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REFRIGERATION COMPARTMENT****Publication Classification**(71) Applicant: **BSH Bosch und Siemens Hausgeräte
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ABSTRACT

The invention relates to a refrigeration device with at least one refrigeration compartment for storing goods to be cooled, having input means for inputting information about the goods to be cooled and a control device for adjusting at least one cooling condition of the refrigeration compartment depending on the input information.

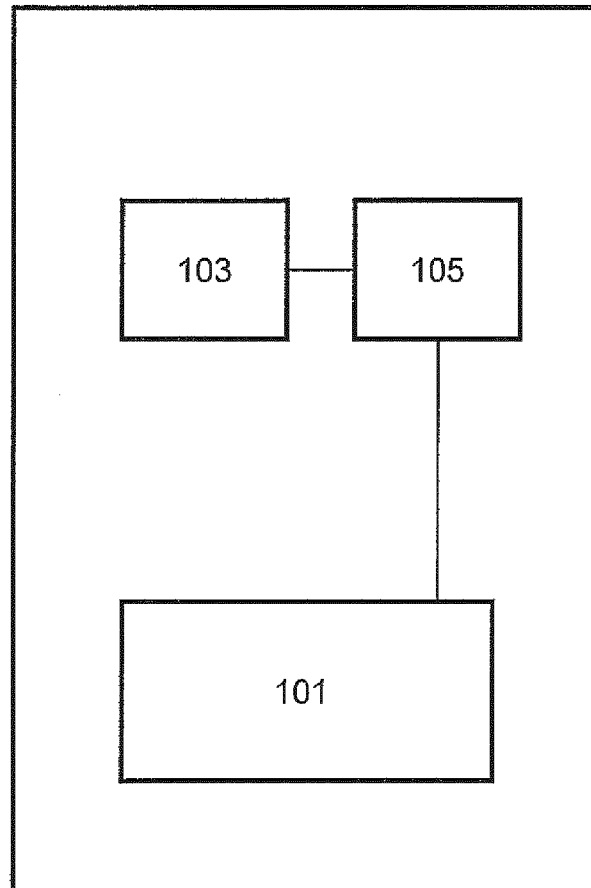
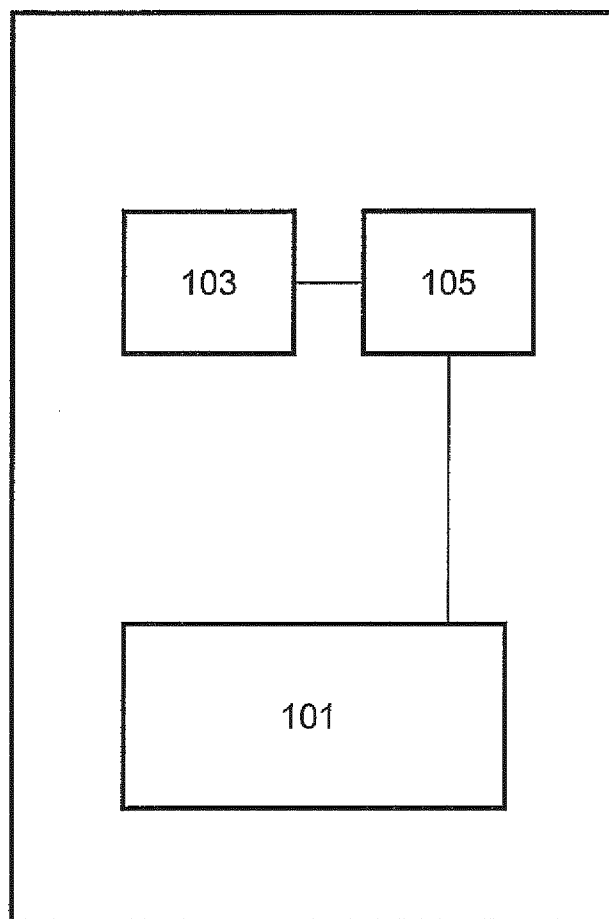


Fig. 1



100

REFRIGERATION DEVICE WITH A REFRIGERATION COMPARTMENT

[0001] The invention relates to a refrigeration appliance with at least one refrigeration compartment.

