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(54) **A device for packaging food**

(57) The invention relates to a device (1) arranged to bring about a decreased degradation of food placed in an gastight food package (5, 45, 49), the device comprising a gas conductor (7, 39) adapted to be connected

between a gas supply (9a, 9b) and the food package (5, 45, 49) for changing the composition of the gas inside the food package (5, 45, 49) to a composition with food preserving qualities. The invention also relates to a use of such a device (1).

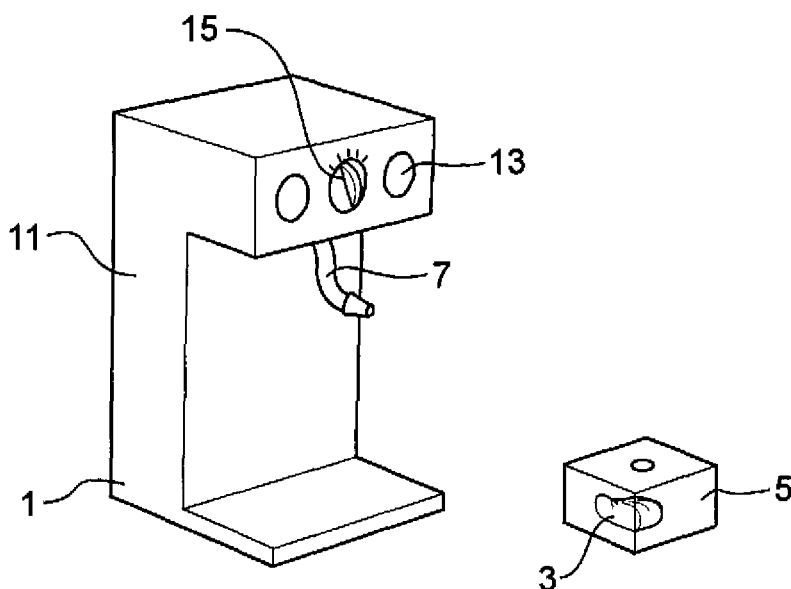


Fig. 1a

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a device arranged to bring about a decreased degradation of food placed in a gastight food package. The device comprises a gas conductor adapted to be connected between at least one gas supply and the food package for changing the composition of the gas inside the food package to a composition with food preserving qualities.

PRIOR ART

[0002] Food may deteriorate due to several different mechanisms, such as bacterial growth, oxidation of fats, dehydration, mould etc. One method used within the food industry to prolong the durability of foods is to store the food in a gastight package and to change the composition of the gas surrounding the food to a gas with food preserving qualities. Such gases usually comprise mixtures of N_2 , O_2 and CO_2 with various contents depending on the food. The mechanisms behind food preservation are well known in the art. For short it can be mentioned that N_2 is usually used as an inert gas for reducing the presence of other gases, such as oxygen, CO_2 dissolves in the water bound in food forming carbon acid, which lowers pH and decrease growth of bacteria and mould, and O_2 is used to reduce browning of for example meat.

[0003] Several methods and devices for preserving foods by changing the composition of the gas surrounding the food are known. In DE 2005 062 962 A1, storage of pastries in an oxygen free atmosphere in gastight housings is shown. In JP 01153038 storage of mushrooms in containers with a mixture of CO_2 , N_2 and air is shown, wherein the container is placed in a cold reserving chamber and the container further comprises a selectively gas permeable membrane for controlling the composition of the gas. In US 2006/0127554 A1 a method for removing oxidants from liquids is shown, wherein the liquid is first fed with a reactive gas, which is then replaced with an inert gas.

[0004] Common for these methods and devices is that they are fairly complicated and therefore demand skilled operators when used. A correct gas composition must be selected depending on the type of food in order to optimize the storage time. Furthermore, the methods involve gases stored under high-pressure conditions, demanding both handling skill and heavy investments. The method of using a food preserving gas has therefore primarily been used by food producers while packing foods for shipment to stores, in order to increase the time available for delivery and marketing of the product.

SUMMARY OF THE INVENTION

[0005] One object of the present invention is to further decrease the degradation of foods in order to increase

the time available before consumption.

[0006] This object is achieved with the device according to the preamble of claim 1, which comprises a gas conductor adapted to be connected between at least a first gas supply and the food package for changing the composition of the gas inside the food package to a composition with food preserving qualities, and which is **characterized in that** the device is adapted to be positionable and usable in a kitchen.

[0007] Thus a consumer, and not only the industrial food producers, may store food in a food preserving atmosphere, wherein the durability of the food is increased considerably. Normal consumer behaviour concerning the handling of foods comprises that the consumer opens a food package, either for direct consumption or for cooking, which simultaneously let out any food preservative gas, and then continues to store either or both of the unused food or its cooked counterpart. Hitherto, most foods have been well preserved in an unopened package, but as soon as a consumer breaks the seal the food degrades swiftly, even if stored in a refrigerator or freezer. By using the device according to the invention the consumer may store food from an opened package or cooked food in a food preservative atmosphere, so that at least a part of the long durability date of an unopened package may be retained.

