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(54) **RADON INHALATION DEVICE**

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(57) **ABSTRACT**

It is possible for users to inhale radon at a stable concentration regardless of the surrounding atmospheric temperature to gain effects similar to those of radon hot springs. The radon inhalation device **1** includes a radon generation container **5** and a heater **6** that heats the inside of the radon generation container **5**. The radon generation container **5** includes a container main body **4** the inside of which is divided into a radon reservoir **8** and an external air opening chamber **10** by the bag **11**, radioactive material containing ores **7** stored inside the radon reservoir **8**, and a radon extractor **14** that communicates with the inside of the radon reservoir **8** and the outside of the container main body **4**. External air can be introduced when the bag **11** is deformed to increase the volume of the radon reservoir **8**, and the radon inside the radon reservoir **8** is released outside the container main body **4** when the gas inside an internal space **39** is suctioned from the outside of the container main body **4**.

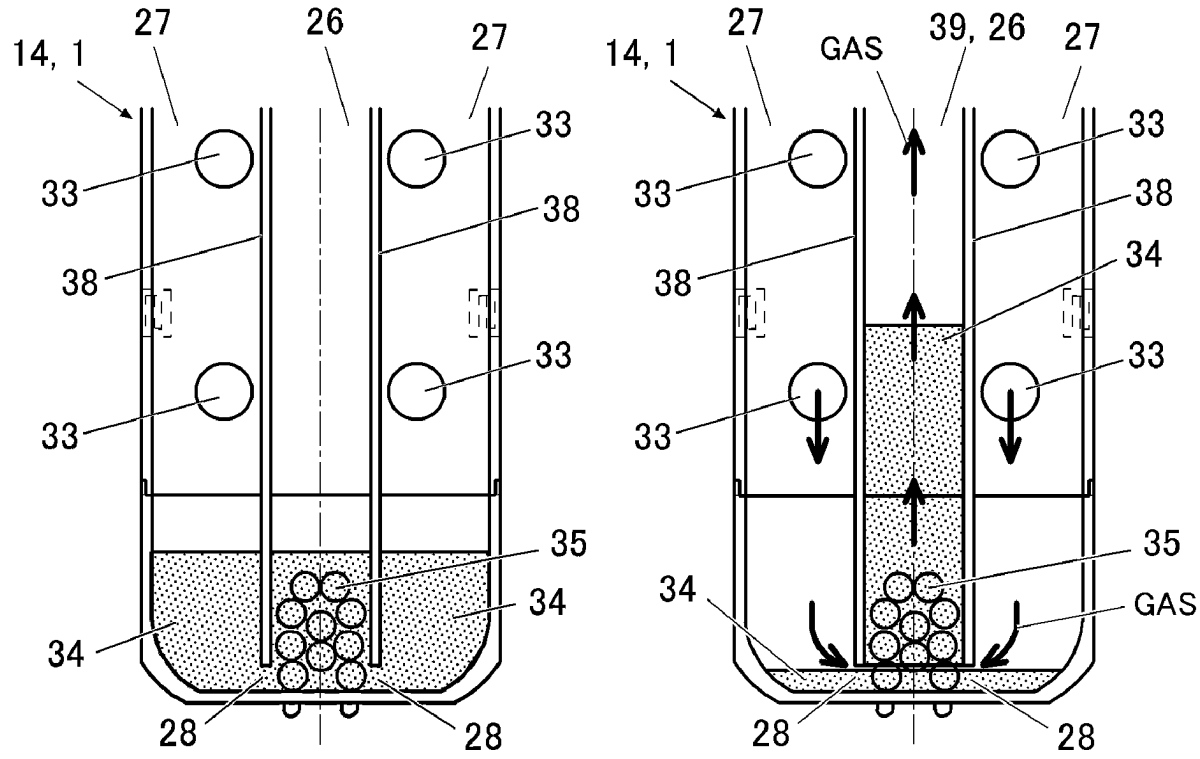


FIG.1

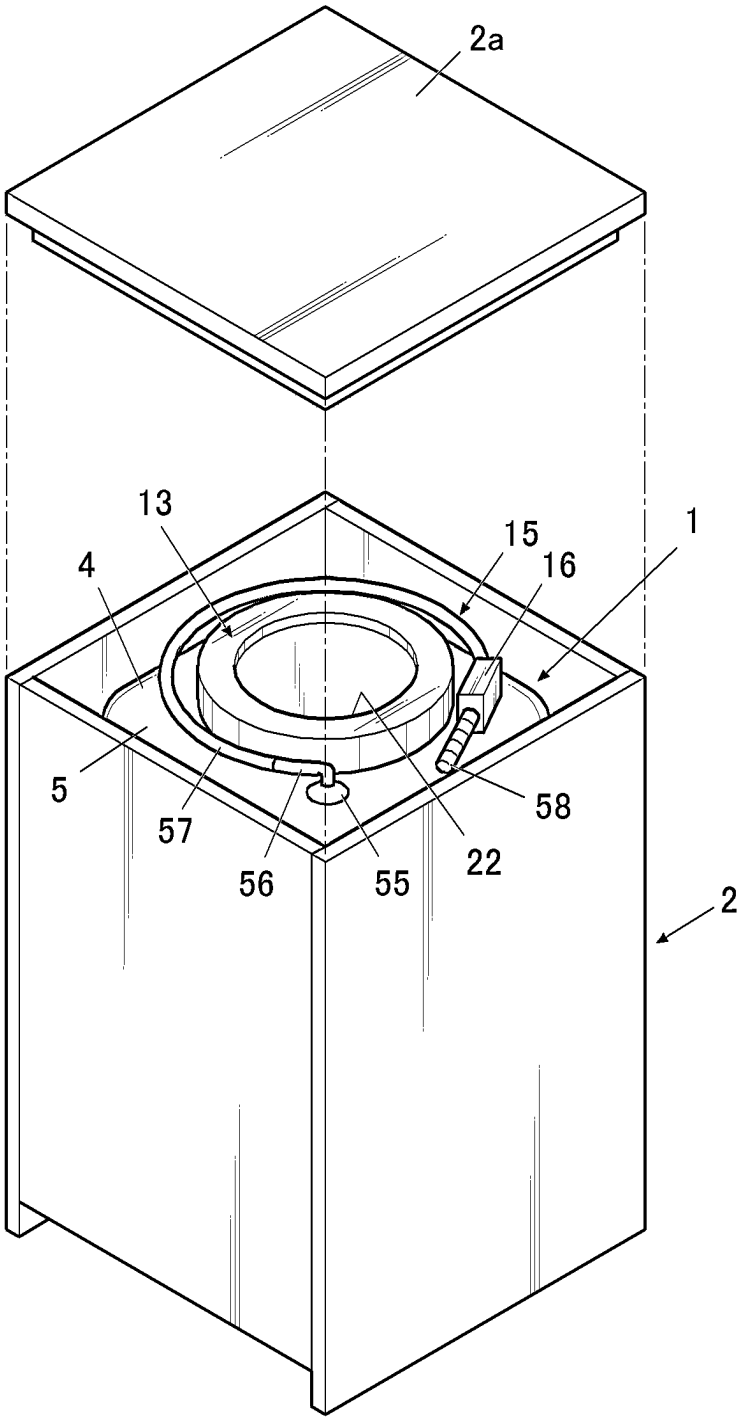
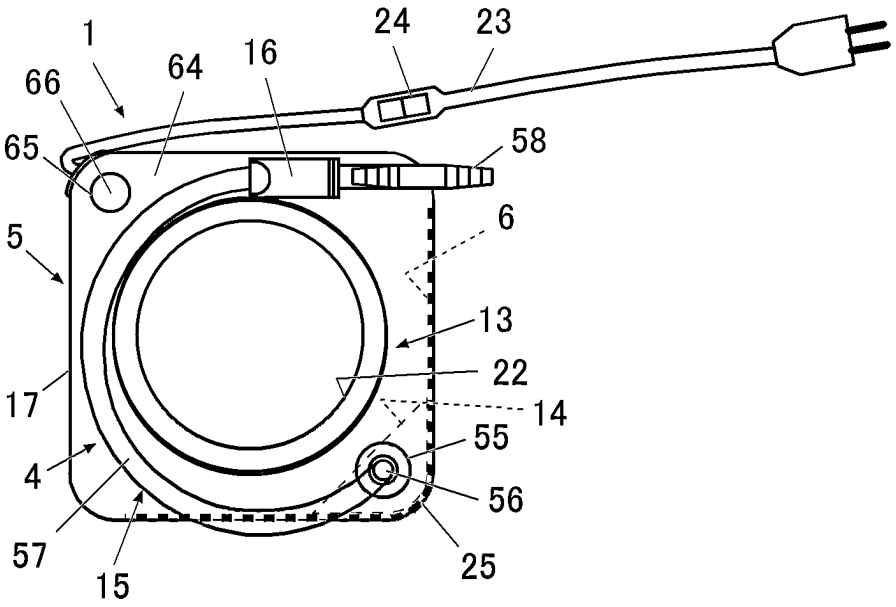


FIG.2A


1
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23
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5
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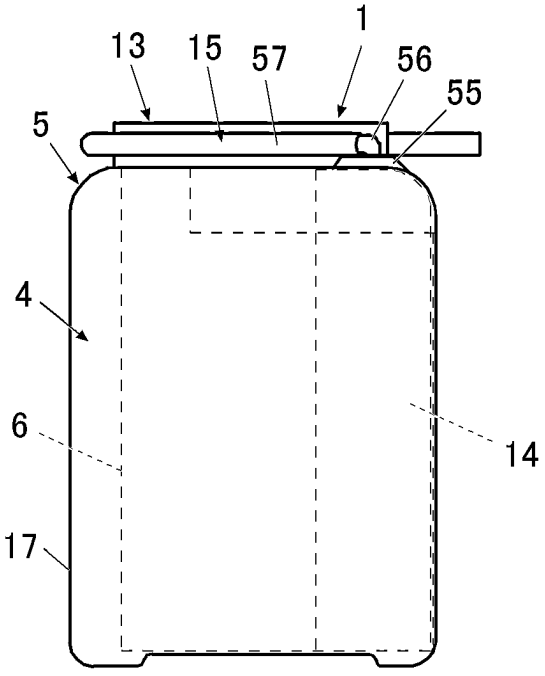
FIG.2B


