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(54) Title: A COOLING DEVICE NOT AFFECTED BY POWER OUTAGES

(57) Abstract: The present invention relates to a cooling device comprising at least one compartment; a compressor (3) and at least one temperature sensor (4) which is electrically connected between the mains (2) and the compressor (3), which 5 enables the compartment temperature to be controlled, the compressor (3) to operate according to the compartment temperature and the compartment to remain within the desired compartment temperature range.

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A COOLING DEVICE NOT AFFECTED BY POWER OUTAGES

The present invention relates to a cooling device which is not affected by power outages.

5 The electrical energy required for the operation of household appliances, such as cooling devices, washing machines, dishwashers, ovens, washer/dryers, is received from the mains and operated at a certain operating voltage. Due to various malfunctions in the mains, power outages or voltage values outside the standard values occur. Since household appliances are generally connected to the
10 mains throughout their economic life, they are adversely affected by the power outages or voltage fluctuations.

In some countries there are planned power outages. The storage life of foodstuffs stored in the cooling devices used especially in countries where power outages are common decreases due to the power outages. Since the duration of the power
15 outages varies and the cooling device does not operate during this period, the foodstuffs stored in the cooling device get spoiled or their economic life decreases.

In the state of the art static cooling devices, a thermostat is provided, which enables the compressor to be activated to perform the cooling process when a
20 predetermined temperature is reached (cut-in), and which deactivates the compressor to prevent the compressor from operating unnecessarily and the cooling process from continuing when the cooling device reaches the desired temperature (cut-out).

In the state of the art International Patent Application No. WO03065535, the
25 voltage at the mains input is detected by a voltage divider and compared with a reference voltage value. When an overvoltage is detected, the leakage current circuit is operated and overvoltage protection is provided.

In the state of the art United States Patent No. US5039009, an air conditioner is disclosed, wherein the control unit is improved without improving the thermostat.

In the state of the art United States Patent No. US4829779, a cooling device is disclosed, wherein the changes in the mains are detected and the thermostat is remotely controlled.

The aim of the present invention is the realization of a cooling device which is not
5 affected by power outages.

The cooling device realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises at least one compartment; a compressor; at least one temperature sensor which is electrically connected between the mains and the compressor, which enables the
10 compartment temperature to be controlled, the compressor to operate according to the compartment temperature and the compartment to remain within the desired compartment temperature range, and a cooling device control circuit having a switching unit which deactivates the temperature sensor until the power outage before the power outage and which enables the compressor to be directly activated
15 and the compartment to be cooled. In this embodiment, the power outage time information is stored in the switching unit. The temperature sensor is deactivated a time determined by the manufacturer before the power outage, and the compressor is activated such that the cooling process continues until the power outage, enabling the compartment to be cooled. By means of the present invention, the
20 compartment is precooled before the power outage, thus preventing the temperature of the compartment from increasing during the power outage. Thus, the economic life of the foodstuffs stored in the cooling device is increased.

In the embodiment of the present invention, the information on when and how long the power outages will occur as well as the information on how much time
25 before the power outage the temperature sensor will be activated and how long and at what speed the compressor will be operated is stored in the switching unit. Thus, freezing of the foodstuffs in the compartment due to overcooling is prevented, and the information on how much time before the power outage the compressor will be activated by means of the switching unit and for how long the
30 same will be active is predetermined by taking into account the size and the capacity of the cooling device and the ambient temperature.

In the embodiment of the present invention, the temperature sensor is a thermostat.

In another embodiment of the present invention, the cooling device comprises a switching unit which is electrically connected to the temperature sensor in parallel
5 and bypasses the temperature sensor when activated. In this embodiment of the present invention, the energy received from the mains passes through the switching unit with the activation of the switching unit a time predetermined by the manufacturer before the power outage, and the compressor is driven directly via the switching unit by bypassing the temperature sensor. Thus, a precooling-
10 like process is performed by operating the compressor according to the switching unit, not according to the temperature sensor, until the power outage, for a certain period of time before the power outage. Consequently, the increase in the temperature of the compartment during the power outage and the decrease in the economic life of the foodstuffs stored in the compartment are prevented.

15 In an embodiment of the present invention, the switching unit is a switch. In this embodiment of the present invention, the temperature sensor is deactivated when the switch is used by the user, independent of the status of the temperature sensor, and the compressor is operated by means of the switching unit.

