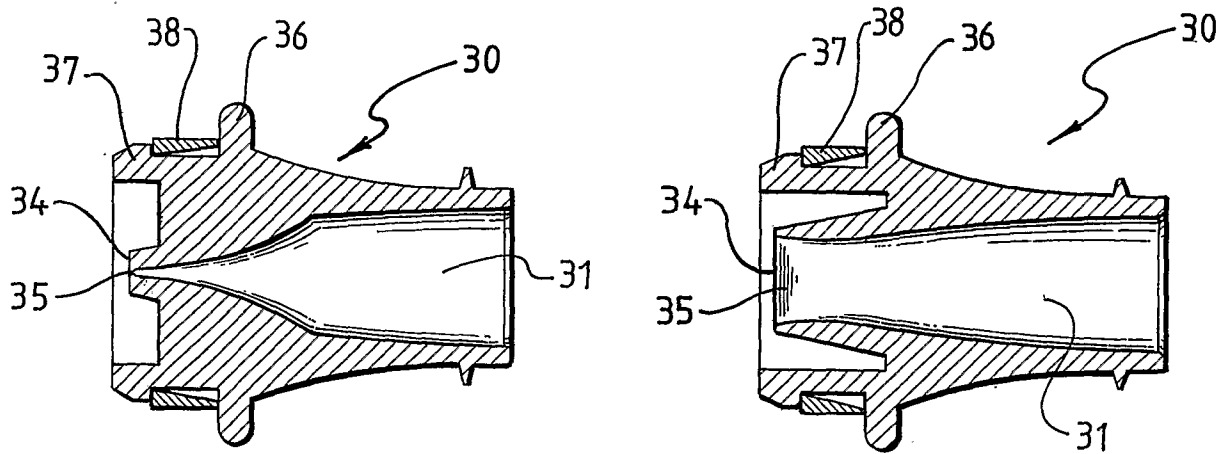


FIG. 2

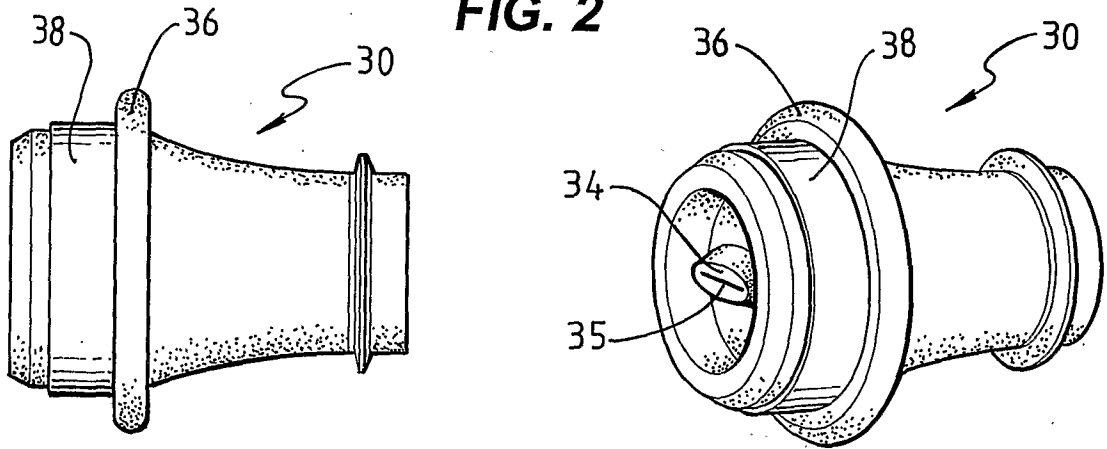
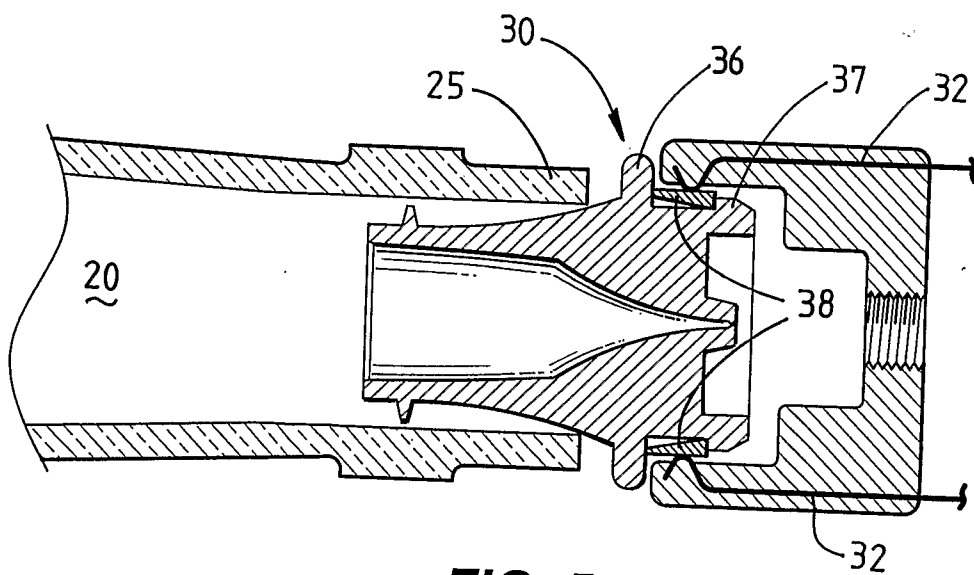
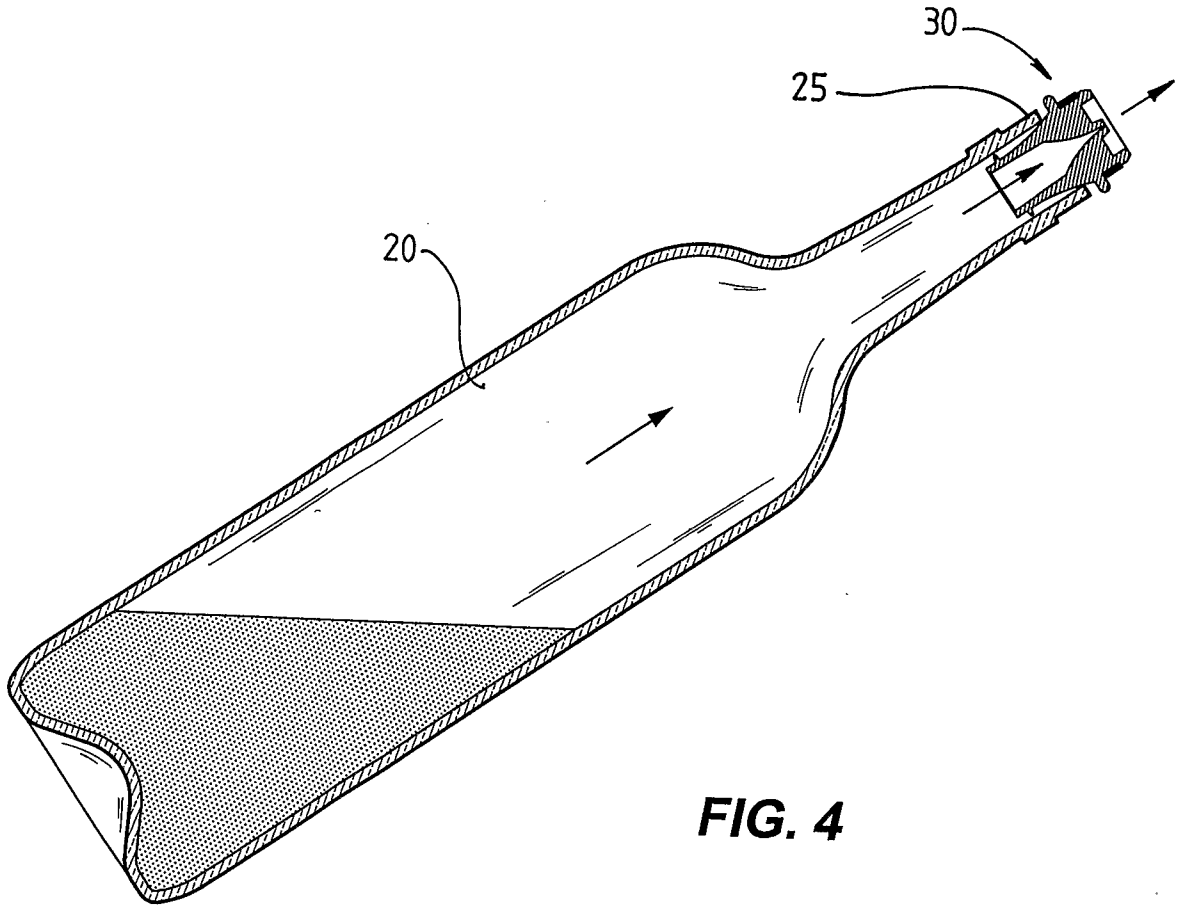


