



(11) **EP 1 580 503 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
03.09.2008 Bulletin 2008/36

(51) Int Cl.:
F25D 23/12 ^(2006.01)

(21) Application number: **05006582.0**

(22) Date of filing: **24.03.2005**

(54) **Temperature control apparatus for use in a carbonator of a refrigerator**

Kühlschrank ausgestattet mit einer Einheit zur Herstellung von kohlensäurehaltigem Wasser

Réfrigérateur équipé avec unité de fabrication d'eau chargée de gaz carbonique

(84) Designated Contracting States:
DE FR GB IT NL

(30) Priority: **26.03.2004 KR 2004020706**
26.03.2004 KR 2004020708
26.03.2004 KR 2004020711

(43) Date of publication of application:
28.09.2005 Bulletin 2005/39

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(56) References cited:
GB-A- 2 160 847 **US-A- 4 866 949**
US-A- 5 484 538

- **PATENT ABSTRACTS OF JAPAN** vol. 2003, no.
12, 5 December 2003 (2003-12-05) & JP 2005
024119 A (TOSHIBA CORP), 27 January 2005
(2005-01-27)

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Description

[0001] The present invention relates to a refrigerator equipped with a carbonator comprising a temperature control apparatus and more particularly, a refrigerator equipped with a carbonator comprising a temperature control apparatus which is capable of controlling the temperature of the carbonator by using cool air inside the refrigerator and warm air outside the refrigerator.

[0002] Recently, some of home refrigerators have been designed to produce carbonated water by dissolving carbon dioxide into chilled water and supply it to a user through a dispenser installed in a refrigerator door.

[0003] For example, a conventional carbonated liquid supplying system for use in a refrigerator is disclosed in US Pat No. 4,866,949, entitled "CARBONATED LIQUID REFRIGERATION SYSTEM" and its front plan view is shown in Fig. 1 wherein the carbonator 3 is located in a freezer door 1 and supplies carbonated water to a liquid dispenser 2.

[0004] Further, in US Pat No. 4,866,949, there is also disclosed a refrigeration system for cooling the carbonator, which includes an evaporator disposed in the inside of or around the carbonator 3, and for absorbing heat from the inside of the carbonator 1, and a condenser disposed in the inside of the freezer compartment for dissipating the heat absorbed from the carbonator 1 to the freezer compartment. The evaporator and the condenser are formed of tubes and connected to each other, and a refrigerant circulates therein.

[0005] However, the refrigeration system for cooling the carbonator disclosed US Pat No. 4,866,949 has a problem that its complicated construction and the refrigerant separately used therein increase the manufacturing time and cost.

[0006] US 5,484,538 shows a portable multiple service apparatus for purifying and disinfecting water from potable or non-potable water sources and dispensing cold water from the purified/ disinfecting water. The apparatus comprises a freezer unit for making ice cubes from the purified water. Cool air from the freezer unit is diverted to the chiller unit for cooling the purified water. For this, a water reservoir is accommodated within a cavity in which cold air may circulate around the water reservoir. The circulated cool air enters the cavity through an inlet port and sorts through an outlet port that are both connected by separate air channels to the freezer compartment. The air channels may be opened/closed via valves that are controlled by a controller in response to the temperature inside the water reservoir measured by a temperature sensor. Furthermore, a fan may be disposed within the air channel to actively circulate the air around the water reservoir.

[0007] US-A-4,866,949 shows the features of the preamble of claim 1. In particular, this document shows a refrigerator having a door in which a recess accommodates a water reservoir which is connected to a carbonator. The covered recess is connected via two channels

to a condenser located in the freezer compartment. Condensed water flows via two channels to the covered recess where it is evaporated when cooling down the water reservoir, and the evaporated water flows back to the condenser.

[0008] GB-A-2 160 847 shows a refrigerator incorporating a tapping device that includes a mixing station. A waterline is connecting the mixing station with the water container provided in the ice box of the refrigerator. Furthermore, a pressure gas cartridge attached to the water container generates pressure. Upon depressing a key water and concentrate may be tapped into a cup positioned in a recess of the refrigerator door.

[0009] JP 2005024119 A shows a refrigerator wherein a cool water tank is installed on the inside of the refrigerator door adjacent to the freezer chamber. Cool air leaking ports are formed in the inside door of the freezer in order to circulate cool air around the cool water tank.

[0010] It is, therefore, an object of the present invention to provide a refrigerator equipped with a carbonator comprising a temperature control apparatus, which has a simple construction and is operated without a refrigerant.

[0011] The invention achieves the object with the subject-matters of independent claims 1 and 6, respectively. Preferred embodiments are disclosed in the dependent claims.

[0012] The above and other objects and features of the present invention will become apparent from the following description of preferred embodiments given in conjunction with the accompanying drawings, in which:

Fig. 1 provides a front plan view of a refrigerator having a conventional carbonated liquid supplying system and a conventional refrigeration system for cooling a carbonator;

Fig. 2 shows a schematic front plan view of a refrigerator in which a temperature control apparatus for use in a carbonator of a refrigerator in accordance with a preferred embodiment of the present invention is installed;

Fig. 3 describes a partial cross-sectional diagram of the refrigerator shown in Fig. 2 taken along the lines 3-3 and illustrates a preferred embodiment of the present invention;

Fig. 4 sets forth a partial cross-sectional diagram of a modified embodiment of the preferred embodiment shown in Fig. 3; and

Fig. 5 depicts a bottom plan view of a cover of the modified embodiment shown in Fig. 4.

[0013] Hereinafter, embodiments of the present invention will be described in detail with reference to accompanying drawings.

[0014] Referring to Fig. 2, there is illustrated a schematic front plan view of a refrigerator having a temperature control apparatus installed therein for use in a carbonator of a refrigerator in accordance with a preferred embodiment of the present invention. The refrigerator

includes a hinged freezer door 10 for closing or opening a freezer compartment 60; a carbonator 11 constituted by a box-shaped container and mounted on an inner surface of the freezer door 10; a dispenser 12 for selectively discharging a chilled water and a carbonated water; a water tank 13 for supplying water to the carbonator 11; and a carbon dioxide (CO₂) storage cylinder 15 for supplying carbon dioxide gas to the carbonator 11.