In an embodiment of the present invention, the switching unit is mechanical so as
20 to be manually operated by the user to bypass the temperature sensor and operate the compressor for as long as desired.

In another version of this embodiment of the present invention, the switching unit is programmable. Thus, remote access is provided to the user to control the switching unit without the need for the user to be physically present.

25 In another embodiment of the present invention, the cooling device comprises a cooling device control circuit having the switching unit which is electrically connected semi-parallel to the temperature sensor and which has a first position wherein the temperature sensor and the switching unit are not active, a second position which enables the compressor to be driven with the temperature sensor
30 when the temperature sensor is active and a third position which enables the compressor to be driven by the switching unit regardless of the position of the

temperature sensor. Thus, a cooling process is performed by operating the compressor according to the switching unit, not according to the temperature sensor, until the power outage, for a certain period of time before the power outage. Consequently, any instantaneous increase in the temperature of the cooling device during the power outage and the decrease in the economic life of the foodstuffs stored in the compartment are prevented.

By means of the present invention, the temperature increase time is fully activated by performing precooling before a long-term power outage, and during the power outage, the temperature of the cooling device is prevented from increasing excessively and adversely affecting the economic life of the foodstuffs stored therein.

A cooling device realized in order to attain the aim the object of the present invention is illustrated in the attached figures, where:

Figure 1 – is the schematic view of a cooling device control circuit.

Figure 2 – is the schematic view of another cooling device control circuit.

The elements illustrated in the figures are numbered as follows:

1. Cooling device control circuit
2. Mains connection
3. Compressor
4. Temperature sensor
5. Switching unit

The cooling device comprises at least one compartment; a compressor (3); at least one temperature sensor (4) which is electrically connected between the mains (2) and the compressor (3), which enables the compartment temperature to be controlled, the compressor (3) to operate according to the compartment temperature and the compartment to remain within the desired compartment temperature range, and a cooling device control circuit (1) having a switching unit (5) which deactivates the temperature sensor (4) until the power outage before the power outage and which enables the compressor (3) to be directly activated and

the compartment to be cooled. In this embodiment, the power outage time information is stored in the switching unit (5). The temperature sensor (4) is deactivated a time determined by the manufacturer before the power outage, and the compressor (3) is activated such that the cooling process continues until the power outage, enabling the compartment to be cooled. By means of the present invention, the compartment is precooled before the power outage, thus preventing the temperature of the compartment from increasing during the power outage. Thus, the economic life of the foodstuffs stored in the cooling device is increased.

In the embodiment of the present invention, the information on when and how long the power outages will occur as well as the information on how much time before the power outage the temperature sensor (4) will be activated and how long and at what speed the compressor (3) will be operated is stored in the switching unit (5). Thus, freezing of the foodstuffs in the compartment due to overcooling is prevented, and the information on how much time before the power outage the compressor (3) will be activated by means of the switching unit (5) and for how long the same will be active is predetermined by taking into account the size and the capacity of the cooling device and the ambient temperature.

In the embodiment of the present invention, the temperature sensor (4) is a thermostat.

In another embodiment of the present invention, the cooling device control circuit (1) comprises a switching unit (5) which is electrically connected to the temperature sensor (4) in parallel and bypasses the temperature sensor (4) when activated. In this embodiment of the present invention, the energy received from the mains (2) passes through the switching unit (5) with the activation of the switching unit (5) a time predetermined by the manufacturer before the power outage, and the compressor (3) is driven directly via the switching unit (5) by bypassing the temperature sensor (4). Thus, a precooling-like process is performed by operating the compressor (3) according to the switching unit (5), not according to the temperature sensor (4), until the power outage, for a certain period of time before the power outage. Consequently, the increase in the temperature of the compartment during the power outage and the decrease in the

economic life of the foodstuffs stored in the compartment are prevented (Figure 1).

In an embodiment of the present invention, the switching unit (5) is a switch. In this embodiment of the present invention, the temperature sensor (4) is
5 deactivated when the switch is used by the user, independent of the status of the temperature sensor (4), and the compressor (3) is operated by means of the switching unit (5).

In an embodiment of the present invention, the switching unit (5) is mechanical so as to be manually operated by the user to bypass the temperature sensor (4) and
10 operate the compressor (3) for as long as desired.

In another version of this embodiment of the present invention, the switching unit (5) is programmable. Thus, remote access is provided to the user to control the switching unit (5) without the need for the user to be physically present.