1
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14
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FIG .2C

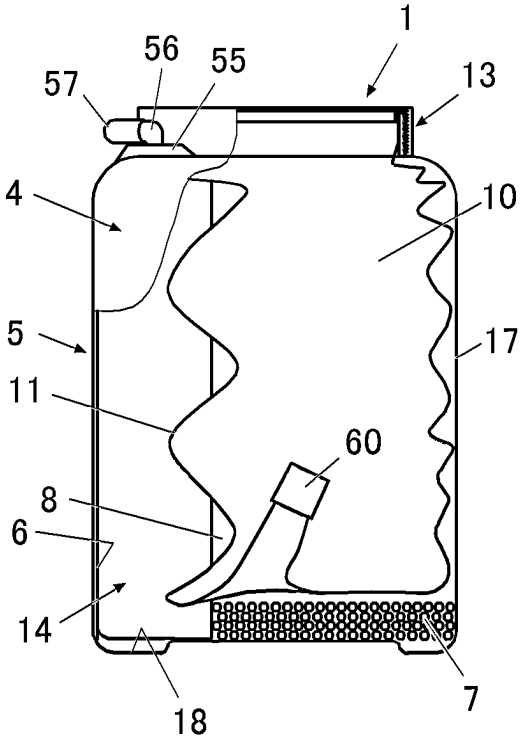
1
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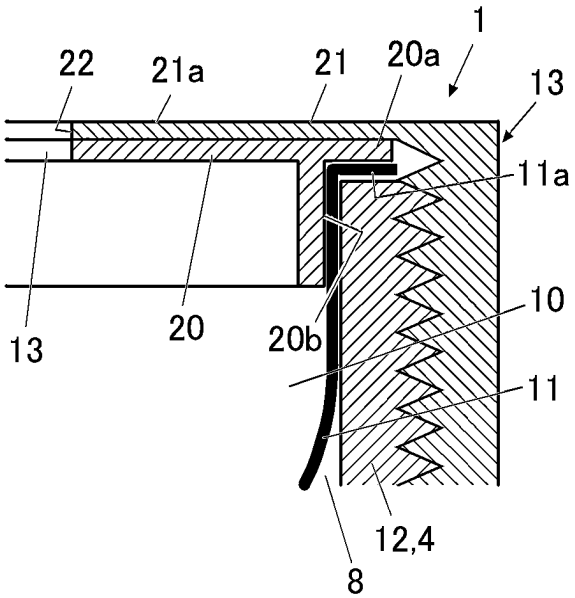
FIG .2D


1
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21a
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20a
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11a
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20b
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12,4
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FIG .3A

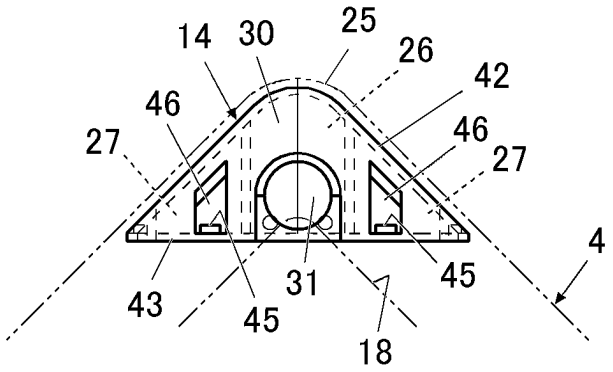
14
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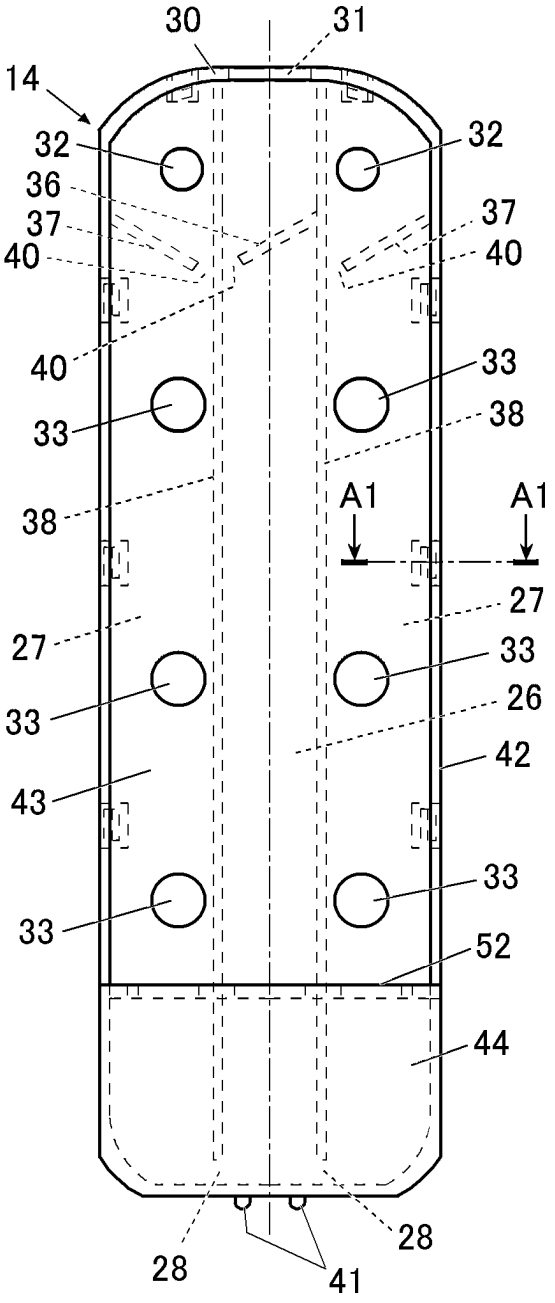
FIG .3B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A1
A1
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FIG .3C

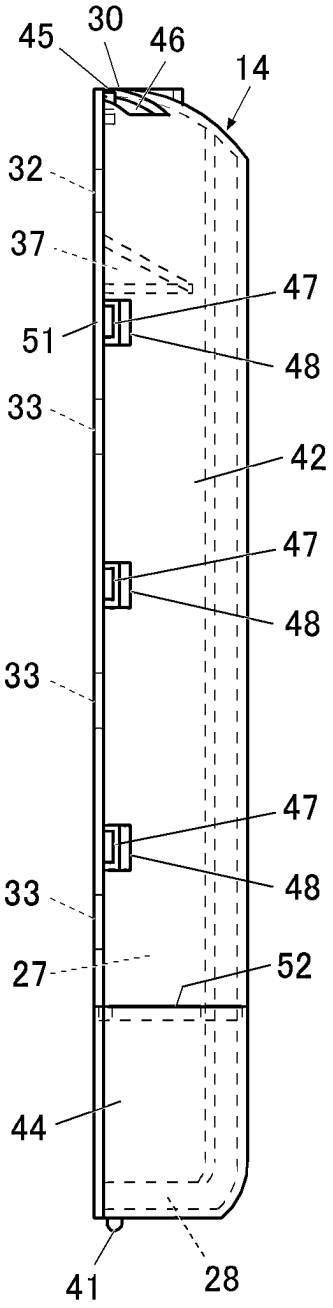
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FIG .3D

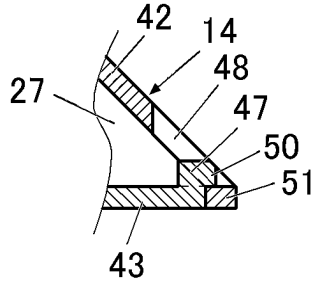
42
14
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FIG .4A

