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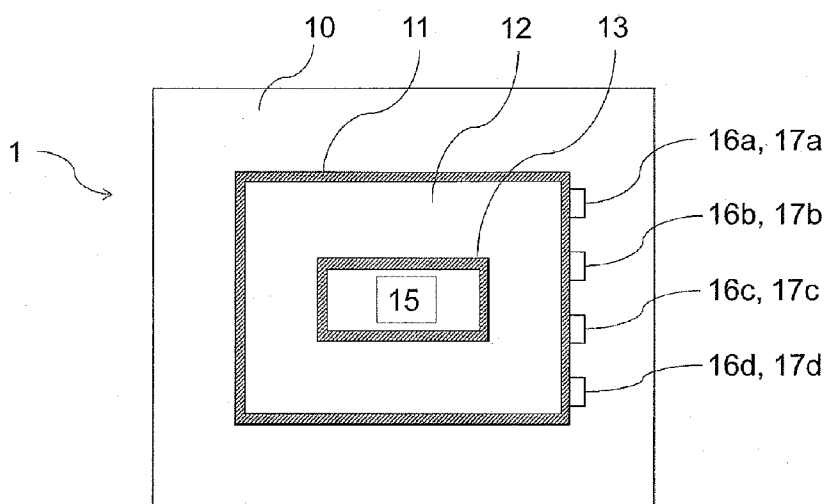
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[Continued on next page]

(54) Title: ARTICLE HOUSING DEVICE

[Figure 1]



(57) Abstract: To provide an article housing device for which propagation of physical change outside the device to an article inside a housing chamber is suppressed. The device 2 includes a first metal layer 20 that demarcates an outermost side surface of the container, a first heat insulator layer 21 arranged on an inner side of the first metal layer 20, and a second metal layer 22 that is arranged on the inner side of the first heat insulator layer 21 and demarcates an innermost side surface of the container, and the inside of the second metal layer 22 demarcates a housing chamber 23 capable of keeping a bottle in which an alcohol-containing beverage as food or drink is packed.



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Description

Title of Invention: ARTICLE HOUSING DEVICE

Technical Field

[0001] The present invention relates to an article housing device provided with a housing chamber for housing articles, and more specifically relates to an article housing device for which propagation of physical change outside the device into a housing chamber is suppressed.

Background Art

[0002] Conventionally, alcohol-containing beverages have been kept under an environment with little temperature change.

[0003] However, a temperature of the alcohol-containing beverage actually changes with time due to change of the seasons and daily temperature change of an external environment, and a change width of the temperature is wide.

[0004] In order to solve such a problem, in Patent Literature 1 below, a liquor storage device having a temperature regulating function, which is capable of storing liquors while regulating the temperature to be suitable for drinking is proposed. The liquor storage device in Patent Literature 1 includes, as illustrated in Figure 1 of Patent Literature 1, a storage unit having a plurality of tanks 2, 3 and 4 that store liquors 20 respectively, a jacket 13 provided around a tank wall, a cooling device 9 that indirectly performs cooling from the tank wall by making cold air flow to the jacket 13, heating devices 18a-18c that indirectly heat each tank from the tank wall, temperature detectors 15a-15c

that detect internal temperatures of the plurality of tanks 2, 3 and 4 for each tank, and a temperature regulating device 17 that controls the cooling device 9 and the heating devices 18a-18c so that a detected detection value coincides with a target value of the internal temperatures of the plurality of tanks 2, 3 and 4.

[0005] In addition, in Patent Literature 2 below, a wine aging type storage device that regulates a temperature so as to age wine is proposed. In the wine aging device in Patent Literature 2, temperature control means that controls a temperature of a wine storage compartment performs control of repeatedly raising and lowering the temperature of the wine storage compartment in accordance with a cycle preset in association with wine aging, a temperature width preset in association with wine aging, and a change pattern preset in association with wine aging.

[0006] However, while the technique described in Patent Literature 1 is to maintain the temperature inside the same tank fixed with time, since the heating devices 18a-18c are installed only on a surface where bottles are placed, it is conceivable that a spatial temperature distribution of the liquor inside the bottle is not uniform. In this case, since a Rayleigh number of a fluid in a barrel or a bottle becomes extremely large, natural convection is generated inside the bottle or the like, causing the movement of the fluid.

[0007] In addition, generally, in feedback temperature control, there is a fluctuation around a fixed temperature to be a target. In the technique of Patent Literature 1, the

liquor inside a bottle is directly affected by this temperature fluctuation, and no means for mitigating the temperature fluctuation is suggested in Patent Literature 1.

[0008] Further, in Paragraph [0077] of Patent Literature 1, it is described that "In the case of using a Peltier element, since the Peltier element serves both cooling and heating, it is not needed to use complicated apparatuses such as a refrigerator, an evaporator or a heater as before and an apparatus which generates vibration is not used so that old wine with a risk of degradation by the vibration can be stored at ease.". However, other than the vibration from the apparatus, means for preventing the vibration is not disclosed in Patent Literature 1.

[0009] Regarding Patent Literature 2, similarly to Patent Literature 1, it is conceivable that the spatial temperature distribution of wine inside a bottle is nonuniform, but a configuration for uniformizing it is not disclosed or suggested. In addition, the technique in Patent Literature 2 positively creates the temperature width of 4°C or more or 8°C or more, and temporal temperature fixation control is not performed. Further, in Patent Literature 2, means for preventing vibration is not disclosed or suggested.

Citation List

Patent Literature

[0010] PTL 1: Japanese Patent Laid-Open No. 2000-274909

PTL 2: Japanese Patent No. 4109701

Summary of Invention

Technical Problem

[0011] The present invention is implemented in consideration of the fact described above and an object of the present invention is to provide an article housing device for which propagation of physical change outside the device into a housing chamber is suppressed.

Solution to Problem

[0012] (Principles of the present invention)

The present invention is according to the following principles. However, it is not limited thereto.

[0013] The applicant of the present application has been working for many years on a problem that why alcohol-containing beverages that are left at rest have a good flavor. In this work, the inventors of the present application conducted research on whether or not there is a relation between movement of a liquid of an alcohol-containing beverage that is left at rest and a flavor of the alcohol-containing beverage. In the process of conducting the research, the inventors of the present application paid attention to a phenomenon that a diffusion coefficient decreases in an experiment under microgravity conducted by an astronaut, and conducted an experiment of measuring a mutual diffusion coefficient of a water-ethanol based solution under the microgravity. The experiment is to preserve the water-ethanol solution inside an experimental apparatus arranged inside an airplane in a vibration blocking state and create a microgravity state by lowering the airplane. By the experiment, a result was obtained that the mutual diffusion coefficient measured under the microgravity decreases by about

40% compared to the mutual diffusion coefficient measured when normal gravity exists in a low ethanol concentration for example. In addition, as the diffusion coefficient, there are a self-diffusion coefficient and a mutual diffusion coefficient. The self-diffusion coefficient is associated with diffusion of the movement of target molecules, and the mutual diffusion coefficient is associated with the diffusion in a solvent of a solute due to a concentration difference. In the present application, the attention is paid to the mutual diffusion coefficient.

[0014] Since the mutual diffusion coefficient changed under the microgravity even though there was no change in the component itself of a water-alcohol based solution, the experiment suggests that some change was brought to a structure of solute molecules in a solvent under the microgravity where there was no local convection in a microscopic scale. That is, in a state that chemical change does not substantially exist and there is no influence of physical change from the outside, the structure itself of solvent molecules physically changes.

[0015] The inventors of the present claimed invention obtained the following idea from the above information.

[0016] (First principle)

"In an article housing device including a housing chamber for housing articles, by providing a shielding part that uniformizes physical change propagated from the outside of the article housing device into the housing chamber, the physical change of the article itself inside the housing chamber can be

further accelerated compared to the time when influence of the external physical change is received."

[0017] Normally, when physically changing an article, it is conceivable to exert physical change from the outside to the article, however, it is a base of the idea of the present claimed invention that some kind of physical change of the article itself can be further accelerated by not exerting the physical change from the outside on the contrary. The present claimed invention provides the article housing device that makes the above possible.

[0018] In the case of using an alcohol-containing beverage as one example of the article, an experimental result that the diffusion coefficient of the alcohol-containing beverage that is aged through a long period of time and the diffusion coefficient of the alcohol-containing beverage that is not aged through a long period of time are different has been obtained, supporting the first principle.

[0019] For example, in an experiment of measuring the diffusion coefficient using protons of ethanol by NMR, the ethanol was a target, and as an aging period became longer, the diffusion coefficient indicated a smaller value. It is conceivable that association of molecules with each other occurred around the ethanol in whisky and apparent molecular weight increased so that the movement around the ethanol became slow, and the diffusion coefficient became small as a result. That is, it is conceivable that, since there is no influence of external force, molecules (solute molecules) of the component exist in a state of an aggregate and mass

transfer occurs without destroying the weak cohesion so that the diffusion coefficient appears small.