[0015] Fig. 3 illustrates a partial cross-sectional diagram of the refrigerator shown in Fig. 2 taken along the lines 3-3 and illustrates a preferred embodiment of the present invention. As shown in Fig. 3, the carbonator 11 is mounted in a recessed portion 20 formed in the inner surface of the freezer door 10. Connected to an upper portion of the carbonator 11 are a water supply tube 51 for transferring water from the water tank 13 to the carbonator 11 and a gas exhaust tube 16 for discharging the carbon dioxide gas in the carbonator 11 to the outside of the refrigerator. And, connected to a lower portion of the carbonator 11 are a gas supply tube 54 for transferring carbon dioxide gas from the CO₂ storage cylinder 15 to the carbonator 11 and a carbonated water outlet tube 53 for transferring a carbonated water from the carbonator 11 to a nozzle 12a of the dispenser 12. Installed on an outer surface of or in the inside of the carbonator 11 is a temperature sensor 29 which detects whether the temperature of the carbonator 11 is equal to or less than a predetermined temperature and then transmits a signal to a controller 55.

[0016] The recessed portion 20 has a size slightly greater than that of the carbonator 11 so that the carbonator 11 can be housed therein. Between the carbonator 11 and inner surface of the recessed portion 20, a plurality of protrusion members 21 made of an insulating material are disposed in such a manner that the carbonator 11 is fixedly installed in the recessed portion 20 with five sides of the carbonator 11 spaced apart from the inner surface of the recessed portion 20 while forming gaps therebetween as deep as the height of the protrusion members 21.

[0017] At the front of the recessed portion 20, a cover 30 is provided to overlay the recessed portion 20 and the carbonator 11 mounted therein. The cover 30 is fixed to the inner surface of the freezer door 10 by screws (not shown) or the like. Between the inner surface of the cover 30 and the carbonator 11, a plurality of the protrusion members 21 are disposed to form a gap as deep as the height of the protrusion members 21 between the inner surface of the cover 30 and the back side of the carbonator 11.

[0018] In the freezer door 10 at upper and lower ends of the cover 30, an inlet channel 25 and an outlet channel 24 are formed, respectively. The inlet channel 25 and the outlet channel 24 are intended for establishing communication between the recessed portion 20 and the freezer compartment 60. And solenoid valves 26a and 26b controlled by the controller 55 are installed at the inlet channel 25 and the outlet channel 24, respectively.

[0019] In the inlet channel 25 and the outlet channel 24, an outlet opening 125 of an outlet path (not shown) and an inlet opening 124 of an inlet path (not shown) are formed, respectively, both paths being intended for establishing communication between the recessed portion 20 and the outside of the refrigerator. The inlet path serves to introduce warm air outside the refrigerator into the recessed portion 20, whereas the outlet path serves to discharge the air in the recessed portion 20 to the outside of the refrigerator. Moreover, at the outlet opening 125 and the inlet opening 124, solenoid valves 126a and 126b controlled by the controller 55 are installed, respectively.

[0020] Further, a fan device 31 is installed at the outlet channel 24 to forcibly discharge the air in the recessed portion 20 to the inside of the refrigerator, i.e., the freezer compartment 60. Moreover, a separate fan device (not shown) may be installed at the inlet channel 25 without or in addition to the fan device 31 to forcibly blow the cool air in the freezer chamber 60 into the recessed portion 20.

[0021] The controller 55 controls the solenoid valves 26a, 26b, 126a and 126b in response to the signal from the temperature sensor 29. If the controller 55 receives the signal from the temperature sensor 29, the controller 55 controls the solenoid valves 26a and 26b to block the inlet channel 25 and the outlet channel 24, and controls the fan device 31 to stop its operation. Then, the supply of the cool air of the freezer compartment 60 to the recessed portion 20 is shut off so that the temperature of the carbonator 11 does not lowered. In addition, at this time, the controller 55 controls the solenoid valves 126a and 126b to open the outlet opening 125 and the inlet opening 124, so that the warm air outside the refrigerator is introduced into the recessed portion 20 through the inlet path and the inlet opening 124 to flow into the gaps formed between the carbonator 11 and the inner surfaces of the recessed portion 20 and the cover 30 to raise the temperature of the carbonator 11. And, the air in the recessed portion 20 is discharged to the outside of the refrigerator through the outlet opening 125 and the outlet path.

[0022] In contrast, if the temperature of the carbonator 11 becomes higher than the predetermined temperature, for example, because relatively warm water is supplied to the carbonator 11 from the water tank 13, the controller 55 controls the solenoid valves 126b and 126a to block the inlet opening 124 and the outlet opening 125, respectively, and controls the solenoid valves 26a and 26b to open the inlet channel 25 and the outlet channel 24. So, the warm air is not supplied to the recessed portion 20 from the outside of the refrigerator and the cool air in the freezer compartment 60 is supplied to the recessed portion 20 and then flows through the gaps formed between the carbonator 11 and the inner surfaces of the recessed portion 20 and the cover 30 to cool down the carbonator 11. At this time, the controller 55 controls the fan device 31 to start its operation so that the supply of the cool air

from the freezer compartment 60 to the recessed portion 20 is facilitated.

[0023] Fig. 4 is a partial cross-sectional diagram of a modified embodiment of the preferred embodiment shown in Fig. 3, wherein like parts to those of the preferred embodiment of the present invention are represented by like reference numerals, and detailed descriptions thereof will be omitted for simplicity.

[0024] As shown in Fig. 4, at the front of the recessed portion 20, a cover 30a for overlaying the recessed portion 20 and the carbonator 11 mounted therein is provided, which is fixed to the inner surface of the freezer door 10 by screws (not shown) or the like. Between the carbonator 11 and the inner surfaces of the recessed portion and the cover 30a, a plurality of the protrusion members 21 are disposed to form gaps therebetween as deep as the height of the protrusion members 21.