[0008] Apart from a longer durability, the use of food preservative gas by a consumer also gives the advantage of a slower degradation of nutrition content in the food. Another advantage is in the event that the food is to be stored during a longer period than possible in a refrigerator in a normal atmosphere, but not as long as possible in a freezer. This may happen for example when preparing food boxes. In this case the consumer may store the food in a food preservative atmosphere in the refrigerator instead, so that it is not necessary to freeze the food only to be heated shortly afterwards.

[0009] Two main prerequisites for adapting the device for use in a kitchen is that the device should be user friendly and also sufficiently small, so that the device may be positionable and used in a kitchen by the kitchen personnel. In one embodiment of the invention the device is adapted for household use, wherein the device is adapted in size, weight and shape so that the device is positionable and usable in a household kitchen. The device should then be user friendly and also sufficiently small, so that the device may be positionable and used in a household kitchen by a normal consumer. In another embodiment of the invention the device is adapted for use in a restaurant, wherein the device is adapted in size, weight and shape so that the device is positionable and usable in a restaurant kitchen.

[0010] Kitchen personnel or a normal consumer is unskilled in comparison with a skilled worker within the food industry, and thus the device is adapted to be used by a user without any training in the field of preservative gases. In this respect the device is adapted for filling a food package with at least one predefined gas composition.

Preferably the device is arranged to allow selection of one of at least two predefined gas compositions for filling a food package. Preferably the device is arranged to allow selection of one of at the most ten such predefined gas compositions, in order not to confuse the consumer.

[0011] Preferably the device is also adapted to be manually operated. Preferably, the device is arranged for the consumer to manually connect and disconnect the conductor to the food package. Preferably, the device is also arranged for the consumer to manually select a gas mixture and to induce the device to begin the gas filling sequence. Automated operation usually gives a higher filling rate, but also makes the device more cumbersome, and also puts higher demands on training. A device adapted for household use has not the same need of a high production rate, and thus a manually operated device is advantageous. Hence, the device is preferably adapted so that the capacity of the device is lower than within the food industry. According to one embodiment the device is adapted for filling food packages in batches. Preferably the batch size is no more than three food packages simultaneously, and preferably no more than one food package per batch. In one embodiment the device is also arranged to be limited for filling food packages having a maximum volume of about 5 litres.

[0012] Preferably the device is adapted for household use in that the device is adapted in size, weight and shape so that the device is positionable in a household kitchen. Preferably the device is further adapted for use in a kitchen in that the size of the device is restricted so that the device is no more than 1 meter in any dimension, preferably no more than 85 cm in any dimension. Preferably the device has a width, height and depth, which is no more than 60 cm. Thus the device may easily be positioned and used on a kitchen workbench or in a kitchen cupboard. Preferably the device is portable, so that the device may easily be moved between locations within the kitchen. Preferably the weight of the device is no more than 20 kg, preferably no more than 15 kg, and most preferably no more than 10 kg. Thus the device may easily be lifted by a user and moved about in the kitchen.

[0013] The device is adapted to supply gas having food preservative characteristics to the interior of the food package. Preferably the device is adapted to fill the food package with a food preservative gas comprising N_2 and CO_2 . Possibly, the gas may also contain a small content of O_2 , either from a gas supply within the device, or more preferably, by retaining a small amount of the previous air inside the package. Preferably the device is adapted to fill the package with the food preservative gas so that the gas surrounds the food and occupies the space around the food. Thus the gas decreases oxidation of fat and meat, decreases mould and bacterial growth, and decreases discolouring of the food. Preferably the device is adapted to fill the package with gas up to a gas pressure of at the most 2.5 atmospheres, preferably no more than 1.5 atmospheres. With food is primarily intended food for eating, such as solid foods and liquid foods as soups.

The term food is not intended to include beverages, even though it may be possible to use the device for beverages as well.

[0014] Preferably the device is shaped into one unit, and preferably also adapted to contain the gas supply. Thus there is no need for loose conductors leading from an external gas supply to the device. Preferably the device is adapted to admit connection of a gas supply in the form of a gas tube to the device. A gas tube may contain large amounts of gas in a safe manner. Furthermore, it is possible for the user to remove the gas tube from the device and bring only the gas tube to a store for refilling the gas. Preferably the device is adapted to contain two different gas supplies. Thus the device is adapted for filling a food package with different gas mixtures depending on the food placed in the package. Preferably the device is adapted to contain one supply of N_2 and one supply of CO_2 . Preferably the device is shaped so that the size of the gas tubes is restricted to contain no more than 10 litres each, preferably no more than 7 litres each. Hence it is ensured that the size of the device is limited, so that the device is adapted for use in a restaurant kitchen. Preferably the device is shaped so that the size of the gas tubes is restricted to contain no more than 3 litres each, preferably no more than 1.5 litres, and most preferably no more than 1 litre each. Hence it is ensured that the size of the device is limited, so that the device is adapted for use in a household kitchen.

[0015] Preferably the conductor is adapted to be connectable and disconnectable with the food package. Preferably the conductor comprises a mouthpiece adapted to gastightly fit with the food package. Preferably the food package comprises a connecting element for connecting with the mouthpiece, which connecting element is adapted to admit communication between the conductor and the interior of the food package. Preferably the connection element comprises a valve arranged in the package.