[0020] On the other hand, in an experiment of measuring the diffusion coefficient in the case of viewing the entire whisky which is a multi-component system by a dynamic light scattering method (DLS), as the aging period became longer, the diffusion coefficient indicated a larger value. In one experiment, the diffusion coefficient of the whisky that was aged through a long period of time became the value of about 1.1 to 2 times of the diffusion coefficient of the whisky that was not aged through a long period of time. It is conceivable that it is a result of the fact that molecules of various sizes existed in the whisky and the molecules of low molecular weight not fixed to the association by aging moved around more actively as the association around advanced. It is conceivable that, since the diffusion coefficient of the multi-component system is obtained as an integrated value of diffusion effects of individual components, even if the movement of a huge temporary molecular group is little, fast mass transfer of a small particle group appears at a concentration boundary layer end as a result in a system with many small particle groups like the whisky so that the larger diffusion coefficient appears as a whole.

[0021] The first principle can be substantiated also by using the alcohol-containing beverage obtained by keeping a state that the liquid does not move by not being affected by the external physical change for a fixed period and the alcohol-containing beverage obtained by being preserved in a

state that convection or the like can be generated due to the external spatial temperature change for the fixed period in a sensory evaluation test and comparing results (see a first example below).

[0022] (Second principle)

"By selecting at least one of spatial temperature change and temporal temperature change as the physical change from the outside in the first principle, and uniformizing at least one of the spatial temperature change and the temporal temperature change of the article, the physical change of the article itself can be accelerated."

[0023] By keeping the spatial temperature change of the article inside a housing chamber uniform, the generation of the convection within fluid generated due to the spatial temperature change in the case that the article is the fluid can be prevented, and the article can be prevented from flowing inside the housing chamber. Since the convection is not generated, the article does not flow, and the physical change of the article itself can be accelerated.

[0024] In addition, by keeping the temporal temperature change of the alcohol-containing beverage uniform, the movement by repetition of expansion and contraction of the liquid by the temporal temperature change can be suppressed.

[0025] Note that, regarding the temporal change of a temperature, changing the temperature of the article very slowly within a range of a small temperature difference is also included in "uniformization of the temporal temperature change" in the present claimed invention.

[0026] (Third principle)

"By turning a pressure change (pressure distribution) at each height in the article generated due to presence of gravity to a target as the physical change from the outside in the first principle, and allowing attachment of the article in an environment of uniformizing the pressure change, that is, under zero gravity or the microgravity, the physical change of the article itself can be accelerated."

[0027] The zero gravity or the microgravity can be realized on a descending airplane, an artificial satellite, a spaceship flying by inertia, or a celestial body with extremely small gravity. In this case, when the article housing device is in a floating state, there is a risk that the device collides with another object, and when a collision occurs, the housed article moves and receives the physical change (acceleration equivalent to the gravity) from the outside. In order to prevent this, in the third principle, by attaching the device under the zero gravity or the microgravity, the article can be held in the state that the pressure distribution is uniformized under the zero gravity without moving the article. When the pressure distribution becomes uniform, since the convection is not generated necessarily, an effect similar to that of the second principle can be demonstrated.

[0028] (Fourth principle)

"By blocking at least one of the vibration, force and moment transmitted from the outside as the physical change from the outside in the first principle, the physical change of the article itself can be accelerated."

[0029] In "the vibration transmitted from the outside" in the fourth principle, the vibration transmitted by sound waves is also included other than the vibration transmitted from another object by direct contact with the device.

[0030] In "the force" in the fourth principle, all of the force or the moment brought to the article housing device is included. For example, the force and the moment generated when the device is brought into contact or collides with another object, or the force and the moment transmitted when the spaceship makes a sudden accelerating motion or rotating motion in the case that the device is connected with the spaceship are included.

[0031] The fourth principle can demonstrate further effects by being used together with the first to third principles.

[0032] For example, in the case of using the fourth principle together with the third principle, for means for attaching the article, the means for blocking the vibration from the outside or the force transmitted by contact with the outside is used. In this case, the vibration from a spaceship or a small celestial body and the force and the moment by sudden acceleration of the spaceship or a collision with another object are not transmitted to the article, and the physical change of the article itself can be accelerated.

[0033] (Fifth principle)

"By blocking an external electric field, magnetic field and electromagnetic wave of a wavelength in a predetermined range, displacement of molecules of the article by these fields can be suppressed, and thus the physical change of the

article itself can be accelerated."

[0034] It is conceivable that an external electric field, magnetic field, or electromagnetic wave can also hinder physical changes in the article itself. In the aforementioned experiment, it is conceivable that due to the growth of clusters of ethanol molecules, more active movement of smaller molecules through gaps between these clusters resulted. However, it is also conceivable that external fields could prevent the growth of clusters, and by blocking the influence of these fields, the physical change of the article itself can be accelerated.

[0035] The fifth principle can be substantiated by a phenomenon that, in the case of selecting the alcohol-containing beverage as the article, compared to the flavor of the alcohol-containing beverage to which the electromagnetic wave of a predetermined frequency is added, the flavor of the alcohol-containing beverage obtained based on the fifth principle is preferable. The flavor of the alcohol-containing beverage can be evaluated by sensory evaluation.

[0036] The fifth principle can demonstrate further effects by being used together with the first to fourth principles.

[0037] The following are aspects for realizing the first to fifth principles.

[0038] (First aspect)

In order to realize the first principle, the article housing device of the first aspect includes a housing chamber for housing an article, and a shielding part provided on an outer side of the housing chamber, and the shielding part

uniformizes physical change propagated from outside of the article housing device to the housing chamber.

[0039] (Second aspect)

In order to realize the second principle, in the article housing device of the second aspect, the physical change is at least one of spatial temperature change and temporal temperature change.

[0040] (Third aspect)

The device of the third aspect is, in order to realize the second principle, configured such that a temperature difference in at least one of the spatial temperature change and the temporal temperature change is settled in an order of 0.1 mK.

[0041] (Fourth aspect)

The device of the fourth aspect includes, in order to realize the second principle, at least one double layer formed of a heat insulator layer and a metal layer provided on an inner side of the heat insulator layer.

[0042] (Fifth aspect)

In the device of the fifth aspect, in order to realize the second principle, the plurality of double layers in the fourth aspect are formed.

[0043] (Sixth aspect)

In the device of the sixth aspect, in order to realize the second principle, in the fourth or fifth aspect, at least one temperature control element is arranged at least on a surface of the metal layer configuring the double layer on the outermost side, and the at least one temperature control

element is controlled so that the metal layer becomes a predetermined temperature.

[0044] (Seventh aspect)

In the device of the seventh aspect, in order to realize the second principle, in the fourth to sixth aspects, the heat insulator layer of the double layer on the outermost side demarcates an outermost side surface of the device.

[0045] (Eighth aspect)

In the device of the eighth aspect, in order to realize the second principle, in the fourth to seventh aspects, the metal layer configuring the double layer on an innermost side demarcates an innermost side surface of the device, and food and drink can be kept inside the metal layer.

[0046] (Ninth aspect)

In the device of the ninth aspect, in order to realize the second principle, in the fourth or fifth aspect, a metal layer is formed further on an outer side of the heat insulator layer of the double layer and the metal layer forms an outermost side layer of the device.

[0047] (10th aspect)

In the device of the 10th aspect, in order to realize the second principle, in the second or third aspect, a heat capacity of the device exceeds a predetermined value.

[0048] (11th aspect)

In the device of the 11th aspect, in order to realize the second principle, in the second or third aspect, the device includes at least one metal layer, and a plurality of pipes where fluid at a fixed temperature is circulated respectively

are arranged over a surface of the metal layer.

[0049] (12th aspect)

In the device of the 12th aspect, in order to realize the third principle, the shielding part further includes attaching means that attaches the device inside an airframe or on a celestial body under zero gravity or microgravity.

[0050] (13th aspect)

In the device of the 13th aspect, in order to realize the fourth principle, the shielding part includes vibration blocking means for blocking or attenuating at least one of vibration, force and a moment transmitted from the outside so that at least one of the vibration, the force and the moment is not propagated to the housing chamber.

[0051] (14th aspect)

In the device of the 14th aspect, the vibration blocking means in the 13th aspect is at least one of a layer of an elastic material arranged in a vibration transmission route or a force transmission route to the device, and connecting means that connects the housing chamber to a fulcrum so as to configure a pendulum system.

[0052] (15th aspect)

The device of the 15th aspect further includes a detector that detects at least one of the vibration, acceleration by the force and angular acceleration by the moment, and the vibration blocking means in the 13th aspect includes an actuator operated so as to offset at least one of the vibration, the acceleration and the angular acceleration detected by the detector.

[0053] (16th aspect)

In the device of the 16th aspect, in order to realize the fifth principle, the shielding part includes field shielding means for shielding at least one of an electric field, a magnetic field and an electromagnetic wave of a wavelength in a predetermined range.

[0054] (17th aspect)

In the device of the 17th aspect, the field shielding means of the 16th aspect is a layer of a magnetic material that covers the housing chamber so as to shield the magnetic field.

[0055] (18th aspect)

In the device of the 18th aspect, a mutual diffusion coefficient of the article housed in the housing chamber increases by a predetermined ratio or more compared to the time when the article receives the physical change from the outside.