[0025] The cover 30a has an empty inner space 37 formed therein. Further, as shown in Fig. 5, the cover 30a has an inlet through hole 32 and an outlet through hole 33 formed in an upper and lower portion of a base plate of the cover 30a, respectively. The inner space 37 communicates the recessed portion 20 through the inlet through hole 32 and the outlet through hole 33. The relatively warmer air in the recessed portion 20 flows into the inner space 37 through the inlet through hole 32 and then is cooled in the inner space 37 indirectly by the cool air of the freezer compartment 60. The air cooled in the inner space 37 descends to the lower portion of the inner space 37 and then flows into the recessed portion 20 through the outlet through hole. The carbonator 11 is then cooled down by help of the air circulation between the recessed portion 20 and the inner space 37 of the cover 30a.

[0026] Further, the outlet opening 125 of the outlet path (not shown) and the inlet opening 124 of the inlet path (not shown) are formed at the upper and the lower portion of the recessed portion 20, respectively. As similar as in the preferred embodiment, both paths are intended for establishing communication between the recessed portion 20 and the outside of the refrigerator. And, at the outlet opening 125 and the inlet opening 124, solenoid valves 126a and 126b controlled by the controller 55a are installed, respectively.

[0027] The controller 55a controls the solenoid valves 126a and 126b in response to the signal from the temperature sensor 29. If the controller 55a receives the signal indicating that the temperature of the carbonator 11 is equal to or less than a predetermined temperature from the temperature sensor 29, the controller 55a controls the solenoid valves 126a and 126b to open the outlet opening 125 and the inlet opening 124. Then, the warm air outside the refrigerator is introduced into the recessed portion 20 through the inlet path and the inlet opening 124. In addition, the air in the recessed portion 20 is discharged to the outside of the refrigerator through the outlet opening 125 and the outlet path. Thus, the temperature of the carbonator 11 mounted in the recessed portion

20 is raised by the warm air flowing through the gaps formed between the carbonator 11 and the inner surfaces of the recessed portion 20 and the cover 30a.

[0028] On the other hand, if the temperature of the carbonator 11 becomes higher than the predetermined temperature, the controller 55a controls the solenoid valves 126a and 126b to block the outlet opening 125 and the inlet opening 124, so that the carbonator 11 is cooled down by the air circulation between the recessed portion 20 and the inner space 37.

[0029] As described above, the temperature control apparatus for use in a carbonator of a refrigerator in accordance with the present invention has a construction in which the temperature of the carbonator mounted in the recessed portion of the freezer door is controlled by the cool air inside the refrigerator and the warm air outside the refrigerator.

[0030] While the invention has been shown and described with respect to the preferred embodiments, it will be understood by those skilled in the art that various changes and modifications may be made without departing from the scope of the invention as defined in the following claims.

Claims

1. A refrigerator equipped with a carbonator (11) comprising a temperature control apparatus wherein the temperature control apparatus comprises:

a cover (30; 30a) overlaying the carbonator (11) mounted in a recessed portion (20) formed in an inner surface of a door (10) of the refrigerator; and

an outlet opening (125) of an outlet path and an inlet opening (124) of an inlet path that are formed in the recessed portion (20), the outlet path and the inlet path being formed in the door (10) of the refrigerator to establish communication between the recessed portion (20) and another part;

characterised in by further comprising:

a pair of valve devices (126a, b), installed at the outlet opening (125) and the inlet opening (124), respectively, wherein the outlet path and the inlet path establish communication between the recessed portion (20) and the outside of the refrigerator;

a temperature sensor (29), installed in the carbonator (11), for detecting a temperature of the carbonator (11) and generating a signal when the detected temperature is equal to or less than a predetermined temperature; and

a controller (55) for controlling the pair of the valve devices (126a, b) in response to the signal

- from the temperature sensor (29),
 wherein if the controller (55) receives the signal
 from the temperature sensor (29), the controller
 (55) controls the pair of the valve devices (126a,
 b) to open the outlet opening (125) and the inlet
 opening (124), so that warm air outside the re-
 frigerator is introduced into the recessed portion
 (20) through the inlet path and the inlet opening
 (124) to raise the temperature of the carbonator.
2. The refrigerator equipped with a carbonator (11) of
 claim 1, wherein the temperature control apparatus
 further comprises a plurality of protrusion members
 (21) disposed between the carbonator (11) and an
 inner surface of the recessed portion (20) to form a
 gap therebetween.
3. The refrigerator equipped with a carbonator (11) of
 claim 1, wherein the temperature control apparatus
 further comprises a pair of cooling valve devices
 (26a, b) which are installed at a cool air inlet channel
 (25) and a cool air outlet channel (24), respectively,
 the cool air inlet channel (25) and the cool air outlet
 channel (24) being formed in the door (10) of the
 refrigerator, to establish communication between the
 recessed portion (20) and an inside of the refrigera-
 tor,
- wherein if the controller (55) receives the signal
 from the temperature sensor (29), the controller
 (55) controls the pair of the cooling valve devices
 (26a, b) to block the cool air inlet channel (23)
 and the cool air outlet channel (24), so that sup-
 ply of cool air from the inside of the refrigerator
 to the recessed portion (20) through the cooling
 inlet channel (25) is shut off and that discharge
 of air from the recessed portion (20) to the inside
 of the refrigerator through the cool air outlet
 channel (24) is shut off.
4. The refrigerator equipped with a carbonator (11) of
 claim 3, wherein the temperature control apparatus
 further comprises a fan device (31), installed at the
 cool air outlet channel (24), for forcedly discharging
 air in the recessed portion (20) to the inside of the
 refrigerator,
- wherein if the controller (55) receives the signal
 from the temperature sensor (29), the controller
 (55) controls the fan device (31) to stop its op-
 eration.
5. The refrigerator equipped with a carbonator (11) of
 claim 1, wherein the cover (30a) has an empty inner
 space (37) formed therein, and an inlet through hole
 (32) and an outlet through hole (33) formed in an
 upper portion and a lower portion of a base plate
 thereof, respectively for establishing communication
- between the recessed portion (20) and the inner
 space (37),
- wherein air in the inner space (37) is cooled
 down by cool air inside the refrigerator and then
 flows into the recessed portion (20) through the
 outlet through hole (33).
6. A refrigerator equipped with a carbonator (11) com-
 prising a temperature control apparatus, wherein the
 temperature control apparatus comprises:
- a cover (30; 30a) overlaying the carbonator (11)
 mounted in a recessed portion (20) formed in an
 inner surface of a door (10) of the refrigerator;
- characterised in** by further comprising:
- a temperature sensor (29) installed in the car-
 bonator (11) and for generating a signal if a tem-
 perature of the carbonator (11) is equal to or less
 than a predetermined temperature;
 a pair of cooling valve devices (26a, b) which
 are installed at a cool air inlet channel (25) and
 a cool air outlet channel (24) respectively that
 are formed in the door (10) of the refrigerator,
 to establish communication between the re-
 cessed portion (20) and an inside of the refrig-
 erator;
 a controller (55) for controlling the pair of the
 cooling valve devices (26a, b) in response to the
 signal of the temperature sensor (29),
 wherein if the controller (55) receives the signal
 from the temperature sensor (29), the controller
 (55) controls the pair of the cooling valve devices
 (26a, b) to block the cool air inlet channel (25)
 and the cool air outlet channel (24), so that sup-
 ply of cool air from the inside of the refrigerator
 to the recessed portion (20) through the cooling
 inlet channel (25) is shut off and that discharge
 of air from the recessed portion (20) to the inside
 of the refrigerator through the cool air outlet
 channel (24) is shut off.
7. The refrigerator equipped with a carbonator (11) of
 claim 6, wherein the temperature control apparatus
 further comprises a fan device (31) installed at the
 cool air outlet channel (25) and for forcedly discharg-
 ing air in the recessed portion (20) to the inside of
 the refrigerator,
- wherein if the controller (55) receives the signal
 from the temperature sensor (29), the controller
 (55) controls the fan device (31) to stop its op-
 eration.