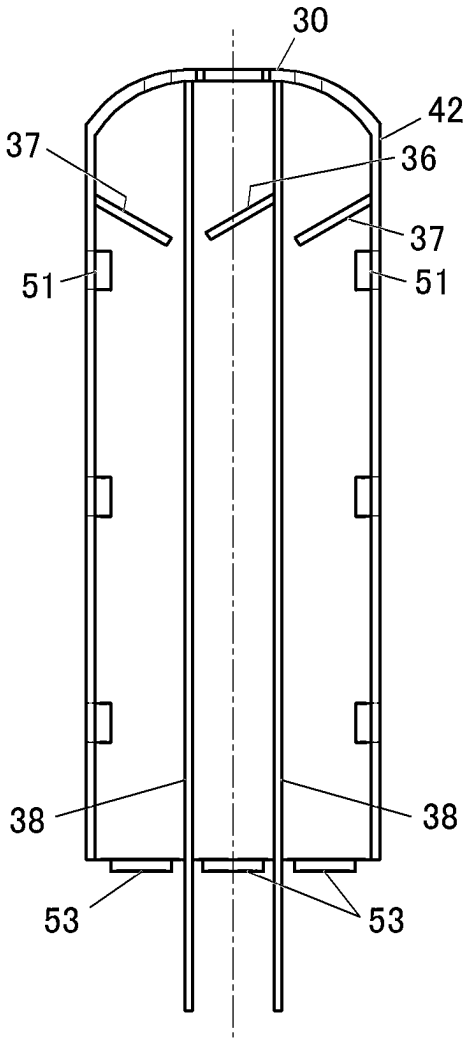

FIG .4B

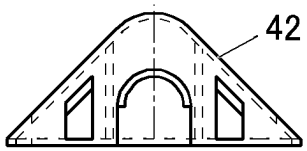

FIG.4C

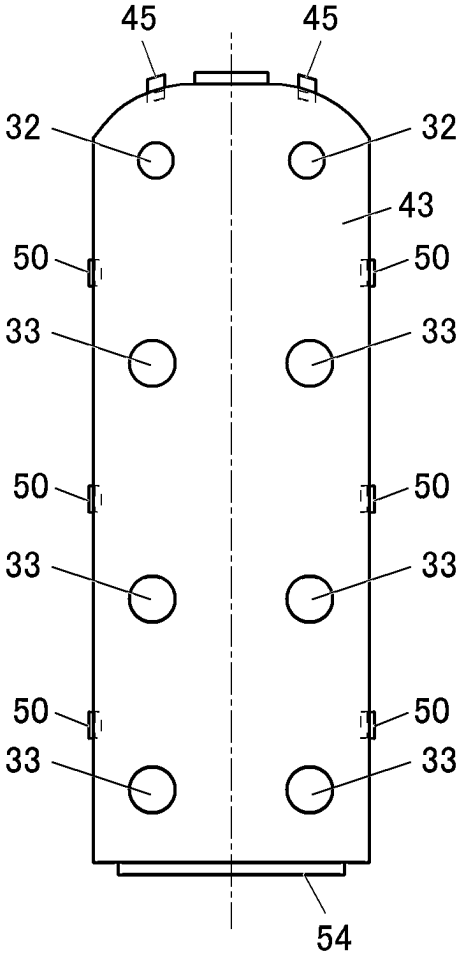

FIG.4D

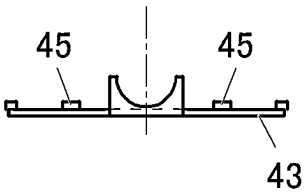

FIG.4E

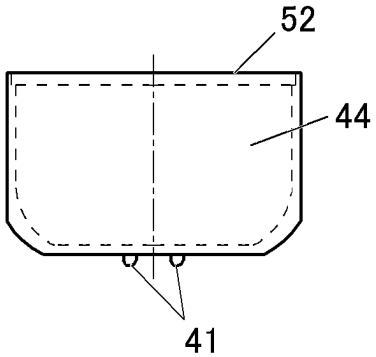

FIG.5A

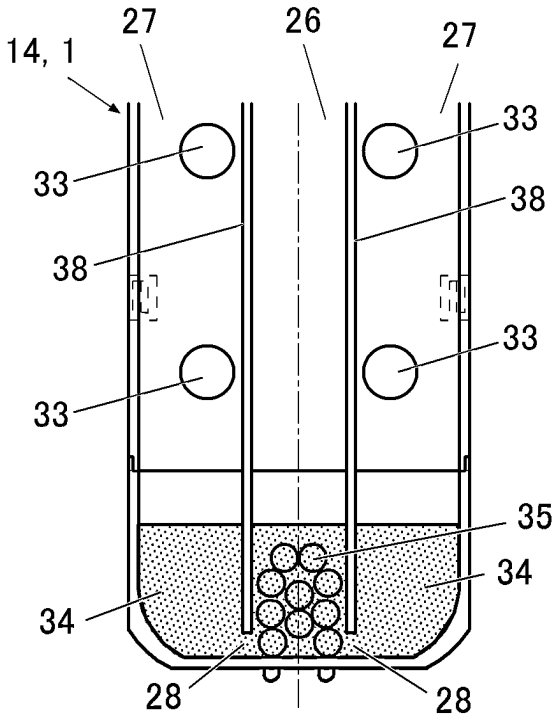
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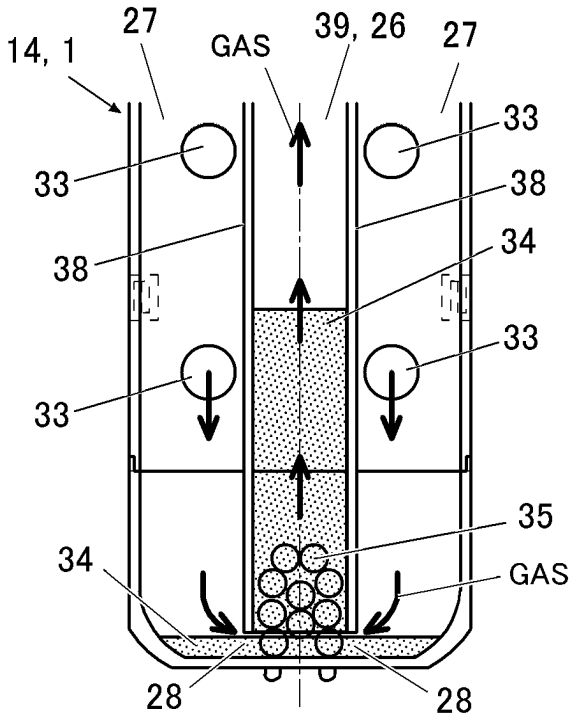
FIG.5B


14, 1
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GAS
39, 26
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GAS
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FIG.6

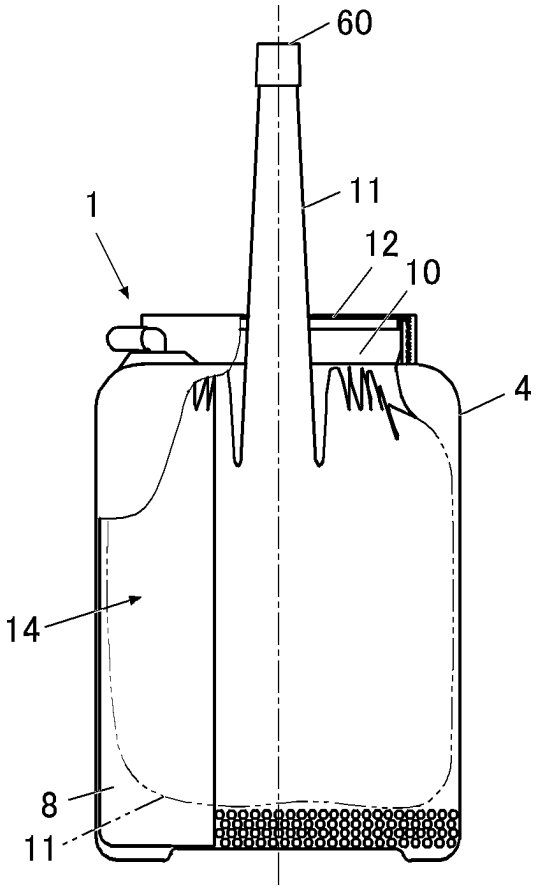

FIG.7A

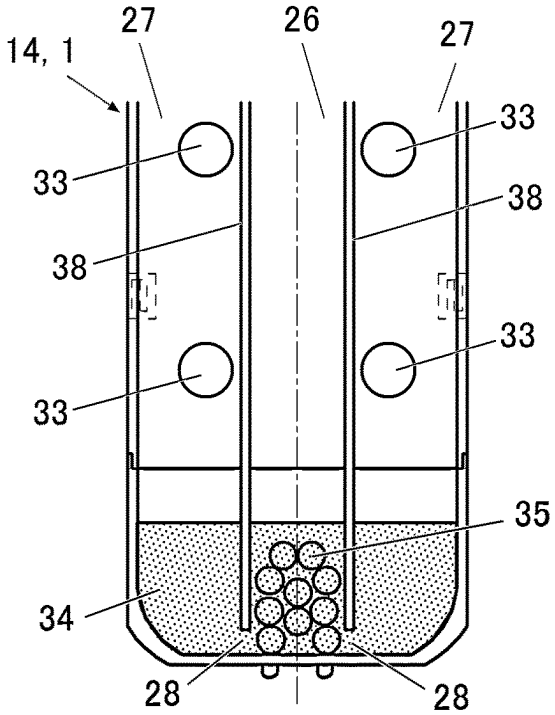
14, 1
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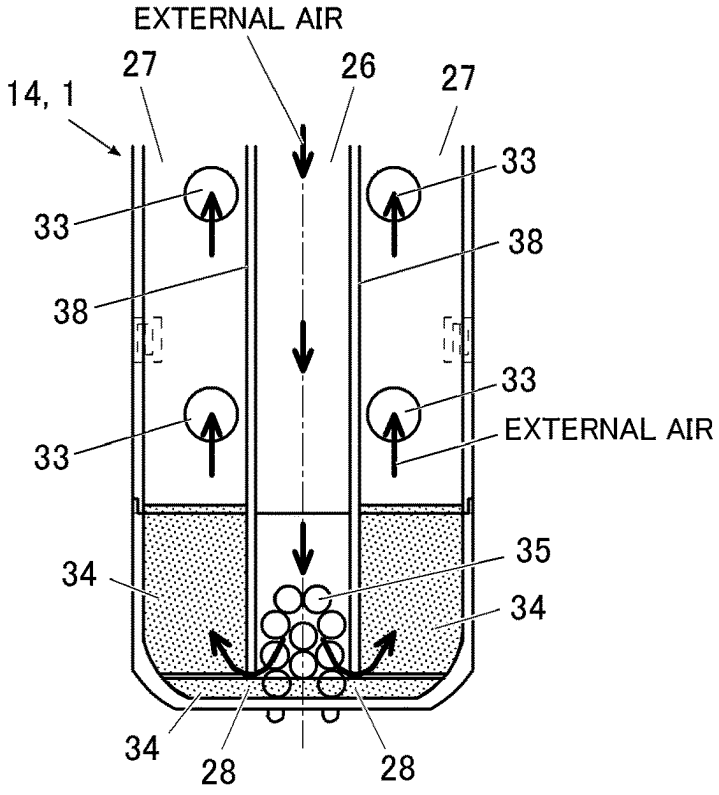
FIG.7B


EXTERNAL AIR
14, 1
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EXTERNAL AIR
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FIG .8