[0056] (19th aspect)

In the device of the 19th aspect, the article is food or drink.

[0057] (20th aspect)

In the device of the 20th aspect, the food or drink is an alcohol-containing beverage.

Brief Description of Drawings

[0058] [Figure 1] Figure 1 is a schematic drawing of a device relating to a first embodiment of the present invention.

[Figure 2] Figure 2 is a schematic drawing of a device relating to a second embodiment of the present invention.

[Figure 3] Figure 3 is a schematic drawing of a device relating to a third embodiment of the present invention.

[Figure 4] Figure 4 is a schematic drawing of an example for which the second embodiment and a fifth embodiment of the present invention are combined.

[Figure 5] Figure 5 is a diagram illustrating change of a temperature inside a housing chamber 23a and an outside air temperature (an upper part and a lower part outside a device 2a) in 325 minutes to 2575 minutes after experiment start.

Description of Embodiments

[0059] Hereinafter, a device relating to individual embodiments of the present invention will be described with reference to the drawings. The device includes a housing chamber that houses an article, and description is given below with an alcohol-containing beverage as an example of the article to be housed.

[0060] Note that, in the present description, the alcohol-containing beverage may be a beverage that contains alcohol. The alcohol-containing beverage may be obtained through a fermentation process, may be obtained without performing the process, or may be synthetic liquor. In addition, the alcohol-containing beverage may be either unprocessed liquor or product. Here, "alcohol" in the present description means ethanol unless otherwise stated. An alcohol percentage of the alcohol-containing beverage is not limited, however, for example, a lower limit value is 0.1%, 0.5%, 0.8%, 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 12%, 14%, 16%, 18%, 20%, 22%, 24%, 26%, 28%, 30%, 31%, 32%, 33%, 34%, 35%, 36%, 37%, 38%, 39%,

40%, 41%, 42%, 43%, 44%, 45%, 46%, 47%, 48%, 49%, 50%, 51%, 52%, 53%, 54%, 55%, 56%, 57%, 58%, 59% or 60%, and an upper limit value is 96%, 90%, 80%, 70%, 66%, 64%, 62%, 60%, 59%, 58%, 57%, 56%, 55%, 54%, 53%, 52%, 51%, 50%, 49%, 48%, 47%, 46%, 45%, 44%, 43%, 42%, 41%, 40%, 39%, 38%, 37%, 36%, 35%, 34%, 33%, 32%, 31% or 30%.

[0061] The alcohol percentage of the alcohol-containing beverage can be measured using a vibration type density meter, for example. In more detail, the alcohol percentage is obtained by preparing a sample from which a carbon dioxide gas is removed by filtering or ultrasonically treating an alcohol beverage of a measurement target, then distilling the sample with direct heat, measuring a density at 15° (288 K) of obtained stationary liquid, and converting it using "Table 2, Alcoholic content and density (15°C) and specific gravity (15/15°C) conversion table" which is an appended table of the analysis method of the National Tax Agency (2007 National Tax Agency directive No. 6, revised on June 22, 2007). In addition, the alcohol percentage lower than 1.0 (v/v)% can be measured by using "B) Gas chromatography analysis method" described in the analysis method 3-4 (alcohol content) of the National Tax Agency.

[0062] Examples of the alcohol-containing beverage are whisky, brandy, wine, shochu, sake, spirits, beer, cider, plum liquor, Shaoxing wine, sherry wine, and a mixture of two or more of these, since they are beverages of appropriate alcohol percentages. Among them, distilled liquor such as whisky, brandy, shochu and spirits is preferable as the alcohol-

containing beverage since it is the beverage of the appropriate alcohol percentage. Whisky is more preferable. Here, whisky is the liquor manufactured by performing saccharification, fermentation and then distillation with grains as a raw material and storing and aging the grains in wooden barrels.

[0063] The alcohol-containing beverage can be packed in containers. Any containers may be used regardless of a form or a material, and for example, aluminum cans, steel cans, bottles, plastic bottles, barrels, pouches, paper containers, flasks, beakers, various kinds of capsule type containers or various kinds of laminated containers laminated with metal foil or a plastic film or the like can be used.

[0064] (First embodiment)

The first embodiment relates to a device having a temperature control function.

[0065] Figure 1 illustrates a device 1 relating to the first embodiment.

[0066] The device 1 includes a first heat insulator layer 10 that demarcates an outermost side surface of the device, a first metal layer 11 arranged on an inner side of the first heat insulator layer 10, a second heat insulator layer 12 arranged on the inner side of the first metal layer 11, and a second metal layer 13 arranged on the inner side of the second heat insulator layer 12. The second metal layer 13 demarcates an innermost side surface of the device 1, and the inside of the second metal layer demarcates a housing chamber 15 capable of housing a bottle in which the alcohol-containing beverage

is packed. Note that the metal layer may be formed by combining metal plates. In addition, the alcohol-containing beverage can be also kept by directly filling the alcohol-containing beverage inside the housing chamber 15.

[0067] The first and second metal layers 11 and 13 are formed in a rectangular parallelepiped or a cube for example, and are formed from a metal of high thermal conductivity such as aluminum or copper.

[0068] On one surface of the first metal layer 11, in a gravity direction from a surface upper end to a lower end, Peltier elements 16a, 16b, 16c and 16d as temperature control elements and thermistors 17a, 17b, 17c and 17d as temperature detection elements are attached. It is preferable that a distance between the Peltier elements and the thermistors is short, and it is preferable to arrange the plurality of Peltier elements and thermistors respectively so as to distribute them as equally as possible. Of course, one Peltier element and one thermistor may be arranged on one surface. Though not shown in the figure, a heat discharge device for releasing heat from the Peltier element is formed in the first heat insulator layer 10.

[0069] Note that, while the Peltier elements and the thermistors are attached on one surface of the first metal layer 11 in Figure 1, it is needless to say that the Peltier elements and the thermistors may be also attached to other surfaces. For example, the Peltier elements and the thermistors may be attached to individual side faces other than an upper surface and a lower surface in the case of

arranging the device on the ground with gravity, and the Peltier elements and the thermistors may be attached to all of the upper surface, the lower surface and the side faces in the case of arranging the device under microgravity or zero gravity.

[0070] According to the first embodiment, the Peltier elements 16a, 16b, 16c and 16d are subjected to feedback control by a controller not shown in the figure, so that temperatures detected by the respectively corresponding thermistors 17a, 17b, 17c and 17d coincide with a predetermined temperature (same target temperature). Since the first heat insulator layer 10 formed of a heat insulator of low thermal conductivity is arranged on the outer side of the first metal layer 11 where the Peltier elements are arranged, even when at least one of the temporal and spatial changes of the temperature is generated outside the device, the temperature change by heat transmitted from an external world is mitigated and transmitted to the first metal layer 11. The mitigated temperature change is immediately reduced by temperature control by the Peltier elements in the first metal layer 11 which is a good conductor of heat. Since the second heat insulator layer 12 is provided on the inner side of the first metal layer 11, the temperature change that is slightly left even after the temperature control by the Peltier elements is further mitigated and transmitted to the second metal layer 13 on the innermost side. Since the thermal conductivity is high compared to the heat insulator, the second metal layer 13 can immediately smooth the temperature

change that is finally left. Thus, in the housing chamber 15, the temporal distribution and spatial distribution of the temperature are uniformized. That is, the housing chamber 15 functions as a constant temperature chamber. Thus, convection due to a temperature difference is not generated in the alcohol-containing beverage inside a bottle (not shown in the figure) arranged inside the housing chamber 15 or the alcohol-containing beverage directly filled in the housing chamber 15, and flavor quality of the alcohol-containing beverage can be improved. Here, the flavor of the alcohol-containing beverage means senses in general obtained through sensations (a sense of taste, a sense of smell, a sense of touch or the like) when drinking the alcohol-containing beverage, and examples are smoothness in the mouth and a feeling on the tongue in addition to a taste and a smell.

[0071] In addition, since the temperature control function is provided, the device 1 relating to the first embodiment can be configured also as a compact desktop type.

[0072] The above is the first embodiment but the present embodiment is not limited only to the above-described example. For example, while the heat insulator layer on the outer side and the metal layer on the inner side are turned to one set of a double layer and two sets of the double layers are formed in the above-described example, by providing three sets, four sets or more of the double layers, a further temperature uniformizing effect can be achieved. In this case, the outermost side layer is the heat insulator layer and the innermost side layer is the metal layer, but it is preferable

that the metal layer of the innermost side layer is not provided with the temperature control function by the Peltier elements. It is because that a control temperature fluctuates around the target temperature due to the feedback control. In addition, the metal layer may be provided further on the outer side of the first heat insulator layer 10.

[0073] Also, while the Peltier elements are used as the temperature control elements and the thermistors are used as the temperature detection elements, the present invention is not limited thereto.

[0074] (Second embodiment)

While temperature fixation control of the Peltier elements or the like is positively used in the first embodiment, the second embodiment relates to a device not using such temperature fixation control.