[0002] In modern refrigeration appliances cooling conditions in a fresh produce zone, for example humidity or temperature, are set manually by means of buttons, slider switches or rotary regulators. However this means that it is not always possible to adjust cooling conditions precisely based on the chilled goods stored in the fresh produce zone.

[0003] It is the object of the present invention to allow efficient adjustment of at least one cooling condition based on the chilled goods to be stored in a refrigeration appliance.

[0004] This object is achieved by subject matter with the features claimed in the independent claims. Advantageous developments are the subject matter of the dependent claims.

[0005] The present invention is based on the knowledge that efficient adjustment of at least one cooling condition based on the chilled goods to be stored in a refrigeration appliance can be allowed by inputting information about the chilled goods. This allows the cooling condition, for example the temperature or ventilation of a fresh produce zone of a freshness system, to be adjusted flexibly and automatically based on the respective chilled goods. This allows a reduction in the loss of quality of stored chilled goods.

[0006] According to one aspect the invention relates to a refrigeration appliance with at least one refrigeration compartment for storing chilled goods, the refrigeration appliance comprising an input facility for inputting information about the chilled goods and a control facility for adjusting at least one cooling condition of the refrigeration compartment as a function of the input information. This allows the cooling condition to be adjusted automatically based on the chilled goods. It is therefore optionally possible to dispense with manual setting of the cooling condition.

[0007] A refrigeration appliance refers in particular to a domestic refrigeration appliance, in other words a refrigeration appliance which is used for household management in households or in catering and serves in particular to store food and/or beverages at defined temperatures, for example a refrigerator, an upright freezer, a combined refrigerator/freezer, a chest freezer or a refrigerated wine cabinet. This has the advantage that specific cooling conditions for the refrigeration compartment that are most suitable for the chilled goods are selected in each instance based on the chilled goods stored.

[0008] According to one embodiment the control facility is a temperature control facility. This has the technical advantage for example that the temperature of the refrigeration compartment can be adjusted based on the chilled goods.

[0009] According to a further embodiment the control facility is a ventilation control facility. This has the technical advantage for example that an exchange of air in the refrigeration compartment can be adjusted based on the chilled goods. Ventilation can be controlled for example by way of a mechanical change to a ventilation cross section.

[0010] According to a further embodiment the refrigeration compartment comprises a ventilation channel with a variable ventilation cross section. This has the technical advantage for example that the exchange of air in the refrigeration compartment can be changed in a technically simple manner.

[0011] According to a further embodiment the ventilation control facility comprises an actuator for setting the ventilation cross section. This has the technical advantage for

example that the ventilation control facility can control the exchange of air with simple technical means.

[0012] According to a further embodiment the control facility is an air humidity control facility. This has the technical advantage for example that air humidity can be adjusted based on the chilled goods stored in the refrigeration compartment.

[0013] According to a further embodiment the input facility is a touch-sensitive flat screen. This has the technical advantage for example that a user can input the information about the stored chilled goods in a simple manner by touching the screen.

[0014] According to a further embodiment the input facility is a projected light control panel. This has the technical advantage for example that almost any flat surface can be used as the input facility.

[0015] According to a further embodiment the input facility is a camera for recording an image of the chilled goods. This has the technical advantage that an image of the stored chilled goods can be stored and processed.

[0016] According to a further embodiment the input facility comprises an image recognition facility for identifying the recorded chilled goods. This has the technical advantage for example that the chilled goods are identified automatically by the refrigeration appliance.

[0017] According to a further embodiment the input facility is a barcode reader. This has the technical advantage for example that the stored chilled goods can be identified with little technical outlay.

[0018] According to a further embodiment the refrigeration appliance comprises a memory for storing the cooling conditions to be applied. This has the technical advantage for example that the refrigeration appliance offers a plurality of cooling conditions and can be operated without a data connection.