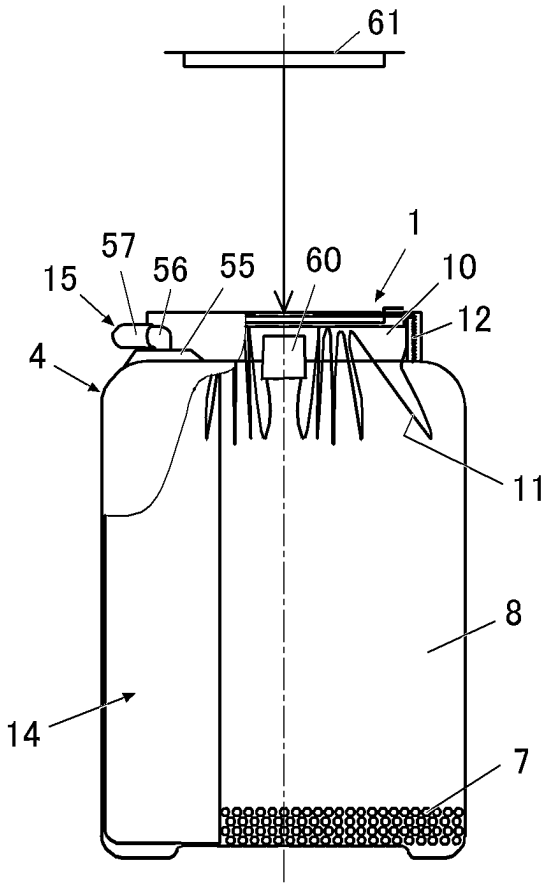


FIG .9A

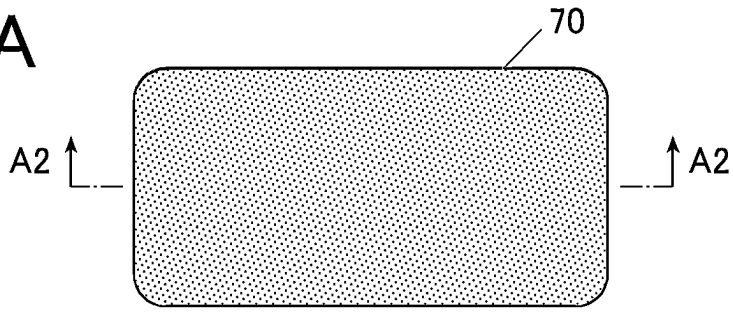


FIG .9B

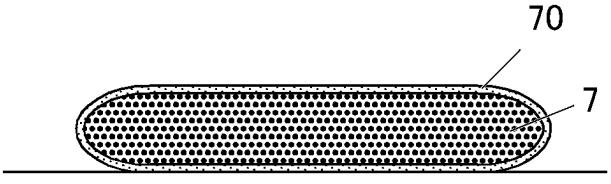


FIG.10

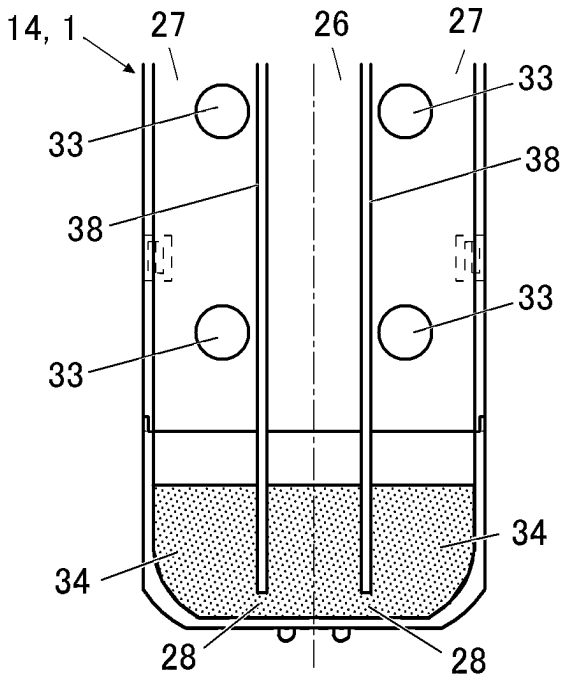


FIG.11

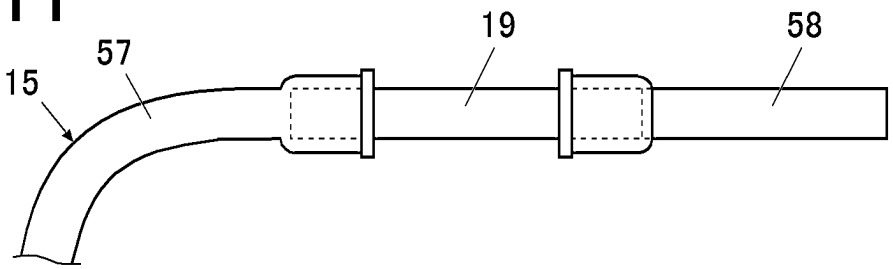


FIG.12

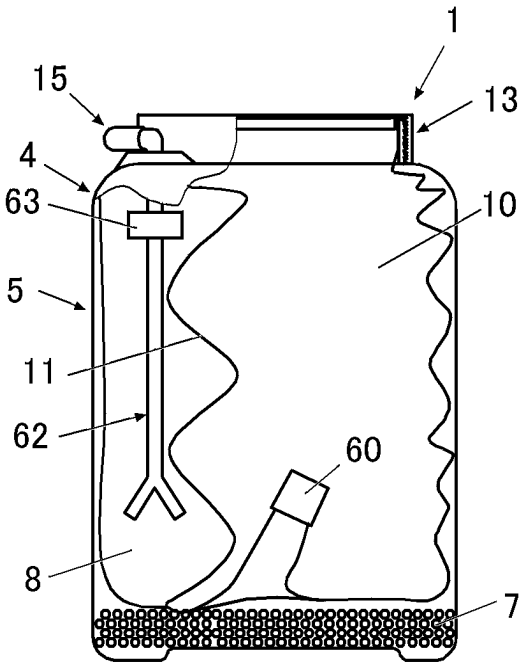


FIG.13A

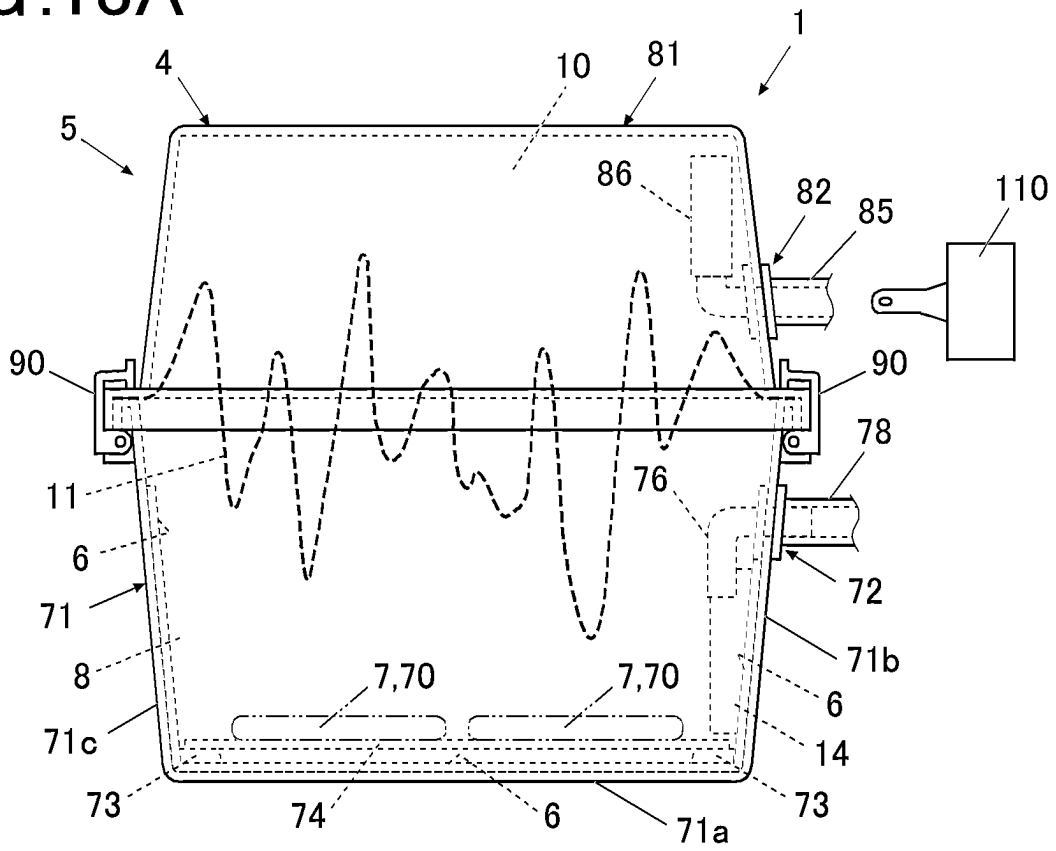