[0016] According to one embodiment the device is also arranged for supplying gas to a beverage container. Preferably the device is arranged for supplying gas to a bottle of beverage. Thus the device may not only supply gas for preserving food, but also for filling a bottle or other liquid container with gas. Preferably, the device then comprises a mouthpiece adapted to be connected with the beverage container, and preferably a bottle. In one embodiment the device is adapted to supply N_2 to the container. N_2 may for example be used in order to preserve wine, by hindering oxidation of the wine. In another embodiment the device is adapted to supply CO_2 to the beverage container. CO_2 may be used for carbonating a liquid, for example in order to make soda water. In a further embodiment the device is adapted for filling a liquid container with N_2 in a first mode of operation and with CO_2 in a second mode of operation. Thus the device may fill a liquid container with both these types of gases.

[0017] According to one embodiment the device comprises an on/off-valve arranged to control the gas flow through the gas conductor. An on/off-valve is much less

expensive than valves allowing a continuous range of gas flows. Thus, the use of an on/off-valve reduces the price and complexity of the device considerably. The use of an on/off-valve is possible since a device adapted for household use does not need to fill a food package with an exact and optimized gas composition, which is in a much higher demand within the food industry. Thus it is possible to use the on/off-valve, even though the valve gives less control over the gas composition. An on/off-valve is also easily operated, which is an advantage since the device is adapted to be used by unskilled users.

[0018] According to one embodiment the device comprises a pressure reducing valve adapted to admit a flow of gas through the pressure reducing valve, such that the gas pressure after the pressure reducing valve is reduced to a gas pressure below a limit gas pressure. Thus, regardless of the present pressure in the gas supply, the same pressure will be obtained in the location after the pressure reducing valve. Hence the gas flow passing through the pressure reducing valve will also be substantially constant, wherein it is simple to appreciate the amount of gas transferred to the food package. This is important for instance if a particular mix of gases is desired. In particular, a pressure reducing valve is advantageous in case of a gas supply in the form of gas tubes, having varying pressure depending on depletion of the tubes.

[0019] According to one embodiment the device is adapted for removing gas from inside the food package prior to supplying a food preservative gas to the food package. Thus it is easier to estimate the gas contents of the package, since it will not be dependent on previous gas content. Furthermore, the package is most likely filled with air before treatment, and removal of the air will also remove oxygen from the interior of the package. This is important since many of the degrading processes in food are directly related to oxygen content. Also, not as much new food preservative gas is needed for filling the food package to desired compositions. Preferably at least some of the gas in the package is removed by flushing the package with new gas.

[0020] In another embodiment the device comprises a suction member arranged to reduce the air pressure inside the food package by use of negative pressure before filling the food package with food preservative gas. Thus there will be less waste of the food preserving gas, which will reduce costs. In one embodiment the suction member comprises a gas pump or gas fan, such as an electrical fan, for removal of the gas. In another embodiment the suction member comprises a by-pass conductor adapted to conduct gas from a gas supply to the surroundings, and a connection conductor adapted to be connected between the by-pass conductor and the interior of the food package, wherein the flow of gas through the by-pass conductor creates a negative pressure inside the food package. This ensures an inexpensive way of creating a negative pressure.

[0021] In one embodiment the device is adapted for

connection of a first gas supply for supplying N_2 to the food package to the device and the gas conductor. The supply of N_2 may be used both as inert gas for preserving wine and for supplying one constituent for very effective food preserving gas mixtures. The function of N_2 in a food preservative gas is as an inert gas as a substitute to the presence of O_2 .

[0022] In another embodiment the device is adapted for connection of a second gas supply for supplying CO_2 to the food package to the device and the gas conductor. The supply of CO_2 may be used both for carbonizing beverages and for supplying one constituent for very effective food preserving gas mixtures. The function of CO_2 in food preservative gas is as a poison to most bacteria and mould.

[0023] In another embodiment the device is adapted for connection of a gas supply in the form of a gas tube to the device and the conductor. The use of gas tubes as a gas supply is advantageous in that the device becomes portable and may be positioned freely inside a household kitchen. Gas tubes are also inexpensive and are easy to use and change when empty. The high internal pressure inside the gas tubes may also drive the flow of gas through the device. Preferably the device is adapted to contain the gas tubes inside the device. Hence the device can be moved easily without ensnaring hoses connecting the device with external gas tubes.

[0024] In another embodiment the device comprises a valve provided with at least one main opening and at least two sub-openings, wherein the valve is arranged to selectively allow communication between the main opening and one of the at least two sub-openings. Thus it is possible to direct the gas flow between different conductors. Preferably the valve is arranged to allow selective communication between the food package and one of at least two gas supplies at the time, wherein it is simple to estimate and control the gas mixture inside the food package.

BRIEF DESCRIPTION OF THE ATTACHED DRAWINGS

[0025] The invention is now to be described as a non-limiting example of the invention with reference to the attached drawings.

Fig. 1 a shows a front view of a device according to one example of the invention.

Fig. 1 b shows a rear view of the device in fig. 1 a.

Fig. 1c shows a schematic view of one example of the internal construction of the device in figs. 1a-b.

Fig. 1d shows a schematic view of another example of the internal construction of the device in figs. 1a-b.

Fig. 2 shows a conductor with different mouthpieces adapted to different food packages.