Patentansprüche

1. Kühlschrank, der mit einer Karbonisiereinheit (11) ausgestattet ist, der eine Temperatursteuereinrichtung umfasst, wobei die Temperatursteuereinrichtung folgendes umfasst:

eine Abdeckung (30; 30a), die die Karbonisiereinheit überdeckt, die in einem Einbauabschnitt (20) angebracht ist, der in einer Innenseite einer Tür (10) des Kühlschranks ausgebildet ist; und eine Auslassöffnung (125) eines Auslasspfades und eine Einlassöffnung (124) eines Einlasspfades, die im Einbauabschnitt (20) ausgebildet sind, wobei der Auslasspfad und der Einlasspfad in der Tür des Kühlschranks ausgebildet sind, um eine Kommunikation zwischen dem Einbauabschnitt (20) und einem anderen Teil herzustellen;

dadurch gekennzeichnet, dass sie ferner umfasst:

ein Paar Ventileinrichtungen (126a, b), die an der Auslassöffnung (125) bzw. der Einlassöffnung (124) angebracht sind, wobei der Auslasspfad und der Einlasspfad eine Kommunikation zwischen dem Einbauabschnitt (20) und der Außenseite des Kühlschranks ermöglichen; einen Temperatursensor (29), der in der Karbonisiereinheit (11) angebracht ist, zum Erfassen einer Temperatur der Karbonisiereinheit (11) und zum Erzeugen eines Signals, wenn die erfasste Temperatur gleich oder geringer als eine vorbestimmte Temperatur ist; und eine Steuerung (55) zum Steuern des Paares an Ventileinrichtungen (126a, b) in Antwort auf das Signal vom Temperatursensor (29), wobei, falls die Steuerung (55) das Signal vom Temperatursensor (29) empfängt, die Steuerung (55) das Paar an Ventileinrichtungen (126a, b) steuert, die Auslassöffnung (125) und die Einlassöffnung (124) zu öffnen, so dass warme Luft außerhalb des Kühlschranks in den Einbauabschnitt (20) durch den Einlasspfad und die Einlassöffnung (124) eingeführt wird, um die Temperatur der Karbonisiereinheit zu erhöhen.

2. Kühlschrank, der mit einer Karbonisiereinheit (11) ausgestattet ist, nach Anspruch 1, bei dem die Temperatursteuerungseinrichtung ferner eine Vielzahl an Vorsprüngen (21) umfasst, die zwischen der Karbonisiereinheit (11) und einer Innenfläche des Einbauabschnitts (20) angeordnet sind, um eine Lücke dazwischen zu bilden.
3. Kühlschrank, der mit einer Karbonisiereinheit (11) ausgestattet ist, nach Anspruch 1, bei dem die Temperatursteuerungseinrichtung ferner ein Paar Kühl-

ventileinrichtungen (26a, b) umfasst, die an einem Kühllufteinlasskanal (25) bzw. einem Kühlluftauslasskanal (24) angebracht sind, wobei der Kühllufteinlasskanal (25) und der Kühlluftauslasskanal in der Tür (10) des Kühlschranks ausgebildet ist, um eine Kommunikation zwischen dem Einbauabschnitt (20) und einem Inneren des Kühlschranks zu ermöglichen,

wobei die Steuerung (55) das Signal vom Temperatursensor (29) empfängt, die Steuerung (55) das Paar an Kühlventileinrichtungen (26a, b) steuert, den Kühllufteinlasskanal (23) und den Kühlluftauslasskanal (24) zu blockieren, so dass die Kühlluftversorgung vom Inneren des Kühlschranks zum Einbauabschnitt (20) durch den Kühllufteinlasskanal (25) abgesperrt und der Luftauslass von dem Einbauabschnitt (20) in das Innere des Kühlschranks durch den Kühlluftauslasskanal (24) abgesperrt ist.

4. Kühlschrank, der mit einer Karbonisiereinheit (11) ausgebildet ist, nach Anspruch 3, bei dem die Temperatursteuerungseinrichtung ferner eine Gebläseeinrichtung (31) umfasst, die am Kühlluftauslasskanal (24) angebracht ist, um Luft im Einbauabschnitt (20) zwangsweise in das Innere des Kühlschranks auszulassen,

wobei, falls die Steuerung (55) das Signal von dem Temperatursensor (29) empfängt, die Steuerung (55) die Gebläseeinrichtung (31) steuert, ihren Betrieb zu stoppen.