In another embodiment of the present invention, the cooling device comprises a
15 cooling device control circuit (1) having the switching unit (5) which is electrically connected semi-parallel to the temperature sensor (4) and which has a first position wherein the temperature sensor (4) and the switching unit (5) are not active, a second position which enables the compressor (3) to be driven with the temperature sensor (4) when the temperature sensor (4) is active and a third
20 position which enables the compressor (3) to be driven by the switching unit (5) regardless of the position of the temperature sensor (4). Thus, a cooling process is performed by operating the compressor (3) according to the switching unit (5), not according to the temperature sensor (4), until the power outage, for a certain period of time before the power outage. Consequently, any instantaneous increase
25 in the temperature of the cooling device during the power outage and the decrease in the economic life of the foodstuffs stored in the compartment are prevented (Figure 2).

By means of the present invention, the temperature increase time is fully activated by performing precooling before a long-term power outage, and during the power
30 outage, the temperature of the cooling device is prevented from increasing

excessively and adversely affecting the economic life of the foodstuffs stored therein.

CLAIMS

1. A cooling device **comprising** at least one compartment; a compressor (3) and at least one temperature sensor (4) which is electrically connected between the mains (2) and the compressor (3), which enables the compartment temperature to be controlled, the compressor (3) to operate according to the compartment temperature and the compartment to remain within the desired compartment temperature range, **characterized by** a cooling device control circuit (1) having a switching unit (5) which deactivates the temperature sensor (4) until the power outage before the power outage and which enables the compressor (3) to be directly activated and the compartment to be cooled.
2. A cooling device as in Claim 1, **characterized by** the temperature sensor (4) which is a thermostat.
3. A cooling device as in Claim 1 or Claim 2, **characterized by** a switching unit (5) which is electrically connected to the temperature sensor (4) in parallel and bypasses the temperature sensor (4) when activated.
4. A cooling device as in any one of the above claims, **characterized by** the switching unit (5) which is a switch.
5. A cooling device as in any one of Claims 1 to 4, **characterized by** the switching unit (5) which is mechanical so as to be manually operated by the user to bypass the temperature sensor (4) and operate the compressor (3) for as long as desired.
6. A cooling device as in any one of Claims 1 to 4, **characterized by** the programmable switching unit (5).
7. A cooling device as in any one of the above claims, **characterized by** a cooling device control circuit (1) having the switching unit (5) which is electrically connected semi-parallel to the temperature sensor (4) and which has a first position wherein the temperature sensor (4) and the switching unit (5) are not active, a second position which enables the compressor (3) to be driven with the temperature sensor (4) when the

temperature sensor (4) is active and a third position which enables the compressor (3) to be driven by the switching unit (5) regardless of the position of the temperature sensor (4).