DETAILED DESCRIPTION

[0026] In figs. 1a-c one example of a device 1 according to the invention is shown. The device 1 is arranged to bring about a decreased degradation of food 3 placed in a gastight food package 5. To this end the device 1 comprises a gas conductor 7 adapted to be connected between a gas supply 9a, 9b and the food package 5 for changing the composition of the gas inside the food package to a composition with food preserving qualities. Such gases are known in the art, and depend on a plurality of factors, such as the expected storage temperature, the type of food, etc. In general food preservative gases comprises a mixture of N_2 , CO_2 , and O_2 .

[0027] In this example the device 1 is adapted to be used in a kitchen. In particular, the device is adapted to be used in a household kitchen. The device is thus adapted in size and shape so that the device is positionable and usable in the household kitchen. In this example the device 1 comprises a housing 11 arranged to contain the device 1. The housing 11 is in turn arranged with a shape and size, so that the device 1 is positionable in a kitchen, in this example in a household kitchen. In particular the device 1 and housing 11 are shaped so that the device is positionable on a kitchen workbench or in a kitchen cupboard.

[0028] In this example the size of the device is restricted so that the housing 11 is no more than 1 meter in any dimension, preferably no more than 85 cm in any dimension, and most preferably no more than 60 cm in any dimension. In this example the housing 11 is shaped 50 cm in height, 40 cm in width and 25 cm in depth. Thus the device may easily be positioned and used on a kitchen workbench or stored in a kitchen cupboard. In this example the device is further adapted for use in a kitchen in that the weight of the device is no more than 50 kg, preferably no more than 40 kg, and most preferably no more than 20 kg. Thus the device may easily be lifted by a user and moved about in the kitchen. The device may also easily be stored in the kitchen when not in use.

[0029] The device 1 is adapted to supply gas having food preservative characteristics to the interior of the food package. In this example the device 1 is adapted to fill the food package with a food preservative gas comprising N_2 and CO_2 . The preservative gas will surround the food and thus the gas will decrease oxidation of fat and meat, decrease bacterial growth, and decreases discolouring of the food. In this example the device is adapted to fill the food package with a preservative gas also comprising a small content of O_2 . A small content of oxygen will decrease purely anaerobic degradation processes. In this example the device is arranged to retain some of the air in the package in order to also retain some oxygen. In another example the device 1 may instead comprise an oxygen supply. The device is further arranged to fill the

food package with gas up to a pressure of at the most 1.5 atmospheres.

[0030] The device 1 is adapted to admit connection of at least one gas supply in the form of a gas tube 9a, 9b to the device. The device thus comprises a gas tube mounting 12 adapted to hold and connect the gas tube 9a, 9b to the device 1. In this example the device 1 is arranged to hold and connect two gas tubes 9a, 9b to the device 1, so that the device may fill the food package with a mixture of two gases. In this example the device is arranged to hold and connect one gas tube 9a containing N_2 and another gas tube 9b, containing CO_2 . Thus the device 1 is arranged to fill the food package with a preservative gas containing a mixture of at least N_2 and CO_2 . The gas tube mounting 11 is adapted to allow removal of the gas tubes 9a, 9b, so that the gas tubes may be changed or refilled. In this example the device 1 is arranged to comprise the at least one gas tube 9a, 9b.

[0031] The housing 11 is further shaped to allow harbouring of the gas supply 9a, 9b inside the housing. In this example the housing 11 is adapted to contain the gas tubes 9a, 9b within the housing. Thus, there is no need for an external gas supply or any external conductors leading to an external gas supply. The device 1 is therefore portable, so that the device may easily be moved between locations within the kitchen. The gas tubes 9a, 9b are arranged to contain no more than 3 litres each, in this example no more than 1.5 litres. In this example the gas tubes 9a, 9b are arranged to contain 1 l each. Hence the tubes are small, wherein the housing 11 can remain small, so that the device is adapted to be positioned and used in a household kitchen.

[0032] The device 1 is arranged to be manually operated, and to fill food packages in batches. The batch size is smaller than three food packages simultaneously, and in this example the device is arranged to fill only one food package per batch. In this example the device 1 is also arranged to be limited for filling food packages having a maximum volume of about 5 litres. Thus the device 1 may be small in size.

[0033] The device 1 further comprises a fill control 13 arranged to induce the device 1 to fill a food package when actuated by a user. In this example the fill control 13 comprises a keypad with buttons for controlling the device. Thus the device is easier to use, so that an unskilled user may use the device. The device further comprises a gas mixture selector 15 arranged to induce the device to select one of at least two predefined gas compositions for filling the package. In this example the gas mixture selector is arranged to allow filling of a food package with four different gas compositions. Thus, depending on the type of food, a better preservative function may be achieved. Since the gas mixtures are predefined it is not necessary for the user to know anything about the contents or properties of the gas mixtures, but it is sufficient to select a gas composition marked, for example, with the type of food, which is to be packed and preserved.