[0019] According to a further embodiment the refrigeration appliance comprises a retrieval facility for retrieving cooling conditions for the chilled goods to be stored from a data network. This has the technical advantage for example that the refrigeration appliance can retrieve the most suitable cooling conditions for a plurality of different and new chilled goods.

[0020] According to a further embodiment the refrigeration appliance comprises a time recording facility for recording a storage start time for the chilled goods. This has the technical advantage for example that the time of storage can serve as a basis for further control operations.

[0021] According to a further embodiment the control facility comprises a time control facility for controlling the cooling conditions as a function of the time that has elapsed since the storage start time. This has the technical advantage for example that cooling conditions can be changed over a time period.

[0022] Further exemplary embodiments are described with reference to the accompanying drawing, in which:

[0023] FIG. 1 shows a schematic diagram of a refrigeration appliance with a refrigeration compartment.

[0024] Depending on their size refrigeration appliances often have a varying number of refrigeration compartments or containers which are generally made of unbreakable glass or plastic. Some of the refrigeration compartments can be moved to different positions and removed.

[0025] Chilled goods can be accommodated in different refrigeration compartments, for example storage compart-

ments or containers that can be pulled out on telescopic rails. Present in the lower part of the cooling space are further refrigeration compartments such as fruit and vegetable drawers on telescopic rails, these being covered with a glass or plastic plate.

[0026] The refrigeration compartments are frequently equipped with humidity regulation. This means that the air humidity in the compartments can be changed manually by way of a slide regulator. When the slide regulator is closed, the air humidity is high. In contrast when it is open, the air humidity is kept low. The same applies for air circulation.

[0027] Other refrigeration compartments can also be formed in a refrigeration appliance, for example for bottles, butter, cheese, eggs and other small chilled goods, on the inside of the door. Small pull-out drawers can also be provided as further refrigeration compartments below the storage surfaces.

[0028] There are also refrigeration appliances that are equipped with refrigeration compartments with additional refrigeration/temperature zones. These can be a cold storage zone or a cellar zone for example.

[0029] The cold storage zone has a temperature of around 0° C. This low storage temperature means that the quality of many foods is maintained for longer than at normal cooling space temperatures. The cold storage zone is often divided into two regions with different levels of air humidity. The “dry” region has a relative air humidity of approx. 50% and is suitable for storing packaged animal products. The “humid” region has a relative air humidity of approx. 90% and is used to store unpackaged vegetable products. Humidity is regulated by way of a slide regulator or by a special filter made of a 3-layer composite material that maintains the humidity of the food in the cold storage zone. The cold storage zone and cooling zone are generally located together behind a common appliance door. The cold storage zone is generally equipped with drawers on telescopic rails. The cellar zone is a storage region with a temperature of approx. +8° C. to +14° C. In refrigeration appliances the cellar zone is often present as a separate drawer below or between the cooling and freezing regions. The temperatures in the different refrigeration compartments of a refrigeration appliance are -18° C. and colder in the freezing zone, +2° C. to +10° C. in the cooling zone, -2° C. to +3° C. in the cold storage zone and +8° C. to +14° C. in the cellar zone. The humidity and/or temperature of these refrigeration compartments and freshness systems are adjusted manually here. The ventilation of the fresh produce zones is generally controlled by way of a mechanical change to the ventilation cross section, for example by means of slider switches or rotary regulators.

[0030] The invention is based on the knowledge that different cooling conditions are optimally suited to different chilled goods. In order to achieve these optimum cooling conditions, information about the chilled goods is input into a data processing apparatus of the refrigeration appliance when the chilled goods are stored. This can be done for example by a user selecting the chilled goods and the refrigeration compartment in which the chilled goods are to be stored from a predetermined selection menu.

[0031] For example different symbols for the chilled goods to be stored, for example butter, eggs, fish, meat, vegetables, ice cream, etc., can be shown on a touch-sensitive TFT flat screen, in the manner of a storage guide for example. The user inputs the information about the chilled goods into the refrigeration appliance by pressing one of these symbols. When

storing chilled goods or food the user is informed by the storage guide about optimum storage, for example temperature or preferred zone in the refrigeration appliance. Menuled user guidance by way of a flat screen makes it possible to adjust the cooling conditions of the refrigeration compartment, for example a freshness zone, actively and automatically based on the food to be stored, by confirming storage of the corresponding chilled goods.