5. Kühlschrank, der mit einer Karbonisiereinheit (11) ausgestattet ist, nach Anspruch 1, bei dem die Abdeckung (30a) einen darin ausgebildeten leeren Innenraum (37) und ein Einlassdurchgangsloch (32) und ein Auslassdurchgangsloch (33) aufweist, das in einem oberen Abschnitt bzw. einem unteren Abschnitt einer Basisplatte davon ausgebildet sind, zum Ermöglichen einer Kommunikation zwischen dem Einbauabschnitt (20) und dem Innenraum (37),

wobei Luft im Innenraum (37) durch Kühlluft innerhalb des Kühlschranks gekühlt wird und dann in den Einbauabschnitt (20) durch das Auslassdurchgangsloch (33) fließt.

6. Kühlschrank, der mit einer Karbonisiereinheit ausgestattet ist, mit einer Temperatursteuerungseinrichtung, wobei die Temperatursteuerungseinrichtung folgendes umfasst:

eine Abdeckung (30; 30a), die die Karbonisiereinheit (11) bedeckt, die in einem Einbauabschnitt (20) angebracht ist, der in einer Innenfläche einer Tür (10) des Kühlschranks ausge-

bildet ist;

dadurch gekennzeichnet, dass sie ferner umfasst:

einen in der Karbonisiereinheit (11) angebrachten 5
Temperatursensor (29) zum Erzeugen eines
Signals, falls eine Temperatur der Karbonisier-
einheit (11) gleich oder geringer als eine vorbe-
stimmte Temperatur ist;
ein Paar Kühlventileinrichtungen (26a, b), die in 10
einem Kühllufteinlasskanal (25) bzw. einem
Kühlluftauslasskanal (24) angebracht sind, die
in der Tür (10) des Kühlschranks ausgebildet
sind, um eine Kommunikation zwischen dem
Einbauabschnitt (20) und einem Inneren des 15
Kühlschranks zu ermöglichen;
eine Steuerung (55) zum Steuern des Paares
der Kühlventileinrichtungen (26a, b) in Antwort
auf das Signal vom Temperatursensor (29),
wobei, falls die Steuerung (55) das Signal vom 20
Temperatursensor (29) empfängt, die Steue-
rung (55) das Paar an Kühlventileinrichtungen
(26a, b) steuert, den Kühllufteinlasskanal (25)
und den Kühlluftauslasskanal (24) zu blockie- 25
ren, so dass die Versorgung der Kühlluft vom
Inneren des Kühlschranks zum Einbauabschnitt
(20) durch den Kühllufteinlasskanal (25) abge-
schaltet ist und der Auslass von Luft vom Ein-
bauabschnitt (20) in das Innere des Kühl- 30
schranks durch den Kühlluftauslasskanal (24)
abgeschaltet ist.

7. Kühlschrank, der mit einer Karbonisiereinheit (11) 35
ausgestattet ist, nach Anspruch 6, bei dem die Tem-
peratursteuerungseinrichtung ferner eine am Kühl-
luftauslasskanal (25) angebrachte Gebläseeinrich-
tung (31) zum zwangsweisen Auslassen von Luft im
Einbauabschnitt (20) in das Innere des Kühl-
schranks aufweist,

wobei, falls die Steuerung (55) das Signal von 40
dem Temperatursensor (29) empfängt, die
Steuerung (55) die Gebläseeinrichtung (31)
steuert, ihren Betrieb zu stoppen.

Revendications

1. Réfrigérateur équipé d'un carbonateur (11) compre- 50
nant un appareil de régulation de la température,
dans lequel l'appareil de régulation de la tempéra-
ture comprend :
- > un couvercle (30 ; 30a) recouvrant le carbo- 55
nateur (11) monté dans une partie renfoncée
(20) formée dans une surface interne d'une por-
te (10) du réfrigérateur ; et
 - > une ouverture de sortie (125) d'une voie de

sortie et une ouverture d'admission (124) d'une
voie d'admission qui sont formées dans la partie
renfoncée (20), la voie de sortie et la voie d'ad-
mission étant formées dans la porte (10) du ré-
frigérateur pour établir la communication entre
la partie renfoncée (20) et une autre partie ;

caractérisé en ce qu'il comprend en outre :

- > une paire de dispositifs formant soupapes 5
(126a, b) installés à l'ouverture de sortie (125)
et à l'ouverture d'admission (124) respective-
ment, dans lequel la voie de sortie et
la voie d'admission établissent une communica-
tion entre la partie renfoncée (20) et l'extérieur 10
du réfrigérateur ;
- > un capteur de température (29) installé dans
le carbonateur (11) pour détecter une tempé-
rature du carbonateur (11) et générer un signal
quand la température détectée est inférieure ou 15
égale à une température prédéterminée ; et
- > un contrôleur (55) pour commander la paire
de dispositifs formant soupapes (126a, b) en réac-
tion au signal provenant du capteur de 20
température (29),

dans lequel si le contrôleur (55) reçoit le signal du
capteur de température (29), le contrôleur (55) com-
mande la paire de dispositifs formant soupapes
(126a, b) afin qu'ils ouvrent l'ouverture de sortie
(125) et l'ouverture d'admission (124) de sorte que
de l'air chaud situé à l'extérieur du réfrigérateur soit
introduit dans la partie renfoncée (20) à travers la
voie d'admission et l'ouverture d'admission (124)
pour augmenter la température du carbonateur.

2. Réfrigérateur équipé d'un carbonateur (11) selon la 40
revendication 1, dans lequel l'appareil de régulation
de la température comprend en outre une pluralité
d'éléments de saillie (21) disposés entre le carbo-
nateur (11) et une surface interne de la partie ren-
foncée (20) pour former un écart entre ceux-ci.
3. Réfrigérateur équipé d'un carbonateur (11) selon la 45
revendication 1, dans lequel l'appareil de régulation
de la température comprend en outre une paire de
dispositifs formant soupapes de refroidissement
(26a, b) qui sont installés au niveau d'un canal d'ad-
mission d'air frais (25) et d'un canal de sortie d'air 50
frais (24) respectivement, le canal d'admission d'air
frais (25) et le canal de sortie d'air frais (24) étant
formés dans la porte (10) du réfrigérateur, pour éta-
blir une communication entre la partie renfoncée (20)
et un intérieur du réfrigérateur, dans lequel si le con-
trôleur (55) reçoit le signal provenant du capteur de
température (29), le contrôleur (55) commande la
paire de dispositifs formant soupapes de refroidis-

sement (26a, b) de manière à ce qu'ils bloquent le canal d'admission d'air frais (23) et le canal de sortie d'air frais (24), de manière à couper l'alimentation en air frais depuis l'intérieur du réfrigérateur vers la partie renfoncée (20) à travers le canal d'admission d'air frais (25), et de manière à couper l'évacuation d'air depuis la partie renfoncée (20) vers l'intérieur du réfrigérateur à travers le canal de sortie d'air frais (24).