[0034] The device 1 is further arranged for supplying gas to a bottle with a beverage. The beverage may be any type of drinkable liquid suitable to be surrounded by a gas or having a gas pressed into the beverage. In this example the device 1 is in one state adapted to fill a beverage container with CO₂. The gas mixture selector 15 is then simultaneously provided with a selection for a gas mixture predominantly comprising CO₂-gas. The CO₂ gas is pressed into the beverage so that the beverage becomes carbonized. In this example the device is further arranged to fill a beverage container with N₂. The gas mixture selector 15 is then simultaneously provided with a selection for a gas mixture predominantly comprising N₂-gas. The inert N₂ gas is filled in the space above the beverage, wherein oxidation of the beverage is prevented. This is particularly useful for example for wine. Naturally, a bottle may also be filled with any of the available pre-defined mixtures of N₂, CO₂ and possibly also O₂.

[0035] In fig. 1c one example of the inner construction of the device 1 is shown schematically. The device 1 comprises the two gas supply gas tubes 9a and 9b, and a conductor 7 for connecting the gas supply tubes with the package 5, as previously described. The device 1 also comprises a first gas supply conductor 17 adapted to connect the first gas supply 9a with the conductor 7, and a second gas supply conductor 19, adapted to connect the second gas supply 9b with the conductor 7. Hence conductor 7 is adapted to conduct the gas from both the first and the second gas supplies 9a, 9b to the package 5. In the event that a third or fourth gas supply is added, the device could comprise a corresponding third and fourth gas supply conductors joining into conductor 7.

[0036] The device comprises a first pressure reducing valve 21 arranged between the first gas supply 9a and the first gas supply conductor 17, and adapted to admit a flow of gas through the pressure reducing valve, such that the gas pressure after the pressure reducing valve is reduced to a gas pressure below a limit gas pressure. The pressure reducing 21 valve is further selected so that the limit gas pressure is lower than the gas pressure of the gas supply, wherein a substantially constant gas pressure is achieved. Thus, regardless of the present pressure in the gas tube 9a, the same gas flow will pass through the pressure reducing valve, meaning that the amount of gas supplied is dependent on time alone. The device 1 further comprises a corresponding second pressure reducing valve 23 arranged between the second gas supply 9b and the second gas supply conductor 19. Hence the partial pressures of both the first and the second gases in the conductor 7 are known. Thus the contents of the gases within the conductor 7 is also known, so that the package may be filled with the desired gas mixture. In some instances, the pressure reducing valves 21, 23 will not allow a gas flow when the pressure in the gas supply tubes drops below a certain gas pressure, wherein the gas tubes must be changed or refilled.

[0037] The device comprises a first on/off-valve 25 arranged to control the gas flow through the first gas supply conductor 17, and thus also through the gas conductor 7. An on/off-valve is much less expensive than a proportional valve, and is also much easier to operate. The device also comprises a second on/off-valve 27 arranged to control the gas flow through the second gas supply conductor 19, and thus also through the gas conductor 7. The device also comprises a control module 29 arranged to control the operation, and thus the state, of the two on/off-valves 25, 27, and therefore also controls the flow of the gases. The control module 29 is also arranged to control the contents of the different gases in the mixture of gases, depending on the state of the gas selector 15, by opening the on/off-valves during different lengths of time.

[0038] The device 1 is arranged to reduce the air pressure inside the food package 5 before supplying a food preservative gas to the food package. This reduces the amount of air in the package, and therefore also unwanted gases present in the air, such as oxygen. Thus a smaller amount of new food preservative gas is needed for filling the food package to desired compositions.

[0039] In this example the device 1 comprises a suction member 31 arranged to reduce the air pressure inside the food package. The suction member may comprise a pump, fan or similar, but in this example the suction member comprises a by-pass conductor 33 leading gas from a gas supply to the surroundings, and a connecting conductor 35 connecting the by-pass conductor 33 with the conductor 7, so that the by-pass conductor is also connected with the package 5. When letting gas flow through the by-pass conductor a negative pressure is created, wherein gas will be removed from the package. The device 1 also comprises a by-pass valve 37, for closing or opening the by-pass conductor. In yet another example the air may instead be removed from the package by blowing gas into the package and allowing the previous air in the package escape through a valve provided in the package, or by some other escape route.

[0040] In fig. 1d a second, schematic example of the interior workings of the device 1 in fig. 1a-b is shown. As before, the device 1 comprises first and second gas supplies 9a, 9b arranged on gas supply mountings 12, and connected with first 17 and second 19 conductors via first 21 and second 23 pressure reducing valves, respectively. The device further comprises a conductor 7 connected with a mouthpiece 53 for connection with a food package 5 containing food 3.

[0041] The device 1 further comprises a four-way valve 59 provided with a main opening and three sub-openings. The openings are adapted to be connected with one gas conductor each. In this example the first and second conductors 17, 19 from the gas supplies are connected with one sub-opening each, and the conductor 7 leading to the food package is connected with the main opening. The four-way valve 59 is arranged to allow selective communication between the main opening and one of the

three sub-openings. Hence the four-way valve is arranged for selecting the gas for filling the food package 5, by allowing communication between a desired gas supply 9a, 9b and the conductor 7. Thus, in a first state the four-way valve 59 is arranged to allow communication between the first conductor 17 and the conductor 7, allowing filling the food package with nitrogen, and in a second state between the second conductor 19 and the conductor 7, allowing filling the food package 5 with carbon dioxide.

[0042] The device also comprises a suction member 65 in the form of a vacuum pump, and a suction conductor 67 connecting the suction member 65 with the third sub-opening in the four-way valve 59. In a third state the four-way valve 59 is arranged to allow communication between the conductor 7 and the suction conductor 67, wherein the suction member 65 is arranged to remove gas from the food package 5.