[0032] If the refrigeration appliance has a number of refrigeration compartments, in the next step a user can select the refrigeration compartment in which he/she wishes to store the chilled goods. For example the different compartments of the refrigeration appliance can be displayed on the flat screen and the user can select the refrigeration compartment in which the chilled goods are to be stored by pressing.

[0033] When this information has been input, the refrigeration appliance determines the optimum storage conditions for the chilled goods by retrieving the desired cooling conditions to be applied from a memory or database. The stored information about the desired cooling conditions here can comprise information about a temperature to be applied in the refrigeration compartment, an air humidity to be applied, ventilation in the refrigeration compartment or a time profile of the cooling conditions. For example the time profile of a temperature in the refrigeration compartment can be predetermined or the time profile of an air humidity. However other cooling conditions that play a role when chilled goods are stored in a refrigeration compartment or any combination of different cooling conditions can generally also be applied.

[0034] When the optimum desired cooling conditions for the chilled goods in the refrigeration compartment have been determined, the refrigeration appliance uses a control facility to set the actual cooling conditions in the refrigeration compartment automatically so that they correspond to the desired cooling conditions. The control facility therefore sets the cooling conditions of the refrigeration compartment as a function of the input information about the chilled goods.

[0035] This is done for example by adjusting the temperature by way of a temperature control apparatus, by adjusting the air humidity by way of an air humidity apparatus or by adjusting the ventilation by means of a ventilation controller so that the previously determined desired cooling conditions are achieved in the corresponding refrigeration compartment and the ideal storage conditions are automatically set. For example an air gap is automatically set to ventilate the refrigeration compartment and/or the temperature in the case of freshness systems by way of the storage guide. The cross section or width of the ventilation gap can be adjusted actively by way of an actuator, for example a motor, which actuates a valve in a ventilation channel. The valve serves to produce a ventilation channel with a variable ventilation cross section.

[0036] In alternative embodiments however other facilities can be used for inputting information about the chilled goods to be stored. For example a projected light control panel can be used instead of a touch-sensitive flat screen. This is produced by a projector, which projects the user interface onto a suitable surface, for example onto the door of the refrigeration appliance or onto a wall or storage surface. An electronic camera records the hand movement of a user and uses the position of the hand or finger to determine the user input relating to the chilled goods. This has the technical advantage for example that almost any surface can be used to input information, without the hand coming into contact with electronic components.

[0037] However generally all facilities that allow the recording of suitable information about the chilled goods to be stored can be used as an input facility.

[0038] In an alternative embodiment the input facility is a camera for recording an image of the chilled goods. When an image of the chilled goods has been recorded, image recognition software identifies the chilled goods to be stored based on color, shape or other visual properties. For example if a user holds a lemon in the recording region of the camera, the image recognition software can identify that it is a lemon and can automatically set the actual cooling conditions in the refrigeration compartment so that they correspond to the desired cooling conditions for lemons.

[0039] In an alternative embodiment the input facility is a barcode reader. When a barcode reader is used, the user can use the barcode reader to scan a barcode on the chilled goods to be stored. The refrigeration appliance uses the barcode to identify the product in question and sets the ideal cooling conditions in the refrigeration compartment automatically. It is advantageous if the barcode reader is connected wirelessly to the refrigeration appliance, as this enhances the user-friendliness of the refrigeration appliance.

[0040] A memory for storing the cooling conditions to be applied comprises the desired cooling conditions for a plurality of different chilled goods so that a user can adjust the refrigeration compartment based on a plurality of products. Such a memory can be formed for example by a non-volatile memory, for example a ROM or flash memory or a hard disk. In an alternative embodiment the refrigeration appliance is embodied in such a manner that a user can define the desired cooling conditions to be applied for the chilled goods him/herself and store them for the next application.