4. Réfrigérateur équipé d'un carbonateur (11) selon la revendication 3, dans lequel l'appareil de régulation de la température comprend en outre un dispositif formant ventilateur (31), installé au niveau du canal de sortie d'air frais (24), pour évacuer de manière forcée de l'air dans la partie renfoncée (20) vers l'intérieur du réfrigérateur, dans lequel si le contrôleur (55) reçoit le signal provenant du capteur de température (29), le contrôleur (55) commande le dispositif formant ventilateur (31) de manière à arrêter son fonctionnement.

5. Réfrigérateur équipé d'un carbonateur (11) selon la revendication 1, dans lequel le couvercle (30a) a un espace interne vide (37) formé dans celui-ci, ainsi qu'un trou d'admission traversant (32) et un trou de sortie traversant (33) formés dans une partie supérieure et une partie inférieure d'une platine de base de celui-ci, respectivement pour établir une communication entre la partie renfoncée (20) et l'espace interne (37), dans lequel l'air dans l'espace interne (37) est refroidi par de l'air frais à l'intérieur du réfrigérateur, puis il s'écoule dans la partie renfoncée (20) à travers le trou de sortie traversant (33).

6. Réfrigérateur équipé d'un carbonateur (11) comprenant un appareil de régulation de la température, dans lequel l'appareil de régulation de la température comprend :

> un couvercle (30 ; 30a) recouvrant le carbonateur (11) monté dans une partie renfoncée (20) formée dans une surface interne d'une porte (10) du réfrigérateur ;

caractérisé en ce qu'il comprend en outre :

> un capteur de température (29) installé dans le carbonateur (11) pour générer un signal si une température du carbonateur (11) est inférieure ou égale à une température prédéterminée ;

> une paire de dispositifs formant soupapes de refroidissement (26a, b) qui sont installés au niveau d'un canal d'admission d'air frais (25) et d'un canal de sortie d'air frais (24) respectivement, lesdits canaux étant formés dans la porte (10) du réfrigérateur, pour établir une commu-

nication entre la partie renfoncée (20) et un intérieur du réfrigérateur ;

> un contrôleur (55) pour commander la paire de dispositifs formant soupapes de refroidissement (26a, b) en réaction au signal provenant du capteur de température (29),

dans lequel si le contrôleur (55) reçoit le signal du capteur de température (29), le contrôleur (55) commande la paire de dispositifs formant soupapes de refroidissement (26a, b) de manière à bloquer le canal d'admission d'air frais (25) et le canal de sortie d'air frais (24), de sorte que l'alimentation en air frais depuis l'intérieur du réfrigérateur vers la partie renfoncée (20) à travers le canal d'admission d'air frais (25) soit coupée et que l'évacuation d'air à partir de la partie renfoncée (20) vers l'intérieur du réfrigérateur à travers le canal de sortie d'air frais (24) soit coupée.

7. Réfrigérateur équipé d'un carbonateur (11) selon la revendication 6, dans lequel l'appareil de régulation de la température comprend en outre un dispositif formant ventilateur (31), installé au niveau du canal de sortie d'air frais (24), pour évacuer de manière forcée de l'air dans la partie renfoncée (20) vers l'intérieur du réfrigérateur, dans lequel si le contrôleur (55) reçoit le signal provenant du capteur de température (29), le contrôleur (55) commande le dispositif formant ventilateur (31) de manière à arrêter son fonctionnement.