[0043] The device 1 also comprises an on/off-valve 60 arranged to allow or shut off the gas flow through the conductor 7. Thus in a first, open state the on/off-valve 60 is arranged to allow communication between the device 1 and the food package 5, while in a second, closed state the on/off-valve is arranged to prevent communication between the device 1 and the food package 5.

[0044] The device further comprises a control module 61 arranged to receive instructions from a keypad 63, which in turn is adapted to receive input instructions from a user. The device also comprises a pressure sensor 69 arranged to sense the gas pressure inside the food package. The control module 61 is further arranged to control the operation of the four-way valve 59, the on/off-valve 60, and the suction member 65 based on the received instructions from the keypad 63 and signals from the pressure sensor 69.

[0045] In operation a user first manually connects the conductor 7 to a food package 5 containing food, which is to be stored in a food preserving atmosphere. Then the user enters information in the key-pad 63, for example on the type and/or amount of food in the food package, and then initiates the filling procedure.

[0046] Upon reception of the initiation signal the control member 61 selects a suitable mix of gases for filling the food package depending on the entered type of food. The control module then set the four-way valve 59 in the third state so as to allow communication between the suction member 65 and the food package 5. The control member 61 then set the on/off-valve in the open state to allow communication with the food package 5, and induces the suction member 65 to remove gas from the interior of the food package. In this example, depending on the desired oxygen content, the removal is continued until a desired pressure is obtained inside the food package, as sensed by the pressure sensor 69.

[0047] The control member 61 then set the four-way valve 59 to the first state for allowing communication between the food package 5 and the nitrogen gas supply 9a. The food package 5 is filled with nitrogen due to the

over-pressure in the gas supply 9a, and is continued until a desired nitrogen level is reached. The desired nitrogen level may either be estimated based on the time allowed for filling the package, since the pressure reducing valve ensures a substantially constant gas flow, or the level may be estimated based on the pressure inside the food package as measured by the pressure sensor 69.

[0048] The control member 61 then set the four-way valve 59 to the second state for allowing communication between the food package 5 and the carbon dioxide gas supply 9b. The food package 5 is then filled with carbon dioxide to a desired level depending on the desired gas mix in the same manner as when filling the package 5 with nitrogen, after which the control member 61 controls the on/off-valve to shut off the conductor 7. The user may then disconnect the conductor 7 from the food package 5 and remove the food package from the device 1.

[0049] In fig. 2 a conductor 39 adapted to be connected between at least one gas supply and a food package is shown. The conductor 39 is provided with a mouthpiece mounting 41 adapted for mounting different types of mouthpieces onto the conductor 39. Depending on the type and shape of the food package or bottle to be filled, different forms of mouthpieces may be needed. By providing a mouthpiece mounting 41 the mouthpiece may be changed into an appropriate mouthpiece.

[0050] In fig. 2 some examples of suitable mouthpieces and corresponding packages are also shown. A first food-package 45 is box-like and made in hard plastic. The food-package comprises a first valve 47 arranged for receiving gas and arranged for coupling with a first mouthpiece 43, and a second valve 48 arranged to let gas out of the package when the pressure is above 1.5 atmospheres. The second valve hence function as a safety valve.

[0051] The first mouthpiece 43 is furthermore adapted to be removable from the mouthpiece mounting 41. The first mouthpiece is furthermore adapted to fit the first valve 47 on the first food-package 45, and to fill the food-package with a food preservative gas via the conductor 39. The mouthpiece 43 is thus adapted to admit communication between the conductor 39 and the interior of the food package. In this example the mouthpiece 43 comprises a sleeve adapted to snugly fit into a notch arranged round the valve 47, so that the connection between the mouthpiece 43 and the first valve 47 is both gastight and secure. After filling the package with food preservative gas the mouthpiece is disconnected from the valve 47. The mouthpiece may also be disconnected from the mouthpiece mounting 41, in the event that another type of food-package is to be filled.

[0052] A second food-package 49 comprises a bag of soft, but thick, plastic, so that the bag is gastight when closed. A second mouthpiece 51 comprises a long snout adapted to be inserted into the bag 49 through its opening. The bag is folded around the snout so that the connection is gastight. Since the desired pressure within the bag is not particularly high, it is possible to obtain a gas-

tight connection by simply folding the bag around the snout. The bag may be held onto the snout either by hand or with for example a rubber band. The bag is then filled with gas through the mouthpiece 51.

[0053] The invention is not limited to the examples shown above, but may be varied freely within the framework of the following claims. In particular, the term conductor is intended to cover all forms of conductors, chambers, pipes, hoses etc, having the ability to conduct gas. The term conductor is also intended to include assemblies of several connected gas conducting pieces. The food package may be made in metal, plastic, cloth, or any other suitable material, and may be either hard or soft and may or may not contain valves. A large number of different mouthpieces may be conceived for fitting with different packages or containers, such as a mouthpiece for connecting with a bottle of beverage. The device may contain a gas supply with a ready-made mixture of food-preservative gas instead of two gas supplies, which need to be mixed. Furthermore the device may contain three or more gas supplies, for example an oxygen supply, and may contain any number of additional conductors, valves etc.