[0041] In an alternative embodiment the refrigeration appliance comprises a retrieval facility for retrieving cooling conditions for the chilled goods to be stored from a data network. If the user input chilled goods information for example which cannot be assigned in the memory, a connection is set up by way of the internet to the manufacturer of the chilled goods and the desired cooling conditions for the chilled goods can be retrieved from a memory, a database or from a web page of the manufacturer.

[0042] In a further embodiment the refrigeration appliance comprises a time recording facility for recording a storage start time for the chilled goods. This time recording apparatus can determine for example the time and date when the chilled goods are stored. This allows the control facility to control cooling conditions as a function of the time that has elapsed since the storage start time. For example the temperature in the refrigeration compartment can be increased over time, for example to thaw particular foods particularly carefully. It is also possible to lower the temperature as a function of the chilled goods over time, for example when freezing. Likewise it is possible to define the air humidity and the ventilation of the compartment or other desired cooling conditions as a function of the chilled goods and the storage start time.

[0043] However generally all facilities that allow the pre-determined desired cooling conditions to be achieved in the refrigeration compartment can be used as a control facility.

[0044] If the refrigeration appliance comprises a number of refrigeration compartments, the cooling conditions can be adjusted as a function of the chilled goods to be stored therein for each individual refrigeration compartment. Different desired cooling conditions can therefore be applied independently for each refrigeration compartment.

[0045] List of Reference Characters

[0046] 100 Refrigeration appliance

[0047] 101 Refrigeration compartment

[0048] 103 Input facility

[0049] 105 Control facility

1. A refrigeration appliance (100) with at least one refrigeration compartment (101) for storing chilled goods, characterized in that the refrigeration appliance comprises an input facility (103) for inputting information about the chilled goods and a control facility (105) for adjusting at least one cooling condition of the refrigeration compartment (101) as a function of the input information.

2. The refrigeration appliance (100) as claimed in claim 1, characterized in that the control facility (105) is a temperature control facility.

3. The refrigeration appliance (100) as claimed in claim 1 or 2, characterized in that the control facility (105) is a ventilation control facility.

4. The refrigeration appliance (100) as claimed in claim 3, characterized in that the refrigeration compartment (101) comprises a ventilation channel with a variable ventilation cross section.

5. The refrigeration appliance (100) as claimed in claim 4, characterized in that the ventilation control facility is an actuator for setting the ventilation cross section.

6. The refrigeration appliance (100) as claimed in one of the preceding claims, characterized in that the control facility (105) is an air humidity control facility.

7. The refrigeration appliance (100) as claimed in one of the preceding claims, characterized in that the input facility (103) is a touch-sensitive flat screen.

8. The refrigeration appliance (100) as claimed in one of claims 1 to 6, characterized in that the input facility (103) is a projected light control panel.

9. The refrigeration appliance (100) as claimed in one of claims 1 to 6, characterized in that the input facility (103) is a camera for recording an image of the chilled goods.

10. The refrigeration appliance (100) as claimed in claim 9, characterized in that the input facility (103) comprises an image recognition facility for identifying the recorded chilled goods.

11. The refrigeration appliance (100) as claimed in one of claims 1 to 6, characterized in that the input facility (103) is a barcode reader.

12. The refrigeration appliance (100) as claimed in one of the preceding claims, characterized in that the refrigeration appliance (100) comprises a memory for storing the cooling conditions to be applied.

13. The refrigeration appliance (100) as claimed in one of the preceding claims, characterized in that the refrigeration appliance (100) comprises a retrieval facility for retrieving cooling conditions for the chilled goods to be stored from a data network.

14. The refrigeration appliance (100) as claimed in one of the preceding claims, characterized in that the refrigeration appliance (100) comprises a time recording facility for recording a storage start time for the chilled goods.

15. The refrigeration appliance (100) as claimed in claim 14, characterized in that the control facility (105) comprises a time control facility for controlling the cooling conditions as a function of the time that has elapsed since the storage start time.