[0075] Figure 2 illustrates a device 2 relating to the second embodiment.

[0076] The device 2 includes a first metal layer 20 that demarcates the outermost side surface of the device, a first heat insulator layer 21 arranged on the inner side of the first metal layer 20, and a second metal layer 22 that is arranged on the inner side of the first heat insulator layer 21 and demarcates the innermost side surface of the device; and the inside of the second metal layer 22 demarcates a housing chamber 23 capable of keeping a bottle in which the alcohol-containing beverage is packed. In addition, the alcohol-containing beverage can be also kept by directly filling the alcohol-containing beverage inside the housing

chamber 23.

[0077] According to the device 2 relating to the second embodiment, even when the spatial change of the temperature is generated outside the device, since the first metal layer 20 provided on the outermost side is the good conductor of heat, the spatial change of the temperature can be immediately reduced over the entire surface of the first metal layer 20 which is the outer side surface of the device. Since the first heat insulator layer 21 is provided on the inner side of the first metal layer 20, the temperature change that is slightly left is further mitigated and transmitted to the second metal layer 22 on the innermost side. Since the thermal conductivity is high compared to the heat insulator, the second metal layer 22 can also immediately smooth the temperature change that is finally left. Thus, in the housing chamber 23, the temporal distribution and spatial distribution of the temperature are uniformized. That is, even when there is sudden temporal temperature change, the fluctuation is absorbed by the device. Thus, convection due to a temperature difference is not generated in the alcohol-containing beverage inside a bottle (not shown in the figure) arranged inside the housing chamber 23 or the alcohol-containing beverage directly filled in the housing chamber 23, and the flavor quality of the alcohol-containing beverage can be improved.

[0078] The above is the second embodiment but the present embodiment is not limited only to the above-described example. For example, while the metal layer is provided respectively on the outer side and the inner side holding the heat insulator

layer in the middle and a triple layer structure is attained in the above-described example, with the triple layer structure as one set, by providing the plurality of triple layer structures such as two sets, three sets or more, the further temperature uniformizing effect can be demonstrated.

[0079] (Third embodiment)

In the third embodiment, in order to uniformize the temporal change of the temperature, the heat capacity of the device that houses the alcohol-containing beverage is made extremely large. Preferably, the device relating to the third embodiment is configured as the device including at least one metal layer. As the device relating to the third embodiment, the one of the same configuration as the devices 1 and 2 of the first and second embodiments described above may be used for instance. Of course, the third embodiment is not limited to this example.

[0080] By increasing the heat capacity of the device, even when the temperature outside the device changes with time, in the housing chamber inside the device, the temperature changes only very slowly compared to the temporal change of the external temperature. Therefore, convection is not generated in the alcohol-containing beverage inside the housing chamber, and the flavor quality can be improved. Here, the alcohol-containing beverage may be packed in a container such as a bottle and kept inside the housing chamber or may be directly filled inside the housing chamber and kept.

[0081] (Fourth embodiment)

The fourth embodiment is targeted to a device that tends

to generate the temperature difference at each location since a size of the device is extremely large, and means that reduces the temperature at each location is provided.

[0082] Figure 3 illustrates a device 3 relating to the fourth embodiment.

[0083] The device 3 includes a device outer wall 30, and a device inner part 31 provided with one or more metal layers not shown in the figure. Over the surface of the metal layer (not shown in the figure) provided in the device inner part 31, a plurality of pipes 32a, 32b, 32c, 32d, 32e,... are arranged. A supply side pipe 33 that supplies fluid (water, for example) at a fixed temperature is connected to individual entrance ends of the pipes 32a, 32b, 32c, 32d, 32e,..., and a discharge side pipe 34 for discharging the fluid circulated through these pipes is connected to individual exit ends of the pipes 32a, 32b, 32c, 32d, 32e,....

[0084] Note that, in the case that the device outer wall 30 is the metal layer, the pipes 32a, 32b, 32c, 32d, 32e,... may be arranged over the surface of the device outer wall 30. For example, in the case of using the device 2 of the configuration illustrated in Figure 2, the pipes 32a, 32b, 32c, 32d, 32e,... may be arranged over the surface of at least one of the metal layers 20 and 22.

[0085] According to the fourth embodiment, even when the temperature difference at each location is generated due to the size of a large scale, the temperature difference is quickly reduced by the fluid circulated at the fixed temperature. Since the pipes 32a, 32b, 32c, 32d, 32e,... in

the fourth embodiment are not connected to each other and only the supply side pipe 33 and the discharge side pipe 34 are in common, even when the plurality of pipes are arranged over a wide area, it is easy to maintain a fluid temperature at the fixed temperature.

[0086] Therefore, in the housing chamber inside the device, even when there is at least one of the temporal change and the spatial change of the external temperature, the temperature at each location inside the housing chamber can be kept fixed, and thus, convection is not generated in the alcohol-containing beverage inside the housing chamber, and the flavor quality can be improved. Here, the alcohol-containing beverage may be packed in a container such as a bottle and kept inside the housing chamber or may be directly filled inside the housing chamber and kept.

[0087] In the first to fourth embodiments described above, by uniformizing at least one of the spatial temperature change and the temporal temperature change transmitted from the outside to the housing chamber, at least one of the spatial temperature distribution and the temporal temperature distribution of the fluid of the alcohol-containing beverage is substantially uniformized (fixed at each location or at each time). Here, at least one of the spatial temperature distribution and the temporal temperature distribution of the fluid of the alcohol-containing beverage being substantially uniform refers to the fact that the temperature difference in at least one of the spatial temperature distribution and the temporal temperature distribution is settled in an order of

0.5 mK, preferably in the order of 0.1 mK. In addition, a preservation temperature can be uniformly held at 5 to 40°C (278 to 313K) for example, preferably at 10 to 35°C (283 to 308K), and more preferably at 15 to 30°C (288 to 303K). Though not necessarily, for example, the preservation temperature can be set to be equal to or lower than 20°C (293K), 25°C (298K) or 30°C (303K). At least one of the spatial temperature distribution and the temporal temperature distribution can be controlled by the plurality of temperature control elements, for example.

[0088] A period of leaving the alcohol-containing beverage at rest can be, for example, 1 day to 50 years, preferably 5 days to 40 years, 10 days to 40 years, and 10 days to 30 years, more preferably 15 days to 30 years, 20 days to 30 years, 20 days to 20 years, and 20 days to 15 years, further preferably 25 days to 10 years, 30 days to 5 years, and 50 days to 3 years. Specifically, for example, the period can be 1 month, 2 months, 3 months, 4 months, 5 months, 6 months, 9 months, 12 months, 15 months, 18 months, 21 months, 24 months, 27 months, and 30 months.

[0089] (Fifth embodiment)

The device of the fifth embodiment relates to a device placed under an environment of the zero gravity or the microgravity.

[0090] Examples of the environment of the zero gravity or the microgravity are the inside of airframes of a space probe flying almost by inertia in outer space, an artificial satellite orbiting around a celestial body and a falling

airplane or the like. Examples of these celestial bodies are a planet such as the earth, a satellite such as the moon or the sun. Examples of the one under the microgravity are the celestial bodies of the gravity weaker than that of the earth, such as a small planet.

[0091] The device of the fifth embodiment includes a housing chamber for housing an article (an alcohol-containing beverage for example), and attaching means for attaching the device inside the airframe or on the celestial body under the zero gravity or the microgravity. Examples of the attaching means are a metal fitting for attaching the device to an inner wall of the airframe, and an anchor for attaching the device onto the microgravity celestial body.

[0092] By the attaching means, the device of the fifth embodiment does not float even under the zero gravity or the microgravity, and a collision with another object can be avoided. Thus, exertion of physical change due to a collision to the housed article can be avoided.

[0093] By using the devices of the individual embodiments described above as the device of the fifth embodiment, an effect that the housed article is not affected by the external physical change can be accelerated further, however, it is not limited to these examples.

[0094] Under a zero gravity environment, convection is not generated in the alcohol-containing beverage inside the housing chamber, and the flavor quality can be improved. Here, the alcohol-containing beverage may be packed in a container such as a bottle and kept inside the housing chamber or may be

directly filled inside the housing chamber and kept.

[0095] (Sixth embodiment)

The device relating to the sixth embodiment includes vibration blocking means for blocking or attenuating at least one of vibration, force and a moment so that at least one of the vibration, the force and the moment transmitted from the outside of the device is not transmitted to fluid housed inside the device.

[0096] In the case of arranging the device on the ground, between the device and a location (a base or a ground surface for example) where the device is placed for example, the vibration blocking means is interposed. An example of the vibration blocking means is an elastic material (rubber or a spring for example) for attenuating the vibration and external force. Another aspect of the vibration blocking means is connecting means for hanging the housing chamber of the present device from a fulcrum. That is, a pendulum system in which the present device is a weight and the connecting means is a string may be configured. As the pendulum system, an inverted pendulum or a multi-stage pendulum may be used. According to the present aspect, the vibration of a frequency higher than a resonance frequency of the pendulum system can be blocked.