Claims

1. A device arranged to bring about a decreased degradation of food placed in a gastight food package (5, 45, 49), the device comprising a gas conductor (7, 39) adapted to be connected between a gas supply (9a, 9b) and the food package (5, 45, 49) for changing the composition of the gas inside the food package (5, 45, 49) to a composition with food preserving qualities, **characterized in that** the device (1) is adapted in size and shape so that the device (1) is positionable and usable in a kitchen.
2. A device according to claim 1, **characterized in that** the device (1) comprises a housing (11) arranged to contain the device, wherein the housing (11) is also shaped to contain at least one gas supply (9a, 9b) containing gas.
3. A device according to claim 1 or 2, **characterized in that** the device (1) comprises an on/off-valve (25, 27) arranged to control the gas flow through the gas conductor (7, 39).
4. A device according to any of the claims 1-3, **characterized in that** the device comprises a pressure reducing valve (21, 23) adapted to admit a flow of gas through the pressure reducing valve, such that the gas pressure after the pressure reducing valve is reduced to a gas pressure below a limit gas pressure.
5. A device according to any of the previous claims,

characterized in that the device (1) is adapted for removing gas from inside the food package (5, 45) prior to supplying a food preservative gas to the food package.

6. A device according to claim 5, **characterized in that** the device comprises a suction member (31) arranged for removing gas from inside the food package before filling the food package with food preservative gas.
7. A device according to claim 6, **characterized in that** the suction member (31) comprises a by-pass conductor (33) adapted to conduct gas from a gas supply to the surroundings, and a connection conductor (35) adapted to be connected between the by-pass conductor (33) and the interior of the food package (5, 45, 49), wherein the flow of gas through the by-pass conductor creates a negative pressure inside the food package.
8. A device according to any of the previous claims, **characterized in that** the device is adapted for connection of a first gas supply 9a to the device, which first gas supply is adapted to contain N₂ and to supply N₂ to the food package.
9. A device according to any of the previous claims, **characterized in that** the device is adapted for connection of a second gas supply 9b to the device, which second gas supply 9b is adapted to contain CO₂ and to supply CO₂ to the food package.
10. A device according to any of the previous claims, **characterized in that** the device is adapted for connection of a gas supply 9a, 9b in the form of a gas tube to the device and the conductor.
11. A device according to any of the previous claims, **characterized in that** the device (1) is also arranged to be able to supply gas to a beverage container.
12. A device according to claim 11, **characterized in that** the device comprises a gas mixture selector (15) arranged to induce the device to select one of at least two predefined gas compositions for filling the package.
13. A device according to any of the previous claims, **characterized in that** the device comprises a valve (59) provided with at least one main opening and at least two sub-openings, wherein the valve is arranged to selectively allow communication between the main opening and one of the at least two sub-openings.
14. Use of a device according to claim 1, **characterized in that** the device (1) is used in a kitchen for filling

a food package (5, 45, 49) with food preservative gas.

15. Use of a device according to claim 14, **characterized in that** the device (1) is used in a restaurant and/or household kitchen for filling a food package (5, 45, 49) with food preservative gas.

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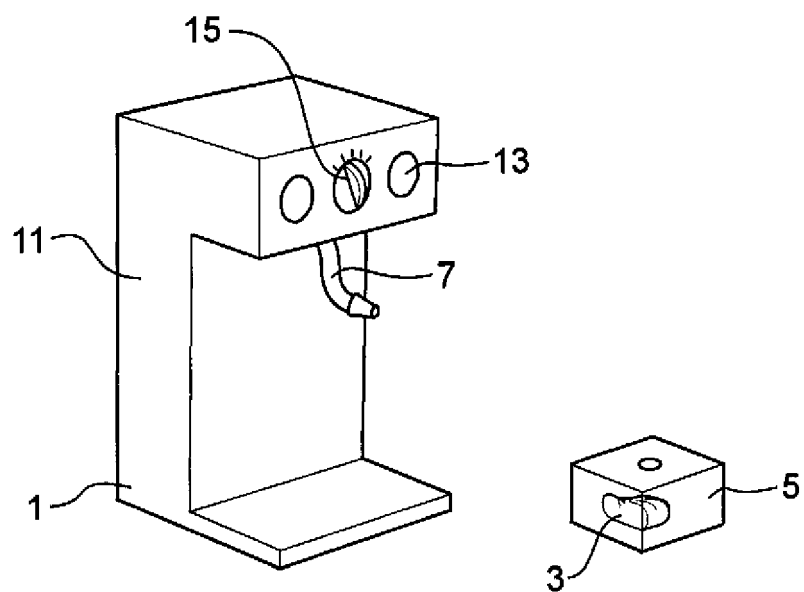