FIG.13B

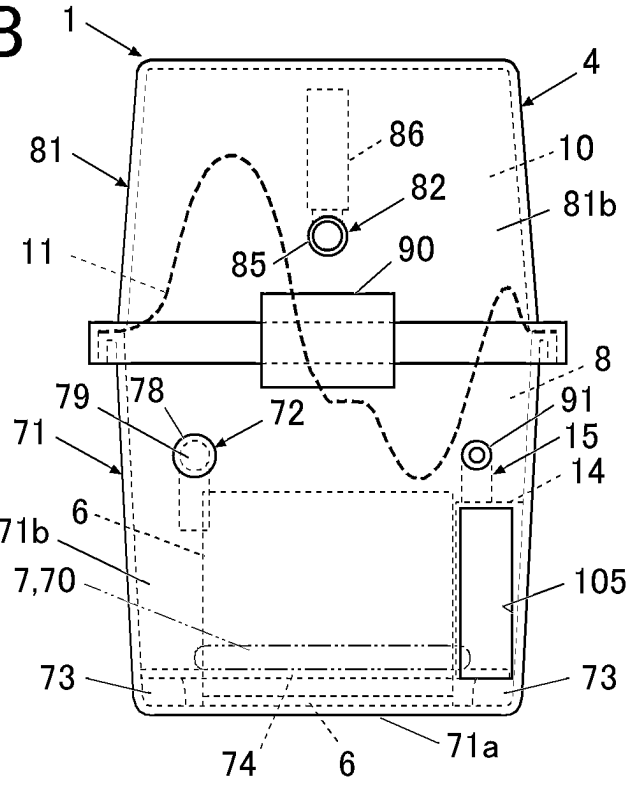


FIG.14

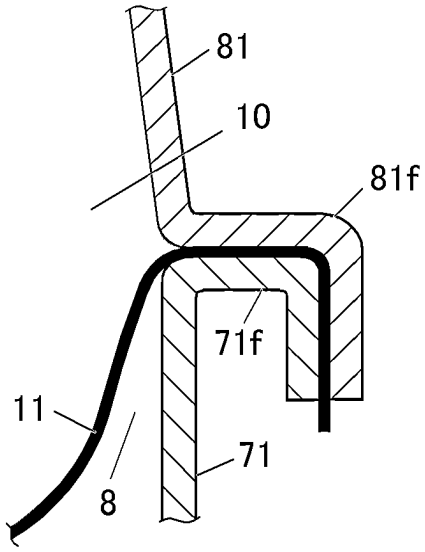


FIG.15

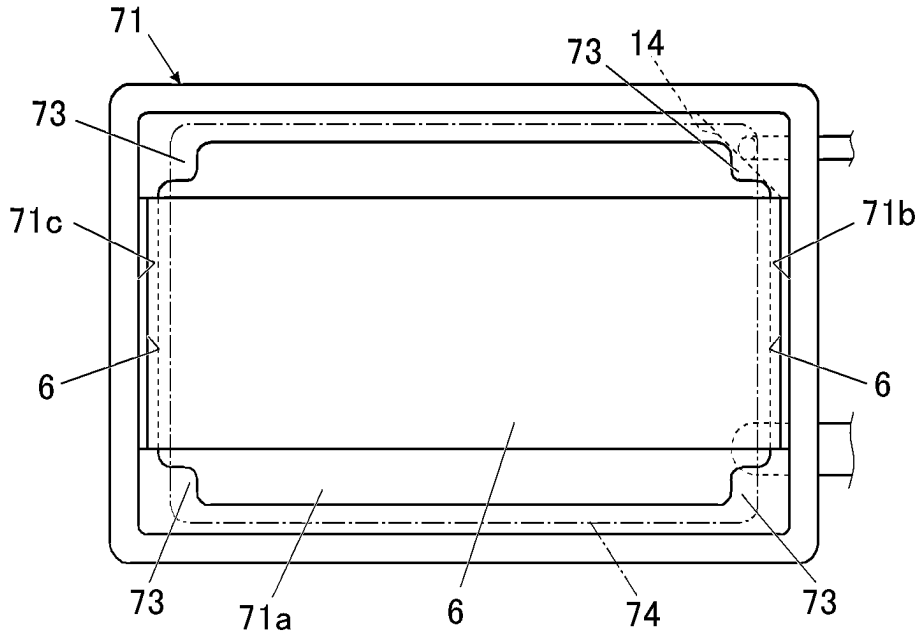
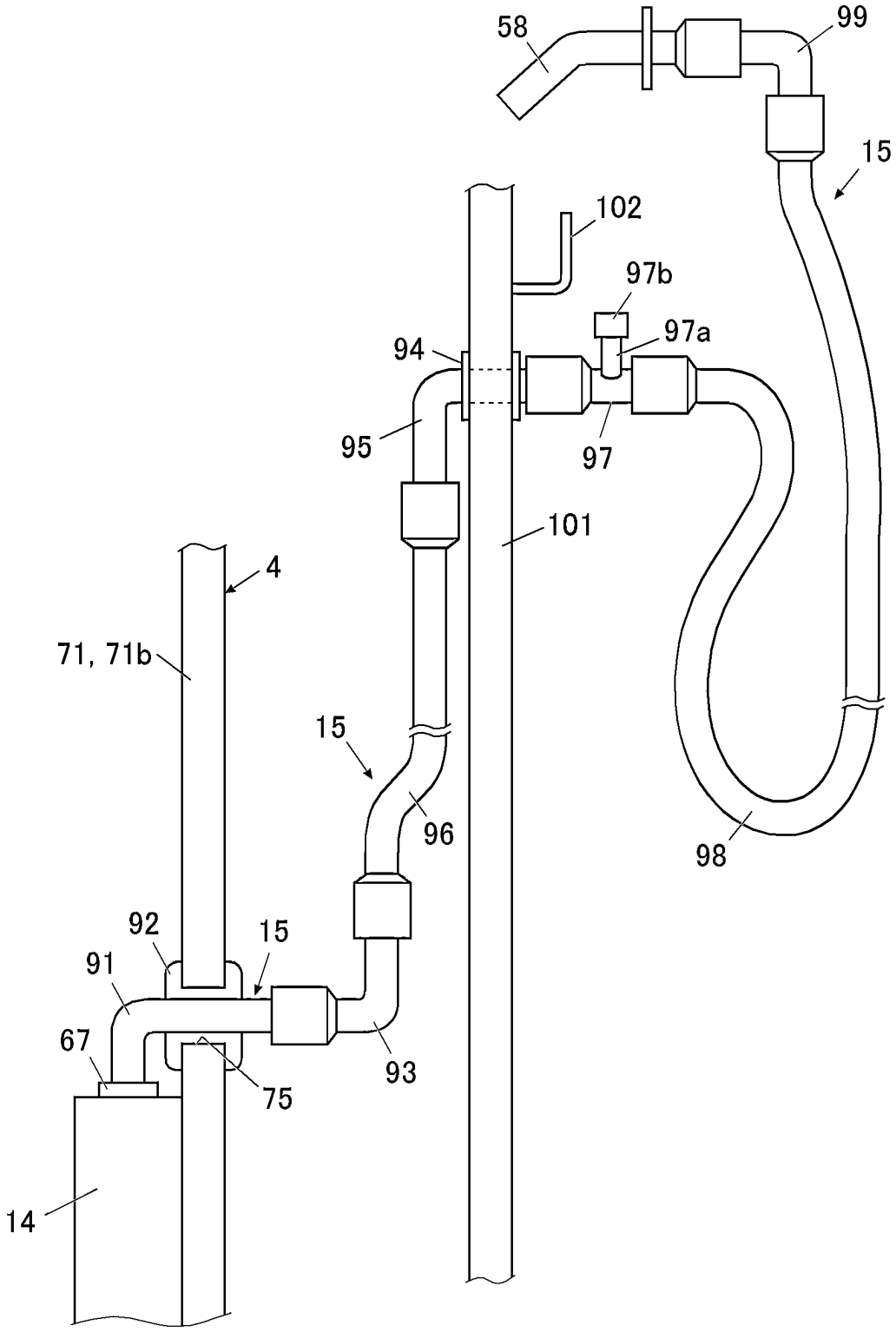


FIG.16


58
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97b
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FIG.17