[0097] In addition, the vibration blocking means also includes holding the device in the air using a magnet or the like. As the vibration blocking means, sound insulating means can be also used to block the vibration by sound waves.

[0098] Further, the present device may include a detector

that detects at least one of the vibration, the force (acceleration) and the moment (angular acceleration) transmitted from the outside, and the vibration blocking means may be configured as an actuator that drives the device so as to offset at least one of the detected vibration, force and moment. As the detector, an acceleration sensor or an angular acceleration sensor or the like can be used. As the actuator, a piezoelectric element or the like can be used.

[0099] The sixth embodiment can further accelerate the effect that the housed article is not affected by the external physical change by being combined with the devices of the individual embodiments described above. For example, the attaching means of the fifth embodiment can be provided with the vibration blocking means. Thus, the vibration from the airframe can be prevented from being transmitted to the device, that is, the article. In addition, the vibration blocking means (an elastic layer for example) may be put around the device of the fifth embodiment, and in this case, even when an object collides with the device placed in the zero gravity state, the influence of the collision can be reduced. Further, in the case that the device is attached to the airframe in the fifth embodiment, when the airframe makes a sudden accelerating motion, since the force originated from the acceleration is transmitted to the device, the device may be moved by the actuator so as to offset the acceleration detected in the acceleration sensor. In addition, possible combinations of some of the above-described modifications of the sixth embodiment can be also provided.

[0100] In the state of blocking the vibration, since the vibration is not transmitted to the alcohol-containing beverage housed inside the device, the flavor quality can be improved. Here, the alcohol-containing beverage may be packed in a container such as a bottle and kept inside the housing chamber or may be directly filled inside the housing chamber and kept.

[0101] (Seventh embodiment)

The device of the seventh embodiment includes shielding means for shielding at least one of an electric field, a magnetic field and an electromagnetic wave of a wavelength in a predetermined range.

[0102] As the shielding means, a conductor (a metal plate or mesh) that covers the outer side of the device can be used. Thus, the propagation of the electromagnetic wave or the electric field from the outside to the inside of the device can be reduced. In the above-described embodiment in which an outer wall is already the metal conductor, it is not needed to cover the outer side further, however, it is also conceivable to cover the outer side with a metallic material of a higher shielding effect.

[0103] In addition, in the case of shielding a static magnetic field or the magnetic field of a low frequency, as the shielding means, a layer of a magnetic material that covers the outer side of the device can be used. Examples of the magnetic material are iron, permalloy, and ferrite or the like.

[0104] By using the shielding means as described above, the

electric field, the magnetic field, and the electromagnetic wave of the wavelength in the predetermined range from the outside can be blocked so that displacement of molecules of the fluid by these fields can be suppressed. Thus, the flavor quality of the alcohol-containing beverage can be efficiently improved.

[0105] The seventh embodiment can further accelerate the effect of not moving the fluid by being combined with the devices of the individual embodiments described above, however, it is not limited to these examples.

[0106] In the state of shielding the field, since the external field is not transmitted to the molecules of the alcohol-containing beverage housed inside the device, the flavor quality can be improved. Here, the alcohol-containing beverage may be packed in a container such as a bottle and kept inside the housing chamber or may be directly filled inside the housing chamber and kept. The effect of the seventh embodiment can be substantiated by a phenomenon that the flavor of the alcohol-containing beverage obtained based on the seventh embodiment is preferable compared to the flavor of the alcohol-containing beverage obtained by exciting the molecules of the fluid by the electromagnetic wave of a predetermined frequency. The flavor of the alcohol-containing beverage can be evaluated by the sensory evaluation.

[0107] According to the individual embodiments of the present invention based on the idea of not exerting the physical change from the outside to the article, the physical change of the article itself can be accelerated. For example,

in the case of selecting the alcohol-containing beverage as the article, the flavor quality of the alcohol-containing beverage can be efficiently improved. That is, in the case of preserving the alcohol-containing beverage in the device of the present invention for the same period as in a normal device, the alcohol-containing beverage whose flavor quality is more improved compared to the one obtained by the normal device can be obtained. Then, even in the case of preserving the alcohol-containing beverage in the device of the present invention for a period shorter than in the normal device, the alcohol-containing beverage whose flavor quality is improved as much as the one obtained by the normal device can be obtained. Such a matter is especially advantageous regarding the alcohol-containing beverage for which the preservation largely affects the flavor quality. In addition, for the alcohol-containing beverage with the improved flavor quality, there are also the effects that stimulation originated from alcohol is reduced, quality of taste becomes softer and sweet, and/or fragrance becomes very gentle and excellent or the like so that the present invention is useful for the alcohol-containing beverage in general. In this way, the taste of the aged alcohol-containing beverage obtained by the present invention is remarkably improved compared to the one obtained by the normal device.

[0108] The above is the embodiments of the present invention, however, the present invention is not limited to the above-described examples, and can be arbitrarily and suitably modified within the scope of the present invention.

[0109] For example, as described above, the present invention is also applicable to a device that houses food and drink other than the alcohol-containing beverage. Further, without being limited to the device that houses the food and drink, the present invention is applicable to a device that houses articles.

[0110] In addition, while a bottle in which the alcohol-containing beverage is packed is arranged inside the housing chamber, an aspect of arranging the food and drink directly inside the housing chamber is also possible. Also, the food and drink may be packed in a second container device other than the bottle and the second container may be arranged in the housing chamber.

[0111] In addition, the device of the present invention can be arranged at an arbitrary location. For example, in the first embodiment, since the device can be made into a small size, the device can be arranged in a living space such as in a room or on a desk. Also, by arranging the device under the ground or in a storage room with little temperature change, a further temperature uniformizing effect can be demonstrated. Furthermore, the device can be buried under the ground or the device can be enlarged to use the device itself as the storage room.

Examples

[0112] (First example)

Figure 4 illustrates a device for which the device used in the second embodiment and the vibration blocking means indicated in the sixth embodiment are combined.

[0113] As illustrated in Figure 4(a), a device 2a includes a first metal layer 20a that demarcates the outermost side surface of the device, a first heat insulator layer 21a arranged on the inner side of the first metal layer 20a, and a second metal layer 22a that is arranged on the inner side of the first heat insulator layer 21a and demarcates the innermost side surface of the device. The inside of the second metal layer 22a demarcates a housing chamber 23a where a bottle 25 in which the alcohol-containing beverage is packed can be left at rest. Note that the metal layers 20a and 22a are formed of aluminum, and the first heat insulator layer 21a is formed of Styrofoam. Note that the alcohol-containing beverage may be left at rest by being directly filled in the housing chamber 23a without being packed in a container such as a bottle.

[0114] In addition, the device 2a is mounted on a desk through vibration blocking means 50 (rubber type vibration removal board).

[0115] Figure 4(b) illustrates a simulation result of the temperature distribution inside the device 2a in Figure 4(a). Figure 4(b) illustrates a temperature distribution curve (isothermal line) at a predetermined interval (described in Figure 4(a)) along an A-A' line and a B-B' line in Figure 4(a). As illustrated in Figure 4(b), it was discriminated that there is the temperature distribution in the heat insulator layer 21a but uniformity is held with accuracy of 0.002K in the housing chamber 23a.

[0116] Bottled whisky:

- Product A (Configured from unprocessed liquor for which malt whisky manufactured in Hakushu distillery is aged in barrels over 10 years. A barrel material is white oak, and the alcohol percentage is 40%), and
- Unprocessed liquor B (Malt whisky manufactured in Yamazaki distillery is aged in barrels for about 18 years. The barrel material is white oak, and the alcohol percentage is 59%), was left at rest for 4 months inside the device 2a. While it was left at rest, the temperature in the housing chamber 23a was held at 26°C (299K) (the present invention). During an experimental period, the temperature inside the housing chamber 23a and an outside air temperature (an upper part and a lower part outside the device 2a) were continuously measured. Then, as a comparative experiment 1, the bottled whisky was preserved for the same period at a normal temperature without being left at rest inside the device 2a (a conventional preservation method). Further, as a comparative experiment 2, the bottled whisky was shaken and preserved for the same period at the normal temperature without being left at rest inside the device 2a.

[0117] For the temperature change, the outside air temperature (the upper part and the lower part outside the device 2a) varied throughout the experiment. On the other hand, the temperature inside the housing chamber 23a was maintained fixed at a set temperature of 26°C (299K) throughout the entire period of the experiment. As a representative example, the change of the temperature inside the housing chamber 23a and the outside air temperature (the

upper part and the lower part outside the device 2a) in 325 minutes to 2575 minutes after the experiment was started is illustrated (Figure 5). Then, the change of the temperature inside the housing chamber 23a and the outside air temperature (the upper part and the lower part outside the device 2a) in 1300 minutes to 2500 minutes after the experiment was started, during which a difference between the temperature inside the housing chamber 23a and the outside air temperature was more clearly observed, is illustrated in Table 1.