Figure 1

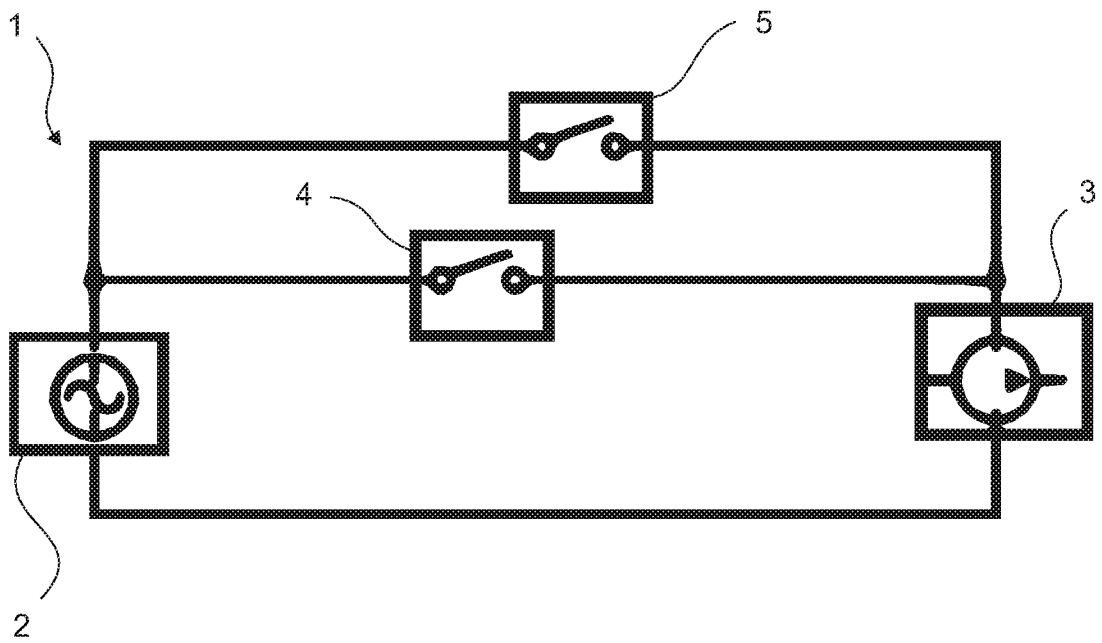
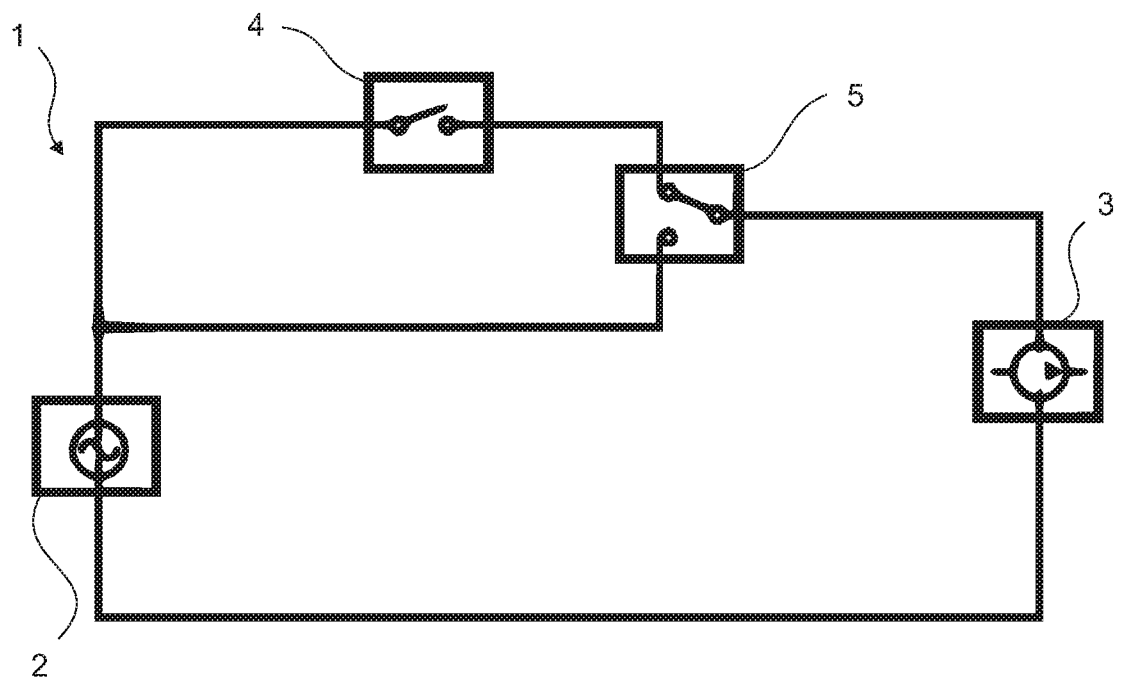


Figure 2



INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

F25D 11/00 (2006.01)i; F25D 23/00 (2006.01)i; F25D 29/00 (2006.01)i; G05B 15/02 (2006.01)i; G05F 1/66 (2006.01)i

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; G05B; G05F

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

TURKPATENT Patent Databases

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

EPO Abstract & Fulltext Databases, WPI Database & Keywords: power cut, power outage, power failure, power blackout, power loss, power interruption, refrigerator, thermostat, temperature

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2021251292 A1 (PANASONIC IP MAN CO LTD [JP]) 16 December 2021 (2021-12-16) Whole document	1-7
X	JP 2003056962 A (TOSHIBA CORP) 26 February 2003 (2003-02-26) Whole document	1-7
X	US 2015198937 A1 (GEN ELECTRIC [US]) 16 July 2015 (2015-07-16) Abstract, Description especially paragraph 40	1-7



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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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

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/TR2023/050658

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
WO	2021251292	A1	16 December 2021	CN	115698610	A	03 February 2023
				JP	2021196079	A	27 December 2021
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