Fig. 1a

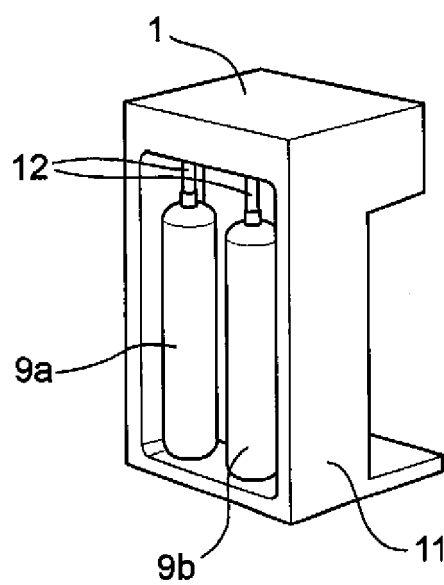


Fig. 1b

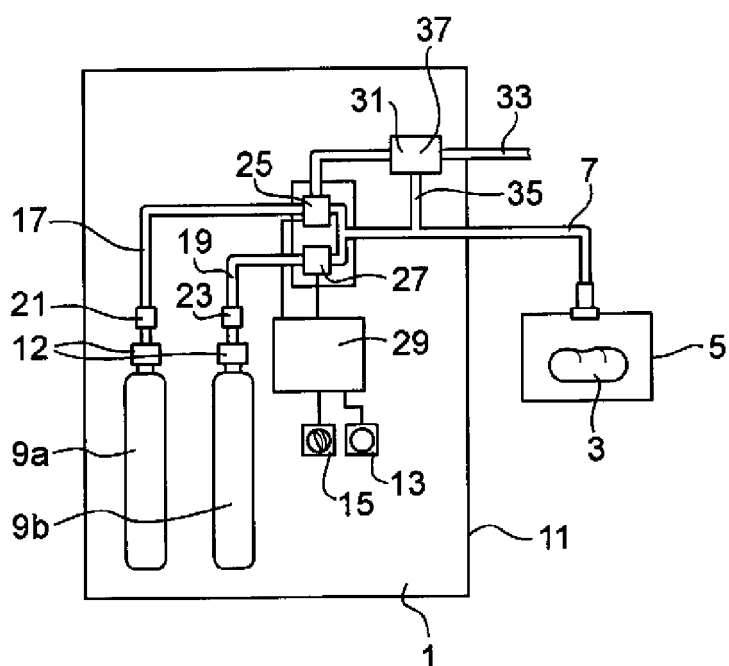


Fig. 1c

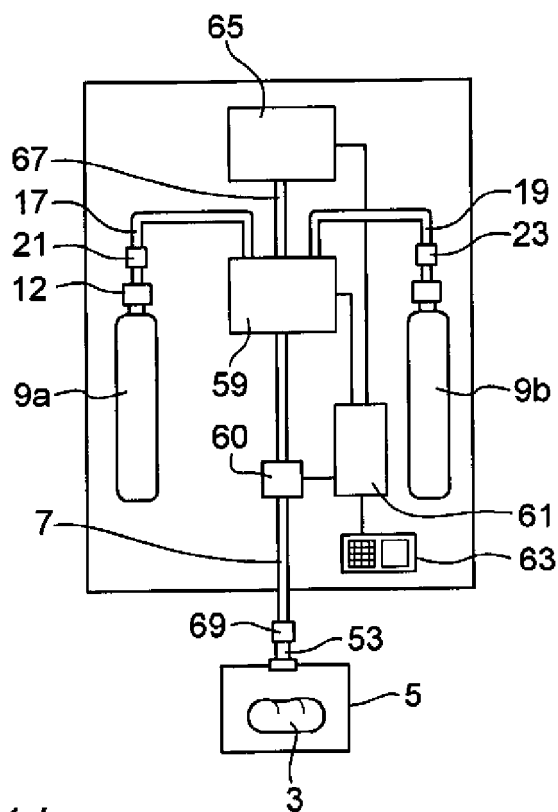


Fig. 1d

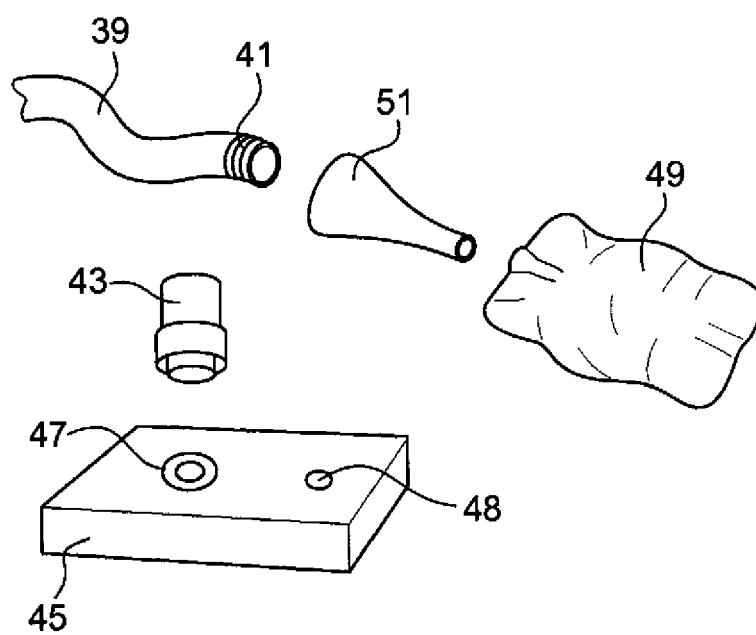


Fig. 2



EUROPEAN SEARCH REPORT

Application Number
EP 08 16 8488

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 16 April 2009	Examiner Damiani, Alberto
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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