[0118] [Table 1]

Temperature change in 1300 minutes to 2500 minutes after experiment start

elapsed time after test start (minutes)	inside housing chamber	outside air (device upper part)	outside air (device lower part)
1300	26.0	26.1	25.9
1400	26.0	26.2	26.1
1500	26.0	26.4	26.1
1600	26.0	26.4	26.2
1700	26.0	26.3	26.1
1800	26.0	26.3	26.0
1900	26.0	26.2	26.0
2000	26.0	26.2	25.9
2100	26.0	26.2	25.9
2200	26.0	26.2	25.9
2300	26.0	26.2	25.9
2400	26.0	26.2	25.9
2500	26.0	26.1	25.9

[0119] From this result, it is suggested that, since the whisky obtained by the method of the present invention was left at rest at the fixed temperature of 26°C (299K) throughout the entire period of the experiment, the liquid did not move or did not substantially move. On the other hand, it is suggested that, since the whisky obtained by the

comparative experiments 1 and 2 was preserved under a temperature condition that changed frequently during the experimental period, the liquid moved due to the temperature change.

[0120] Next, the whisky (product A, unprocessed liquor B) after being left at rest or preserved was mixed with water to adjust the alcohol percentage to 20% and submitted to a sensory test. The sensory test was conducted by three skilled expert panelists under the following conditions.

<Conditions of sensory test>

- Three items that are the fragrance of a top note, glamorousness of the top note and softness of the taste were evaluated. Each item was evaluated out of a maximum of 5 points at 0.5 point intervals. In addition, whether or not there was a flavor characteristic was evaluated.
- The evaluations of each item for the whisky preserved at the normal temperature (comparative experiment 1) was defined as 3.0, and with this as a reference, the whisky (the present invention) left at rest inside the device 2a and the whisky (comparative experiment 2) that was shaken and preserved were evaluated.

[0121] A result of the sensory evaluation is illustrated in Table 2. Numerical values in the table indicate averages of the evaluation. The whisky of the present invention (for both of the product A and the unprocessed liquor B) was evaluated more highly than the whisky of the comparative experiment 1 for all the evaluation items. On the other hand, the whisky of the comparative experiment 2 preserved in a shaken state

was evaluated lower than the whisky of the comparative experiment 1 for all the evaluation items.

[0122] [Table 2]

evaluation item	product A			unprocessed liquor B		
	present invention	comparative experiment	comparative experiment	present invention	comparative experiment	comparative experiment
		1	2		1	2
top fragrance	4.7	3.0	1.0	5.0	3.0	1.0
top glamorousness	4.2		1.0	4.5		1.0
softness of taste	5.0		1.0	5.0		1.0

[0123] Further, the whisky of the present invention (for both of the product A and the unprocessed liquor B) had the following flavor characteristics compared to the whisky of the comparative experiment 1.

- Stimulation originated from the alcohol felt on the tongue was weakened.
- The taste was softened.
- The fragrance was very gentle and excellent.

[0124] From the above, it was suggested that the movement of the liquid of the whisky while it is being left at rest greatly affects the flavor. It was suggested that, by suppressing the movement of the liquid of the whisky, the flavor is improved. It was suggested that not only the large liquid movement by shaking or the like but also even slight

liquid movement caused by the temperature change or the like while it is being left at rest affects the flavor of the whisky.

[0125] It was indicated that, according to the method of the present invention, the liquid of the alcohol-containing beverage can be left at rest without being substantially moved, and the flavor can be improved. The flavor improving effect was remarkably high compared to the case of the preservation for the same period by the conventional method. In addition, according to the method of the present invention, it can be expected to obtain the whisky having the flavor equal to that by the conventional method in a shorter resting period.

[0126] (Second example)

An alcohol beverage was kept by the method indicated in the fifth embodiment. That is, the alcohol-containing beverage was left at rest in the environment where the convection of the liquid was suppressed by the environment of the zero gravity or the microgravity.

[0127] Inside the airframe in the outer space (under the zero gravity or the microgravity), the alcohol-containing beverages (several kinds of distilled liquor with different aging periods) sealed in glass containers were kept in the device including the housing chamber for housing the alcohol-containing beverages and the attaching means for attaching the device. The alcohol-containing beverages were kept for about one year to a plurality of years in the environment to be substantially a non-convection state and were then collected, and the alcohol-containing beverages with the improved flavor

were obtained.

Reference Signs List

[0128]

- 1, 2, 3, 2a device
- 10 first heat insulator layer
- 11 first metal layer
- 12 second heat insulator layer
- 13 second metal layer
- 15 housing chamber
- 16a, 16b, 16c, 16d Peltier element
- 17a, 17b, 17c, 17d thermistor
- 20, 20a first metal layer
- 21, 21a first heat insulator layer
- 22, 22a second metal layer
- 23, 23a housing chamber
- 50 vibration blocking means

Claims

[Claim 1] An article housing device comprising:

a housing chamber for housing an article; and

a shielding part provided on an outer side of the housing chamber,

wherein the shielding part uniformizes physical change propagated from outside of the article housing device to the housing chamber.

[Claim 2] The device according to claim 1, wherein the physical change is at least one of spatial temperature change and temporal temperature change.

[Claim 3] The device according to claim 2, wherein the shielding part is configured such that a temperature difference in at least one of the spatial temperature change and the temporal temperature change is settled in an order of 0.1 mK.

[Claim 4] The device according to claim 2 or 3, wherein the shielding part includes at least one double layer formed of a heat insulator layer and a metal layer provided on an inner side of the heat insulator layer.

[Claim 5] The device according to claim 4, wherein the plurality of double layers are formed.

[Claim 6] The device according to claim 4 or 5, wherein at least one temperature control element is arranged at least on a surface of the metal layer configuring the double layer on the outermost side, and the at least one temperature control element is controlled so that the metal layer becomes a

predetermined temperature.

[Claim 7] The device according to any one of claims 4 to 6, wherein the heat insulator layer of the double layer on the outermost side demarcates an outermost side surface of the device.

[Claim 8] The device according to any one of claims 4 to 7, wherein the metal layer configuring the double layer on an innermost side demarcates an innermost side surface of the device, and food and drink can be kept inside the metal layer.

[Claim 9] The device according to claim 4 or 5, wherein a metal layer is formed further on an outer side of the heat insulator layer of the double layer and the metal layer forms an outermost side layer of the device.

[Claim 10] The device according to any one of claims 2 to 9, wherein the shielding part includes a part having a heat capacity of such a size that the temporal temperature change becomes a predetermined value or smaller.

[Claim 11] The device according to any one of claims 2 to 9, wherein the shielding part includes at least one metal layer, and a plurality of pipes where fluid at a fixed temperature is circulated respectively are arranged over a surface of the metal layer.

[Claim 12] The device according to any one of claims 1 to 11, wherein the shielding part further includes attaching means that attaches the device inside an airframe or on a celestial body under zero gravity or microgravity.

[Claim 13] The device according to any one of claims 1 to 12, wherein the shielding part includes vibration blocking

means for blocking or attenuating at least one of vibration, force and a moment transmitted from the outside so that at least one of the vibration, the force and the moment is not propagated to the housing chamber.

[Claim 14] The device according to claim 13, wherein the vibration blocking means is at least one of a layer of an elastic material arranged in a vibration transmission route or a force transmission route to the device, and connecting means that connects the housing chamber to a fulcrum so as to configure a pendulum system.

[Claim 15] The device according to claim 13, further comprising

a detector that detects at least one of the vibration, acceleration by the force and angular acceleration by the moment,

wherein the vibration blocking means includes an actuator operated so as to offset at least one of the vibration, the acceleration and the angular acceleration detected by the detector.

[Claim 16] The device according to any one of claims 1 to 15, wherein the shielding part includes field shielding means for shielding at least one of an electric field, a magnetic field and an electromagnetic wave of a wavelength in a predetermined range.

[Claim 17] The device according to claim 16, wherein the field shielding means is a layer of a magnetic material that covers the housing chamber so as to shield the magnetic field.