FIG. 3



INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

B65D 51/16 (2006.01) *B65D 43/04* (2006.01) *F16K 7/07* (2006.01)
B65B 31/04 (2006.01) *B65D 81/20* (2006.01)
B65D 39/00 (2006.01) *B65D 81/24* (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 & Keywords: (stopper, evacuate, suck, vacuum, air, valve, unidirectional, pump, wine, oxidize, ring, metal and similar words)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5215129 A (BERRESFORD ET AL.) 01 June 1993 Entire document; Figs. 7, 8; column 4, lines 24-34	1-8
X	WO 2005/020706 A2 (LUIS) 10 March 2005 Entire document; Figs. 1, 2; Pages 5	1-8
X	US 4475576 A (SIMON) 09 October 1984 Entire document; Figs. 1, 3; column 2, lines 18-21; column 2, lines 42-54	1, 3, 4, 7, 8,

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

Date of the actual completion of the international search
09 January 2008

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International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2303766 A (SCHERBAK) 01 December 1942 Entire document	1-8
A	US 4998633 A (SCHNEIDER) 12 March 1991 Entire document	1-8
A	US 6626092 B2 (TARLOW) 30 September 2003 Entire document	1-8

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2007/001546

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.

Patent Document Cited in Search Report		Patent Family Member					
US	5215129	AU	84755/91	CA	2052268	EP	0478243
		IE	913335	NZ	239966	ZA	9107615
WO	2005020706	AU	2004268573	BR	PI0413760	CA	2535820
		EP	1660372	US	6886605	US	7048016
		US	7108023	US	2005061393	US	2005161108
		US	2005161109				
US	4475576	NONE					
US	2303766	NONE					
US	4998633	AU	67523/87	CA	1245195	DK	14487
		EP	0234607	FI	870217	HK	64289
		JP	3124569	JP	62193963	NL	8600111
		NO	870213	PT	84143	US	4763803
		US	4911314				
US	6626092	US	6799506	US	2003136791	US	2003200874
		US	2004226458				

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

END OF ANNEX