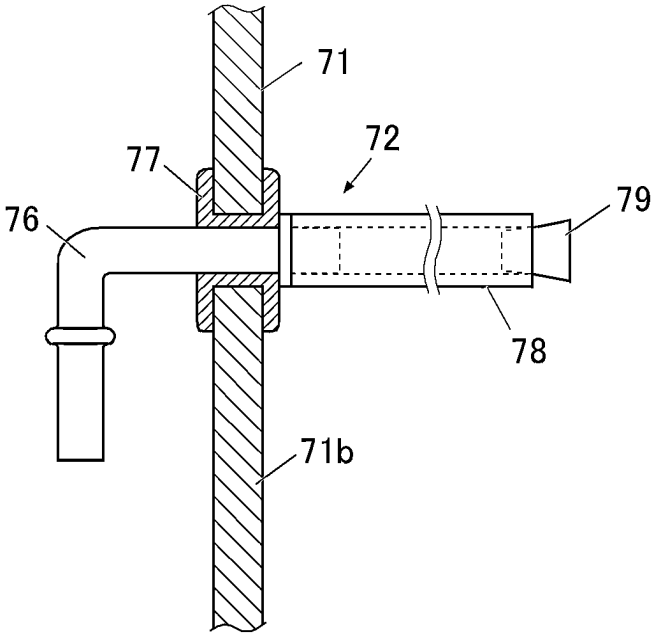


FIG.18

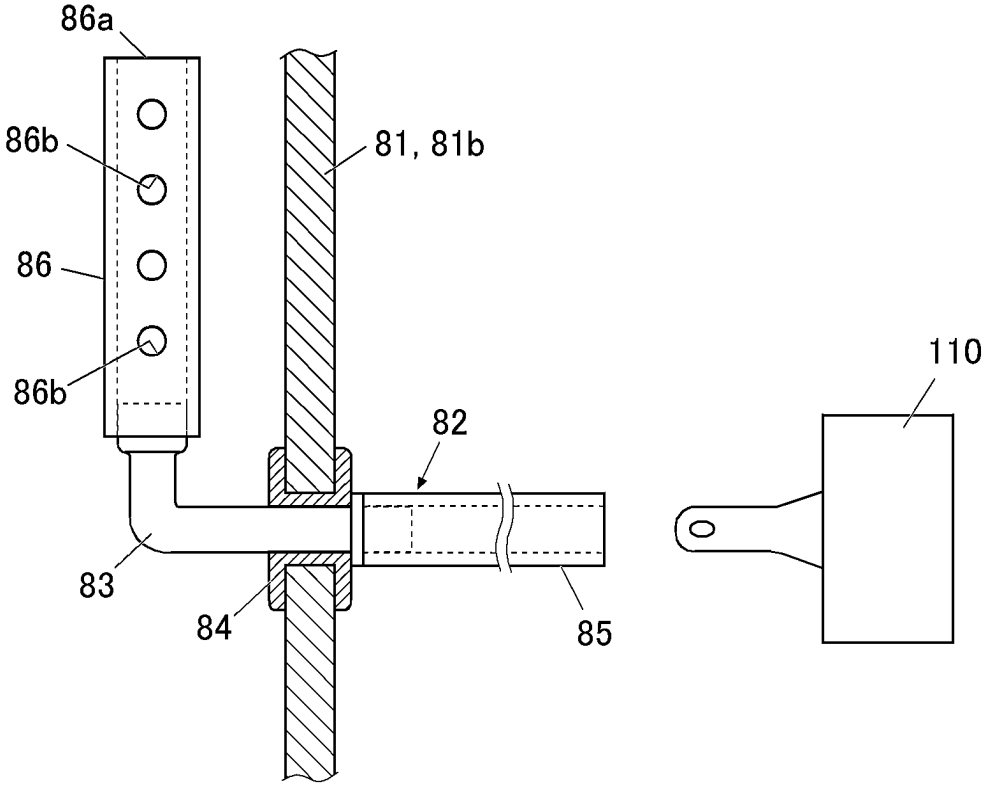


FIG.19A

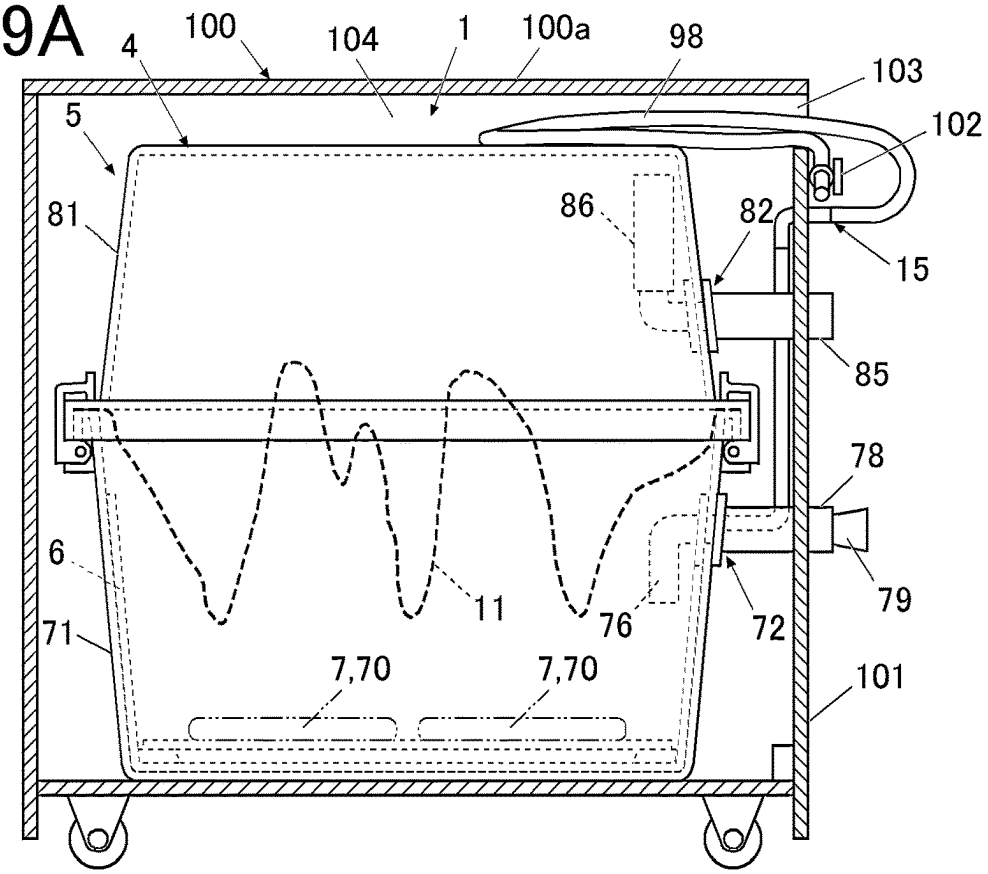


FIG.19B

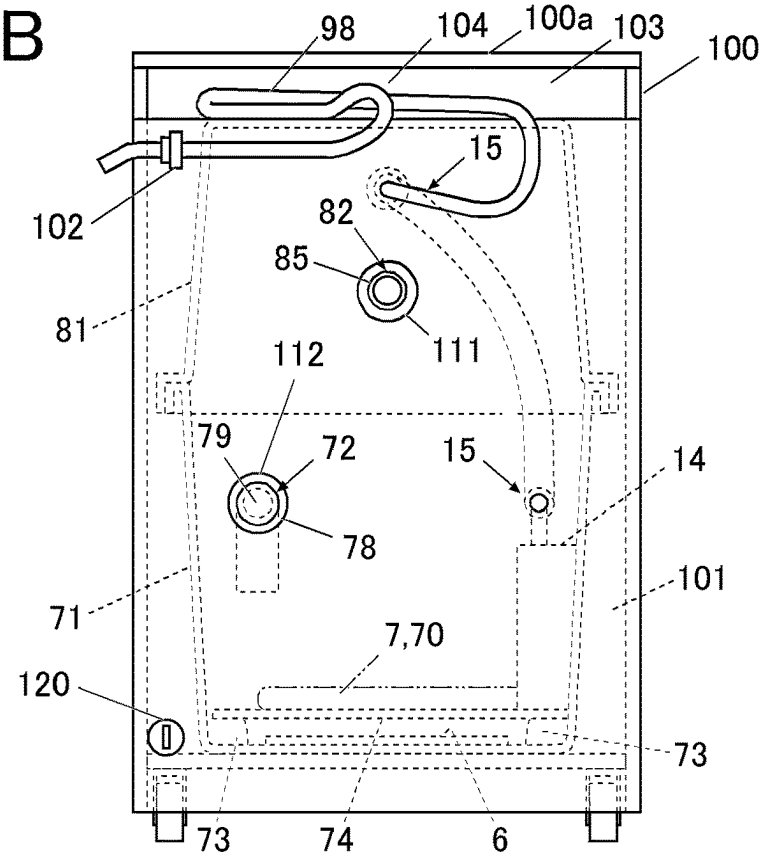


FIG.20A

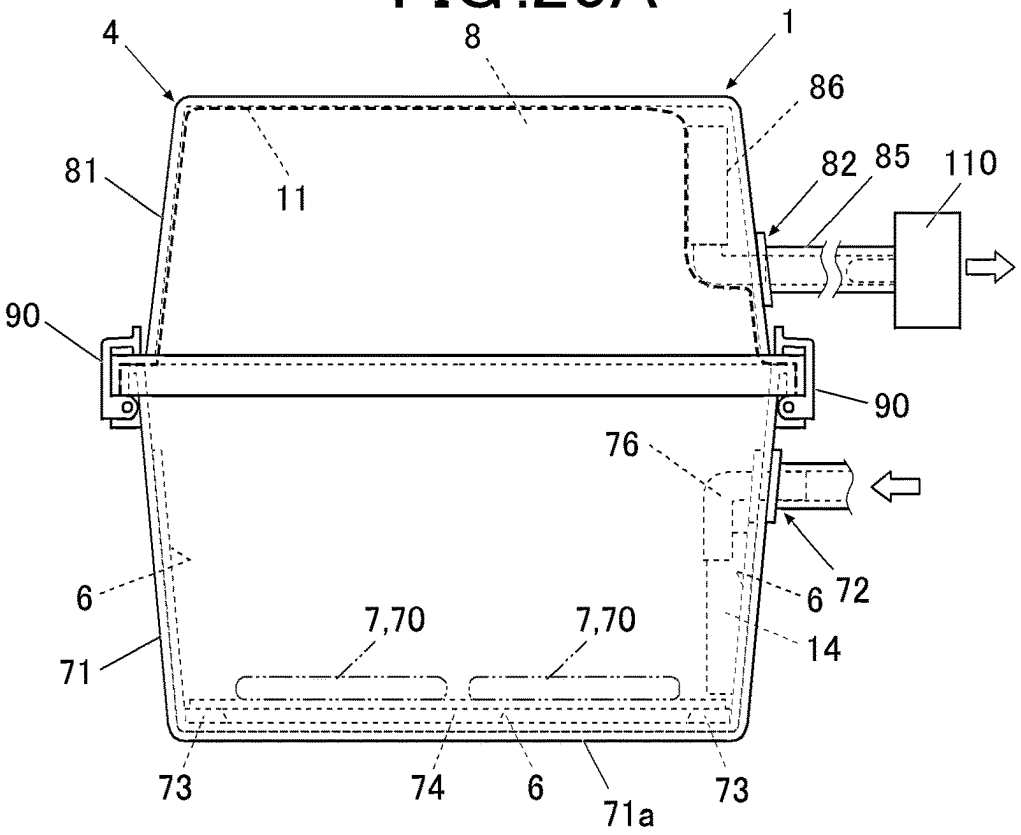
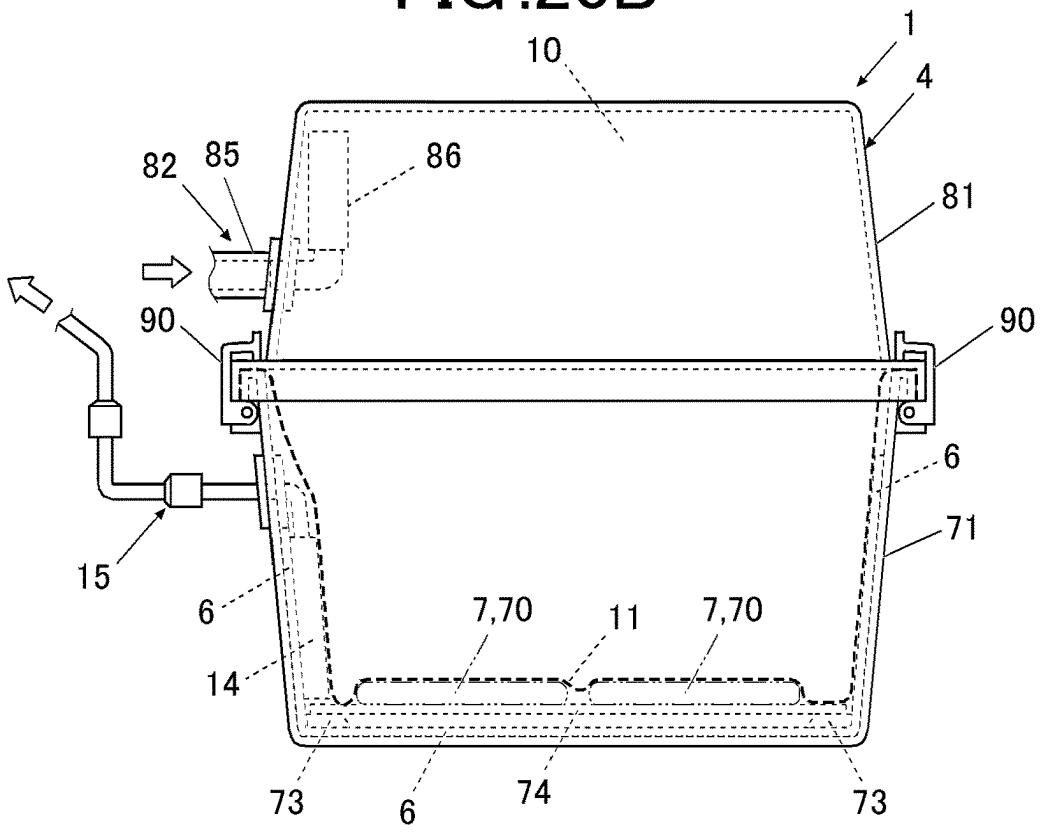