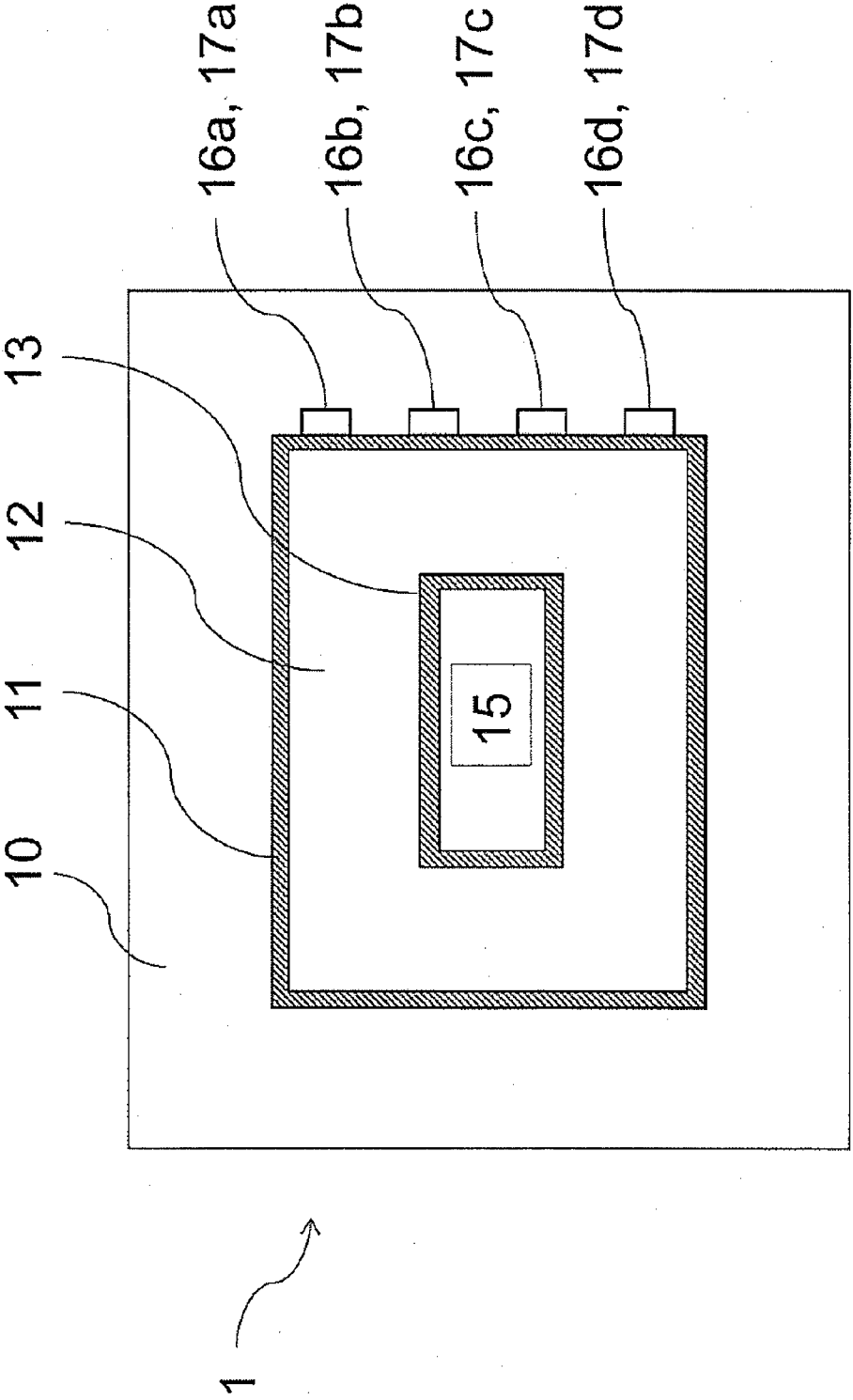
[Claim 18] The device according to any one of claims 1 to

17, wherein a mutual diffusion coefficient of the article housed in the housing chamber increases by a predetermined ratio or more compared to that in the time when the article receives the physical change from the outside.

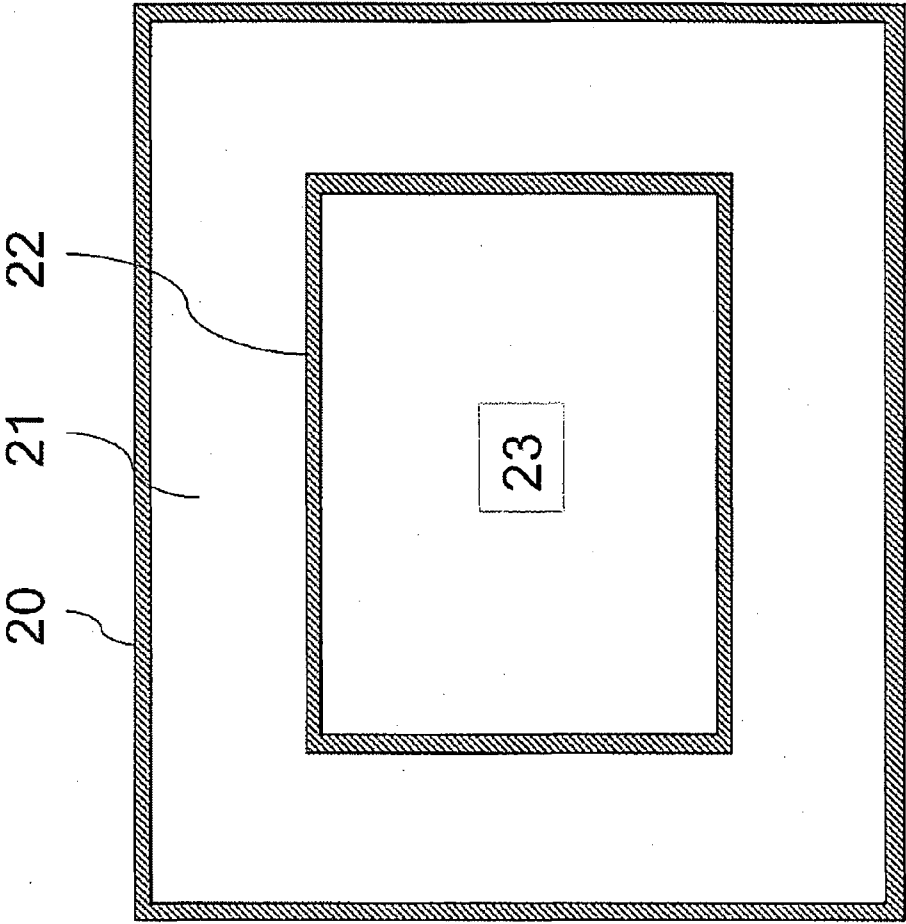
[Claim 19] The device according to any one of claims 1 to 18, wherein the article is food or drink.

[Claim 20] The device according to claim 19, wherein the food or drink is an alcohol-containing beverage.

[Figure 1]



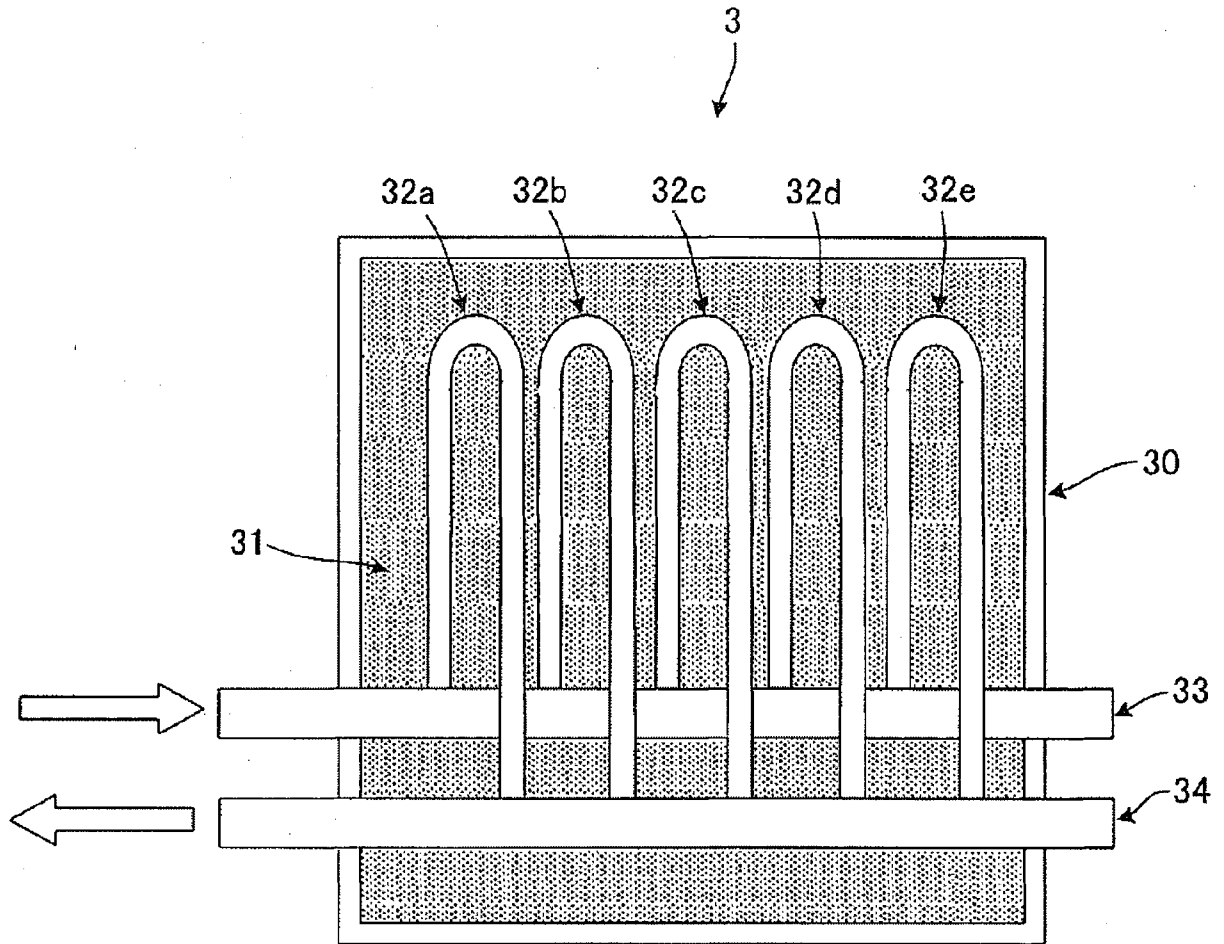
[Figure 2]