FIG. 1

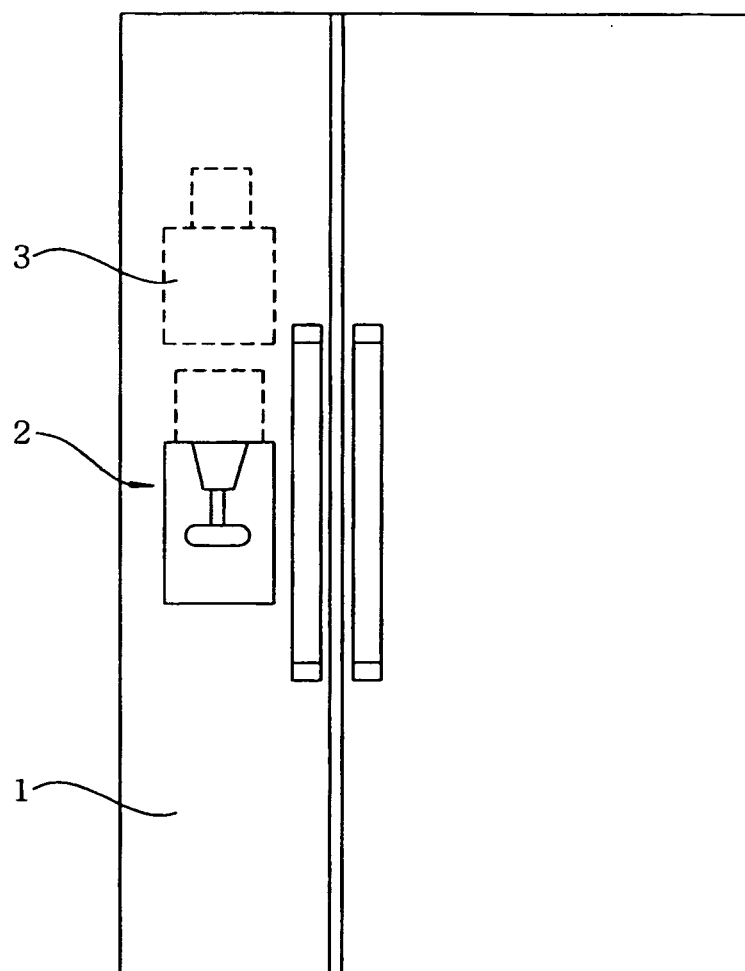


FIG. 2

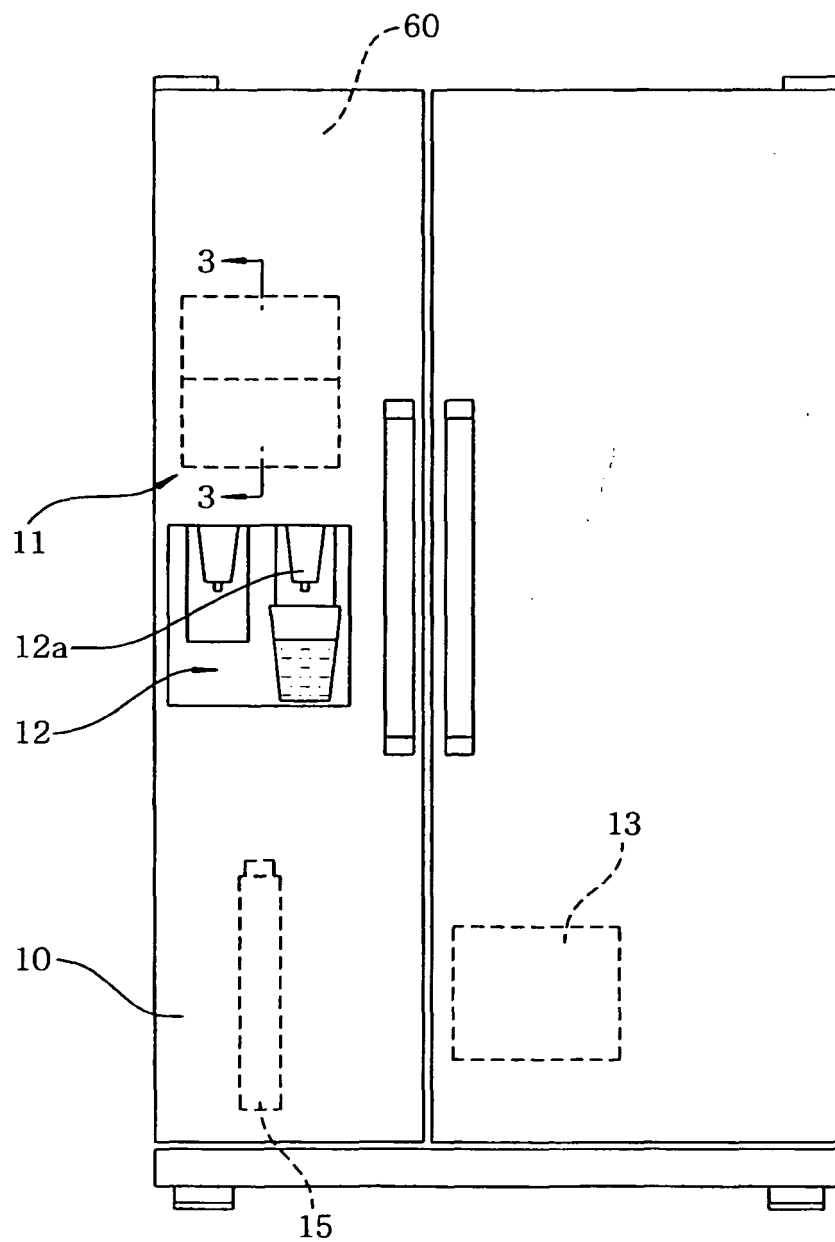


FIG. 3

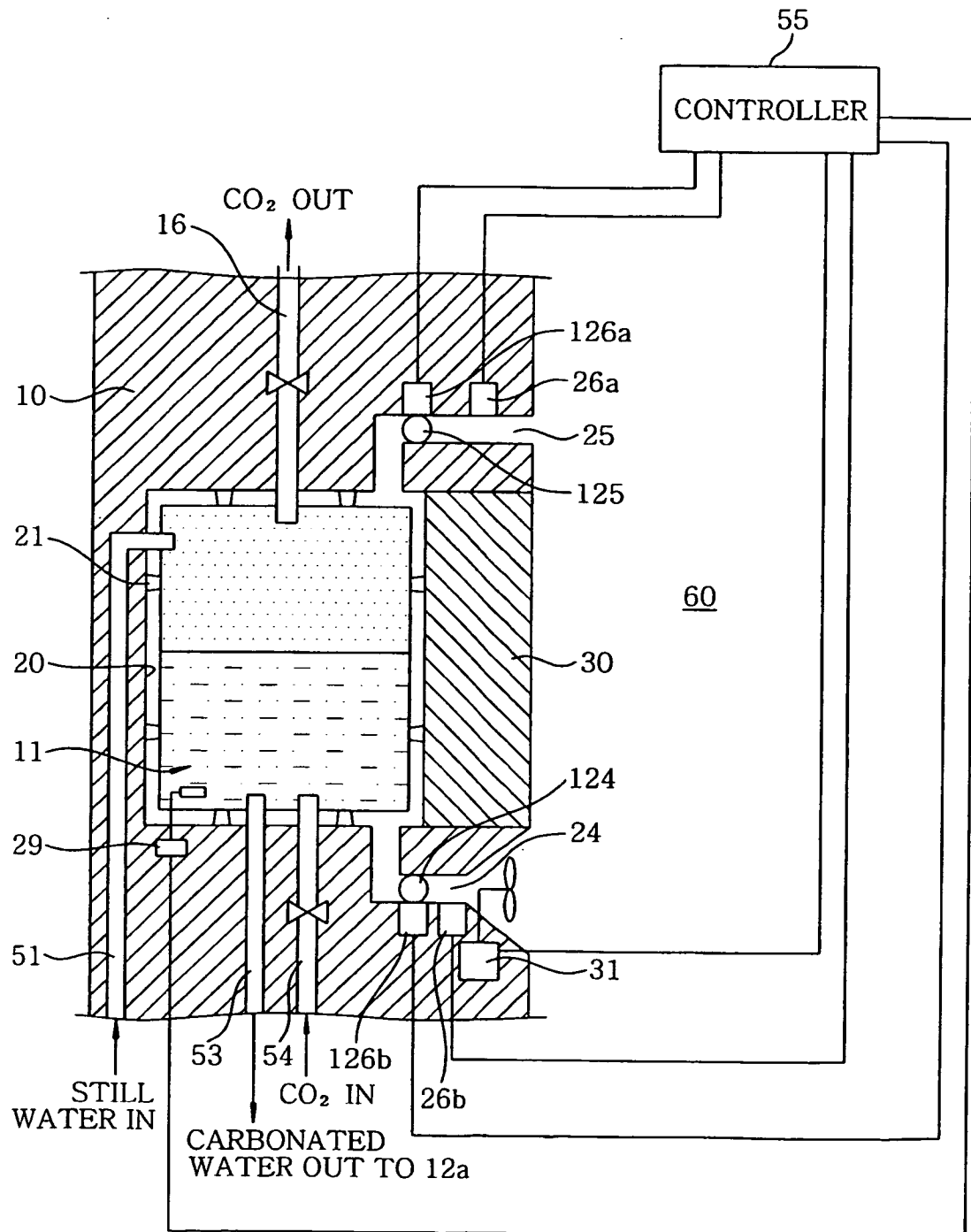


FIG. 4

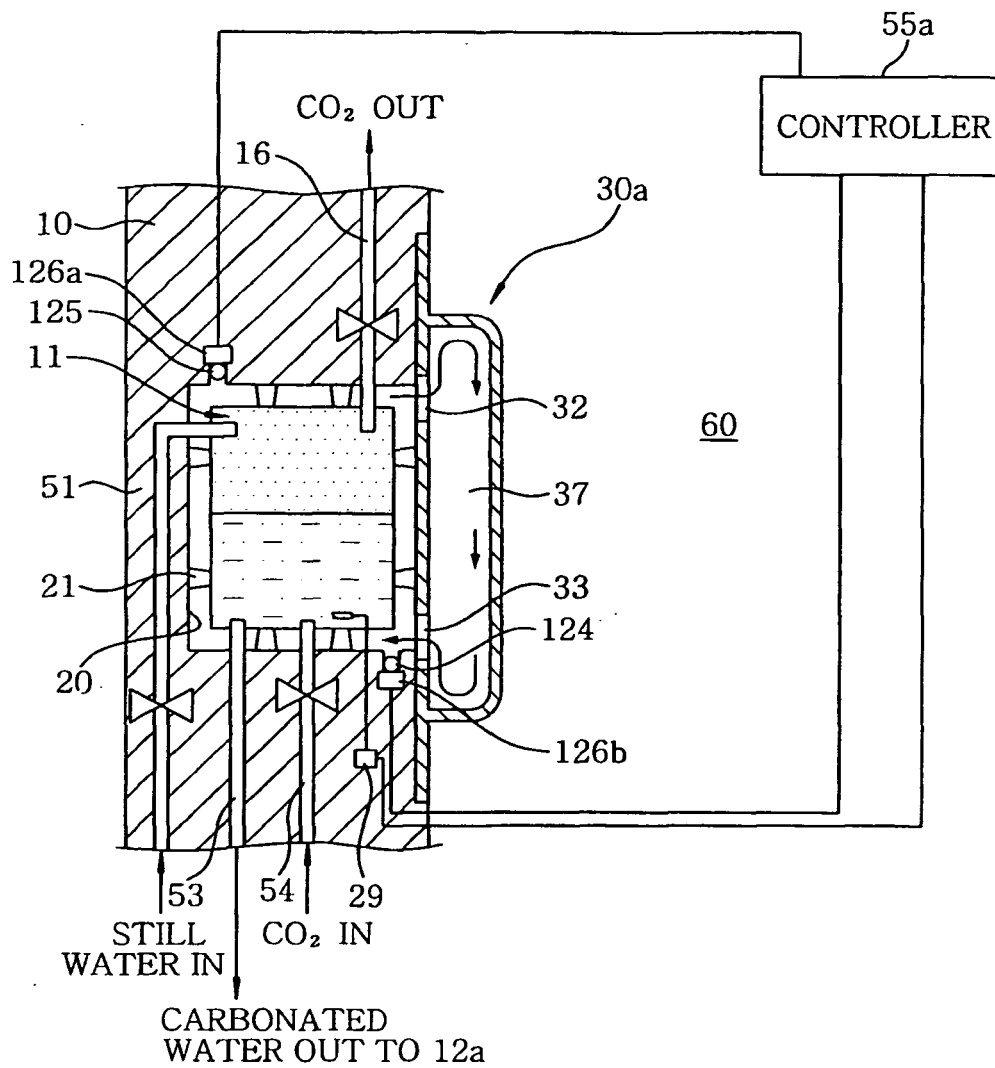