FIG.20B



RADON INHALATION DEVICE

TECHNICAL FIELD

[0001] The present invention relates to a radon inhalation device that allows users to efficiently inhale radon, which offers similar effects with those of a radon hot spring cure.

BACKGROUND ART

[0002] Conventionally in Japan, therapeutic effects on various diseases of Miasa hot springs and Tamagawa hot springs, famous as radon hot springs, have been widely known. In Austria and Germany, radon inhalation therapy is recognized as a medical treatment for nerve pain, peripheral circulatory disturbance, and the like. Various devices have been proposed in light of the advantageous effects of hot springs containing radiation decay products such as radon.

[0003] For example, in a radon inhalation device that has been known, ores containing radioactive materials are stored in a bottomed cylindrical container sealed at its opening with a lid equipped with an air supply tube through which external air is taken into the container, and users can inhale radon emitted from the radioactive ores inside the container with the inhalation tube attached to the lid (see Patent Document 1).

CITATION LIST

Patent Literature

[0004] Patent Document 1: Japanese Unexamined Patent Application Publication No. 2007-313274

SUMMARY OF INVENTION

Technical Problem

[0005] Such a conventional radon inhalation device has a problem that users cannot inhale radon at a desired concentration (a concentration required to gain therapeutic effects similar to those of radon hot springs) when it is used in an environment having low surrounding atmospheric temperature.

[0006] Therefore, the purpose of the present invention is to provide a radon inhalation device that allows users to inhale radon at a stable concentration regardless of the surrounding atmospheric temperature to gain effects similar to those of radon hot spring.

Solution to Problem

[0007] A radon inhalation device according to the present invention comprising: a radon generation container for producing radon; and a heater that heats an inside of the radon generation container,

[0008] wherein the radon generation container includes: a container main body an inside of which is divided into a radon reservoir and an external air opening chamber by a bag; a radioactive material containing ore stored inside the radon reservoir; and a radon extractor that communicates with an inside of the radon reservoir and an outside of the container main body,

[0009] wherein when the bag is deformed to increase a volume of the radon reservoir, the radon extractor can introduce external air to the radon reservoir, and when gas in an internal space is suctioned from the outside of the container main body, the radon extractor releases radon inside the radon reservoir to the outside of the container main body.

Advantageous Effects of Invention

[0010] According to the present invention, the inside of the radon generation container can be heated with a heater to a temperature appropriate for radon production, users can inhale radon at a stable concentration regardless of the surrounding atmospheric temperature to gain effects similar to those of radon hot spring.

BRIEF DESCRIPTION OF DRAWINGS

[0011] FIG. **1** is an external perspective view of a hot spring cure box storing therein a radon inhalation device according to a first embodiment of the present invention.

[0012] FIG. **2**A is a diagram showing a radon inhalation device according to the first embodiment of the present invention, a plan view of a radon inhalation device **1**.

[0013] FIG. **2**B is a diagram showing the radon inhalation device according to the first embodiment of the present invention, a plan view of the radon inhalation device **1**.

[0014] FIG. **2**C is a diagram showing the radon inhalation device according to the first embodiment of the present invention, a right lateral view showing a container main body **4** of the radon inhalation device **1** partially cut out.

[0015] FIG. **2**D is a diagram showing the radon inhalation device according to the first embodiment of the present invention, an enlarged view of a part of the radon inhalation device **1** shown in FIG. **2**C.

[0016] FIG. **3**A is a diagram showing a radon extractor used in the radon inhalation device, a plan view of a radon extractor **14**.

[0017] FIG. **3**B is a diagram showing the radon extractor used in the radon inhalation device, a frontal view of the radon extractor **14**.

[0018] FIG. **3**C is a diagram showing the radon extractor used in the radon inhalation device, a right lateral view of the radon extractor **14**.

[0019] FIG. **3**D is a diagram showing the radon extractor used in the radon inhalation device, an enlarged cross-sectional view of the radon extractor **14** of FIG. **3**B cut out along a line A**1**-A**1**.

[0020] FIG. **4**A is an exploded view of the radon extractor.

[0021] FIG. **4**B is an exploded view of the radon extractor.

[0022] FIG. **4**C is an exploded view of the radon extractor.

[0023] FIG. **4**D is an exploded view of the radon extractor.

[0024] FIG. **4**E is an exploded view of the radon extractor.

[0025] FIG. **5**A shows a first use state of the radon inhalation device, which is a state of use of the radon inhalation device **1** before radon inhalation.

[0026] FIG. **5**B shows the first use state of the radon inhalation device, which is a state of use of the radon inhalation device **1** during radon inhalation.

[0027] FIG. **6** shows a second use state of the radon inhalation device.

[0028] FIG. **7**A shows a third use state of the radon inhalation device, which is a state of use of the radon inhalation device **1** before introduction of external air.

[0029] FIG. **7**B shows the third use state of the radon inhalation device, which is a state of use of the radon inhalation device **1** during introduction of external air.

[0030] FIG. **8** is a fourth use state of the radon inhalation device.

[0031] FIG. **9**A shows a state of a bag storing radioactive containing ores in a powdered form to be placed in the radon inhalation device, and is a plan view thereof.

[0032] FIG. **9**B shows a state of a bag storing radioactive containing ores in a powdered form to be placed in the radon inhalation device, and is a cross-sectional view of the bag cut out along a line A**2**-A**2** of FIG. **9**A.

[0033] FIG. **10** is a diagram explaining a variation of the radon inhalation device.

[0034] FIG. **11** shows a variation of the first embodiment.

[0035] FIG. **12** is a diagram showing the radon inhalation device according to the second embodiment of the present invention, and shows the container main body partially cut out.

[0036] FIG. **13**A shows the sixth embodiment of the radon inhalation device.

[0037] FIG. **13**B is the sixth embodiment of the radon inhalation device.

[0038] FIG. **14** is a cross-sectional view of the bag sandwiched between a lower case member and an upper case member.

[0039] FIG. **15** is a plan view of the lower casing member from above.

[0040] FIG. **16** shows a configuration of a gas channel.

[0041] FIG. **17** shows a configuration of an external air introduction channel.

[0042] FIG. **18** shows a configuration of an air suction channel.

[0043] FIG. **19**A shows the radon inhalation device installed in a cabinet.

[0044] FIG. **19**B shows a diagram of the radon inhalation device installed in the cabinet.

[0045] FIG. **20**A shows a diagram of a case which is almost entirely filled with a radon reservoir **8**.

[0046] FIG. **20**B shows a diagram of the case which is almost entirely filled with an external air opening chamber **10**.

DESCRIPTION OF EMBODIMENTS

[0047] Hereinafter, embodiments of the present invention are described in detail with reference to the drawings.

First Embodiment

[0048] FIG. **1** is a diagram of a hot spring cure box **3** configured with a radon inhalation device **1** stored in a rectangular-parallelepiped box **2** according to a first embodiment of the present invention, and is an external perspective view of the hot spring cure box **3** shown by removing a top panel **2***a* of the box **2**. As shown in FIG. **1**, the radon inhalation device **1** according to the present embodiment can be reserved and transported in a state stored in the box **2**, and can be used with the top panel **2***a* of the box **2** being removed. The radon inhalation device **1** according to the present embodiment can be used, reserved, and transported in a state removed from the box **2**. The box **2** is mainly made of wood but is not limited thereto. Plastics, metals or the like may be appropriately used.

[0049] FIGS. **2**A to **2**D show the radon inhalation device **1** according to the first embodiment of the present invention. FIG. **2**A is a plan view of the radon inhalation device **1**. FIG. **2**B is a frontal view of the radon inhalation device **1**. FIG. **2**C is a right lateral view of a container main body **4** of the radon inhalation device **1** partially cut out. FIG. **2**D is an enlarged view of a part of the radon inhalation device **1** shown in FIG. **2**C.

[0050] As shown in FIGS. **2**A and **2**B, the radon inhalation device **1** includes a radon generation container **5** and a heater **6** that heats the inside of the radon generation container **5**. The radon generation container **5** includes: the container main body **4** storing radioactive material containing ores **7** (e.g., dried radium ores) and the heater **6**; a bag **11** that divides the inside of the container main body **4** into the radon reservoir **8** and the external air opening chamber **10**; a bag fixer **13** that is removably attached to an opening **12** of the container main body **4**; a radon introducer **14** that communicates with the radon reservoir **8** and the outside of the container main body **4**; a gas channel **15** that is attached to the radon extractor **14**; and a valve **16** that opens and closes the gas channel **15**.