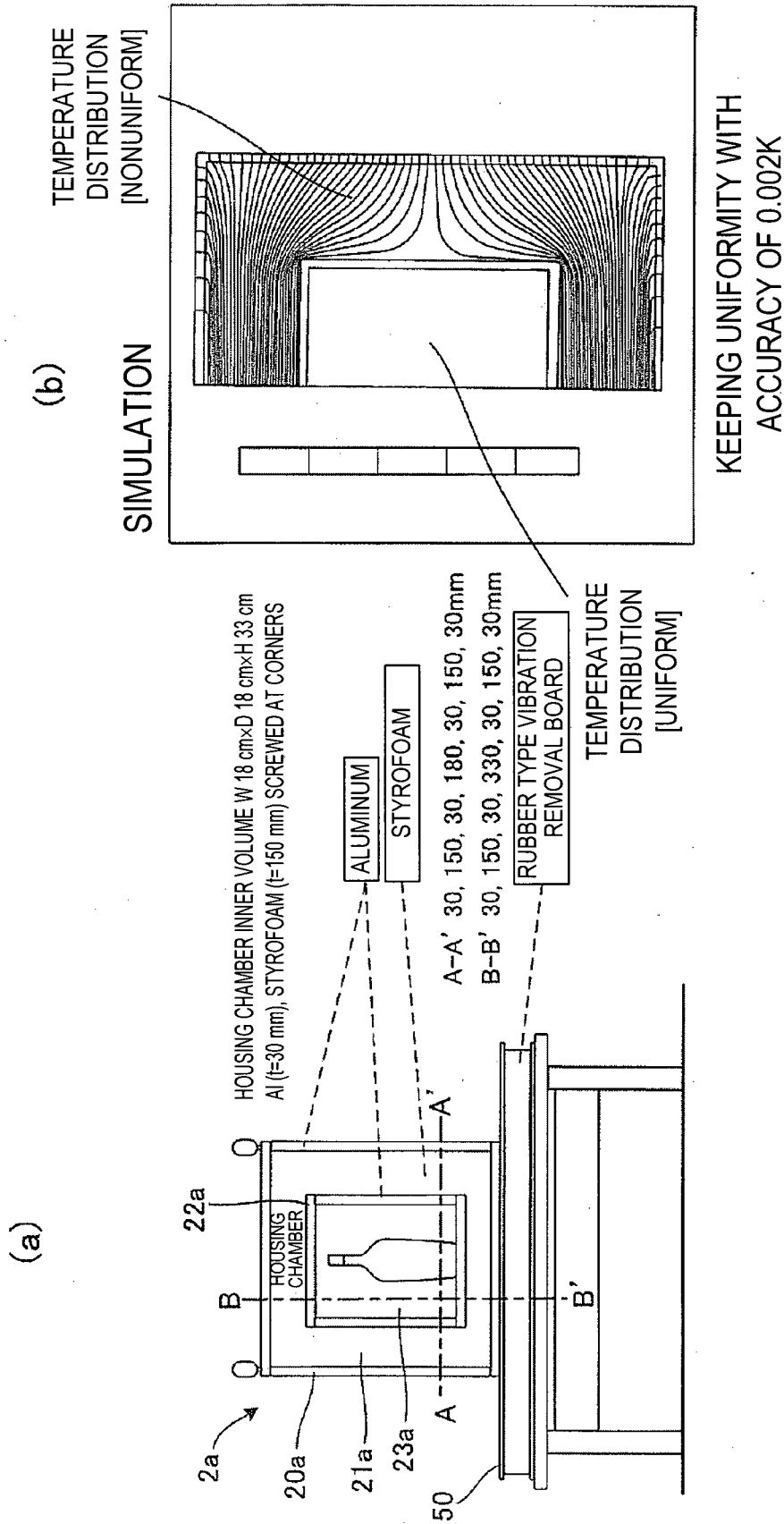
2

3/5

[Figure 3]

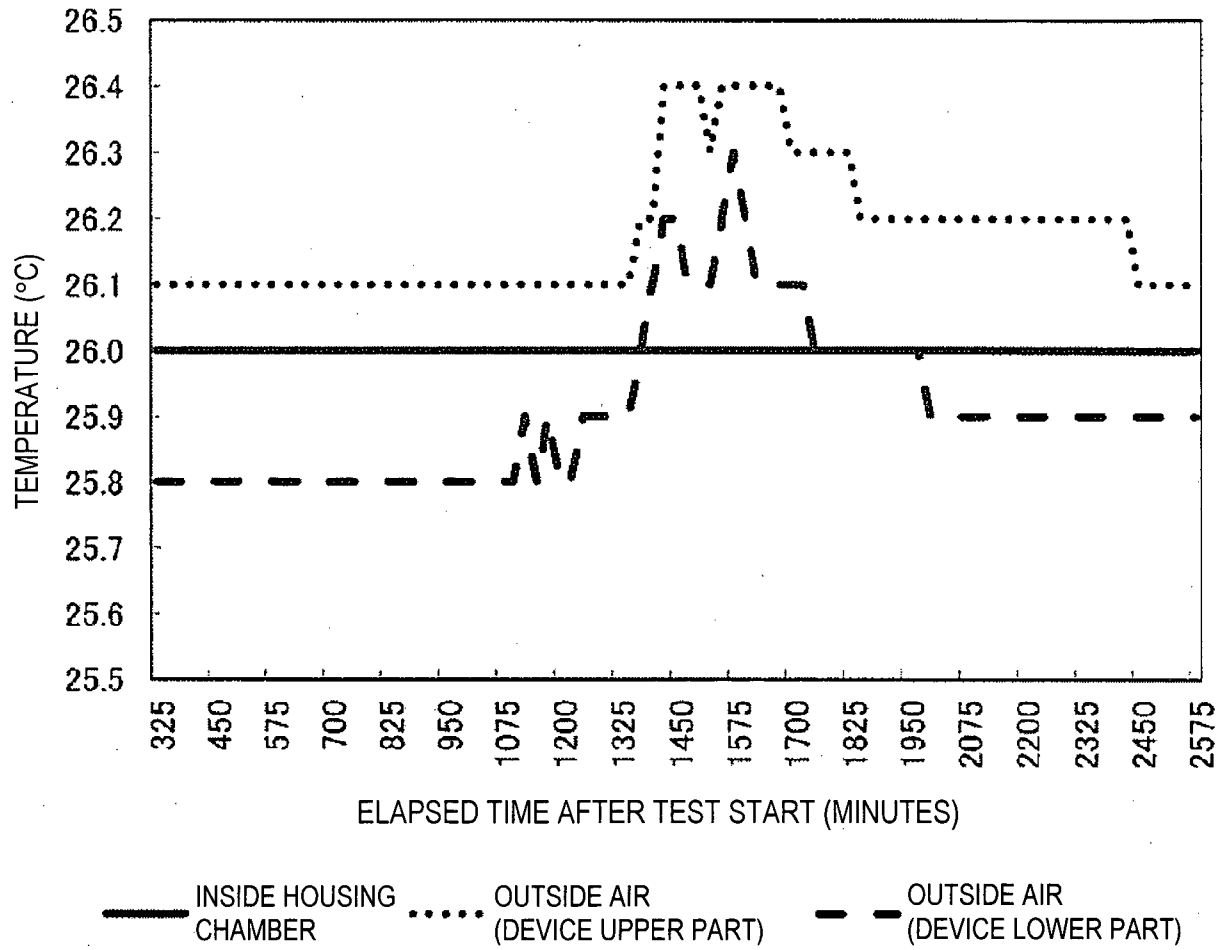


[Figure 4]



5/5

[Figure 5]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2016/073021

A. CLASSIFICATION OF SUBJECT MATTER		
Int.Cl. F25D11/00(2006.01)i, B64D9/00(2006.01)i, B64G1/22(2006.01)i, F25D23/06(2006.01)i, F25D29/00(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)		
Int.Cl. F25D11/00, B64D9/00, B64G1/22, F25D23/06, F25D29/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Published examined utility model applications of Japan 1922-1996 Published unexamined utility model applications of Japan 1971-2016 Registered utility model specifications of Japan 1996-2016 Published registered utility model applications of Japan 1994-2016		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	JP 11-325689 A (MATSUSHITA REFRIGERATION) 1999. 11.26, CLAIMS, [0004]-[0030], FIG.1 (No Family)	1-3, 12, 18-20 13-15 4-11, 16-17
X Y A	US 2006/0249029 A1 (SAMSUNG ELECTRONICS CO., LTD.) 2006.11.09, CLAIMS, [0005], [0043]- [0048], FIGS.1-2 & JP 2006-311861 A & KR 10-2006-0114924 A & CN 1876802 A	1-2, 18-20 11 3-10, 12-17
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International application No.

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