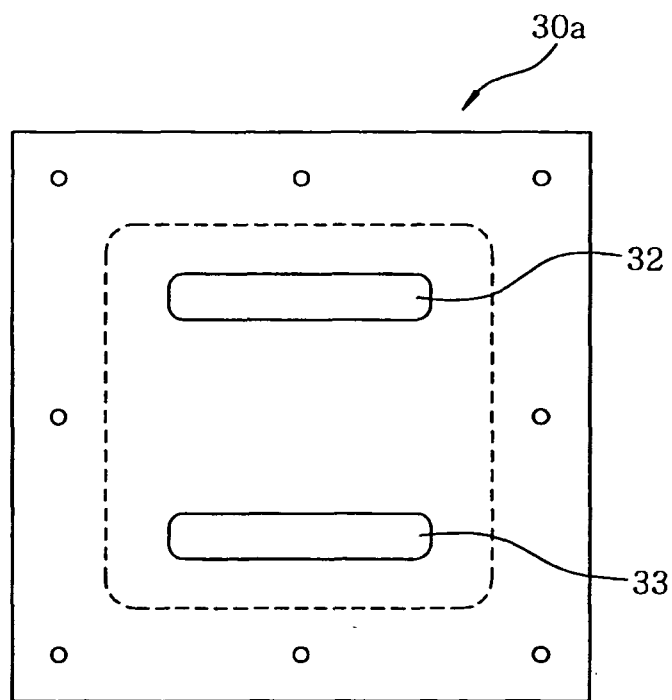


FIG. 5



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4866949 A [0003] [0004] [0005] [0007]
- US 5484538 A [0006]
- GB 2160847 A [0008]
- JP 2005024119 A [0009]