[0051] The container main body **4** includes a bottomed cylindrical part **17** in a rectangular parallelepiped shape and the opening **12** formed integrally with the bottomed cylindrical part **17**. A bottom circumferential groove **18** is formed along the circumferential rim of the bottom of the bottomed cylindrical part **17**. The bag fixer **13** that fixes an opening end **11***a* of the bag **11** is removably attached to the opening **12**. The bag fixer **13** includes an inner fixture **20** and an outer fixture **21**. The inner fixture **20** fixes the opening end **11***a* of the bag **11** to the opening **12**, as the outer circumference **20***b* of the inner fixture **20** is removably fitted to the inner surface of the opening **12** of the container main body **4** with a collar **20***a* being hooked on the end face of the opening **12** of the container main body **4** and the opening end **11***a* side of the bag **11** is sandwiched between the end face and the inner surface of the opening **12**. The outer fixture **21** fixes the inner fixture **20** and the opening end **11***a* side of the bag **11** to the container main body **4** as a female thread formed on the inner circumference of the outer fixture **21** is screwed to a male thread formed on the outer circumference of the opening **12** and the collar **20***a* of the inner fixture **20** and the opening end **11***a* side of the bag **11** are tacked to the end face of the opening **12**. The inner fixture **20** and the outer fixture **21** of the bag fixer **13** have an operation hole **22** with the same diameter opening concentrically with the opening **12** of the container main body **4**.

[0052] As shown in FIG. **2**A, a heater (panel heater) **6** in a sheet form, which stretches over the adjacent walls of the container main body **4**, is stored inside the container main body **4**. The heater **6**, which is flexibly deformable, is inserted inside the container main body **4** from the opening **12** of the container main body **4** and placed such that the center of the heater **6** is positioned at a corner where the radon extractor **14** is placed. The heater **6** is connected to an external power source via an energizing cable **23** and generates heat by being energized when a power switch **24** is turned on to heat the inside of the container main body **4**. The heater **6** is not limited to the panel heater that is stored inside the container main body **4** as in the present embodiment. The heater **6** may be any heater that can heat the inside of the radon generation container **5**, and may be a heater placed outside of the radon generation container **5**.

[0053] As shown in FIG. **2**C, the bag **11** is formed of a thin-film synthetic resin or thin-film rubber so that it can be deformed easily, and is in a bottomed cylindrical shape with an opening end **11***a*. The bag **11** is fixed to the opening **12**

of the container main body **4** with the opening end **11***a* being open to divide the inside of the container main body **4** into the radon reservoir **8** and the external air opening chamber **10**. That is, in FIGS. **2**C and **2**D, the bag **11**, fixed to the opening **12** of the container main body **4**, forms the radon reservoir **8** between its outer circumference of the bag **11** and the inner side of the container main body **4** and forms the external air opening chamber **10** on its inner surface side. The bag **11** is preferably transparent so that other contents in the container main body **4** (e.g., the heater **6**, the radon extractor **14**) can be observed through the operation hole **22** of the bag fixer **13**.

[0054] FIGS. **3**A to **3**D show the radon extractor **14** constituting the radon inhalation device **1** according to the first embodiment of the present invention. FIG. **3**A is a plan view of the radon extractor **14**. FIG. **3**B is a frontal view of the radon extractor **14**. FIG. **3**C is a right lateral view of the radon extractor **14**. FIG. **3**D is an enlarged cross-sectional view of the radon extractor **14** of FIG. **3**B cut out along a line A**1**-A**1**.

[0055] As shown in FIGS. **2**A to **2**D and **3**A to **3**D, the radon extractor **14** is placed inside the container main body **4** at the corner **25** where the heater **6** is installed, and is substantially in an isosceles right-angled triangle in a plan view. The radon extractor **14** includes parallel channels **26**, **27**. The parallel channels **26**, **27** of the radon extractor **14** is formed of a center channel **26** and a pair of the side channels **27**, **27** positioned on both sides of the center channel **26**, and the lower part of the center **26** and the lower part of the pair of the side channels **27**, **27** communicate with each other via the connection port **28**. The center channel **26** communicates with the outside of the container main body **4** via the gas channel **15** attached to a gas channel attachment hole **31** formed at a top **30** of the radon extractor **14**. The pair of the side channels **27**, **27** respectively communicate with the radon reservoir **8** via vents **32**, **33**.

[0056] As shown in FIG. **3**A to **3**D, in the radon extractor **14**, the liquid level of a liquid **34** is above the connection port **28** in a normal state (when there is no difference between the inside pressure of the radon reservoir **8** and the outer pressure of the container main body **4**) and the liquid level of the center channel **26** and the liquid level of the pair of the side channels **27**, **27** are the same, as the liquid **34** is stored in the lower part of the parallel channels (the center channel **26** and the pair of the side channels **27**, **27**). The connection port **28** is thus blocked by the liquid **34** (see FIGS. **5**A and **7**A). Filtering gravel **35** is stored at the lower part of the center channel **26** in the radon extractor **14** (see FIGS. **5**A, **5**B, **7**A, and **7**B). The liquid **34** stored inside the radon extractor **14** may be water, but is preferably a liquid with a color such as green tea, because the remaining amount can be easily checked and has a sterilizing effect.

[0057] As shown in FIGS. **3**B and **3**C, in the radon extractor **14**, splash prevention walls **36**, **37** that prevent splashing are formed obliquely downward at the upper part of the center channel **26** and the upper part of the pair of the side channels **27**, **27**, and a gap **40** is formed between each end of the splash prevention walls **36**, **37** and a channel wall **38**.

[0058] As shown in FIGS. **3**B and **3**C, the radon extractor **14** has a pair of support protrusions **41**, **41** formed on the lower surface, and is supported in a state positioned at the corner **25** inside the container main body **4** with the pair of the support protrusions **41**, **41** being engaged with the bottom circumferential groove **18** of the container main body **4**.

[0059] FIGS. **4**A to **4**E are exploded views of the radon extractor **14**. As shown in FIGS. **4**A to **4**E, the radon extractor **14** includes a shell **42**, a substantially plate-shaped frontal wall **43** that blocks the frontal face of the shell **42**, and a bottomed cylindrical bottom lid member **44** that fits to the lower end of the shell **42** and the frontal wall **43**. In the radon extractor **14**, a pair of tongue-shaped first engaging protrusions **45** at the upper part of the frontal wall **43** is fitted to a pair of first catching holes **46** formed at the upper part of the shell **42**, and a plurality of second engaging protrusions **47** formed along the both end peripheries of the frontal wall **43** is fitted to a plurality of second catching holes **48** formed along the lateral rim of the shell **42** (in the same number as the second engaging protrusions **47**). The hooks **50** of the second engaging protrusions **47** are thereby hooked on opening edges **51** of the second catching holes **48** and the shell **42** and the frontal wall **43** are attach/detachably (separably) integrated by the elastic force of the second engaging protrusions **47**. In this state, in the radon extractor **14**, the end face of the channel wall **38** dividing the center channel **26** and the side channels **27** of the shell **42** is in contact with the inner surface of the frontal wall **43** and the center channel **26** and the side channels **27** are separated by the channel wall **38** and the frontal wall **43**. The radon extractor **14** is assembled with the shell **42** and the frontal wall **43**. In the state where the radon extractor **14** before the bottom lid member **44** is assembled to the shell **42** and the frontal wall **43**, the pair of the channel walls **38**, **38** protrudes (is exposed) downward from the shell **42** and the frontal wall **43**.

[0060] As shown in FIGS. **4**A to **4**E, the radon extractor **14** is sealed with the bottom lid member **44** on the lower side of the shell **42** and the frontal wall **43** as the opening end **52** side of the bottom lid member **44** is fitted to thin-walled parts **53**, **54** on the lower side of the shell **42** and the frontal wall **43**. In the radon extractor **14**, a part of the end face of the pair of the channel walls **38**, **38** which protrudes downward from the shell **42** and the frontal wall **43** is in contact with the inside of the bottom lid member **44**, which makes it possible to suppress gas flow between the center channel **26** and the side channel **27** except through the connection port **28**.

[0061] As shown in FIGS. **2**A to **2**C, the gas channel **15** includes: an L-shaped elbow tube **56** attached with a bushing **55** bridged over both the gas channel attachment hole **31** formed at a top part **30** of the radon extractor **14** and a through hole (not shown) formed at a position aligning with the gas channel attachment hole **31** in an upper wall part **64** of the container main body **4**; an elastically deformable tube **57** connected to the elbow tube **56**; and a suction member **58** removably fitted to the end of the tube **57**. The simple valve **16** for opening/closing the channel is attached to the gas channel **15** on the end side of the tube **57**, and the circulation of the gas in the flow path (the tube **57**) is stopped by closure of the valve **16** and the circulation of the gas in the flow path (the tube **57**) is enabled by opening of the valve **16**. The bushing **55**, which is attached to the corner part of the upper wall part **64** of the container main body **4**, causes the periphery of the gas channel attachment hole **31** of the radon extractor **14** to adhere to the periphery of the through hole on the container main body **4** and blocks the gap between the

elbow tube **56** and the container main body **4** to prevent the gas in the container main body **4** from leaking to the outside of the container main body **4**.

[0062] FIGS. **5**A and **5**B show a first use state of the radon inhalation device **1** according to the present embodiment. FIG. **5**A shows the state of use of the radon inhalation device **1** before radon inhalation. FIG. **5**B shows a state of use of the radon inhalation device **1** during radon inhalation.

[0063] As shown in FIGS. **2**A to **2**D and **5**A, in the radon inhalation device **1**, the inside of the container main body **4** is heated by the heater **6**, which causes part of the liquid **34** in the radon extractor **14** to become water vapor, raising the humidity in the radon reservoir **8**. The radon released from the radioactive material containing ores **7** thereby accumulates in the radon reservoir **8**. Then, in the radon inhalation device **1**, as shown in FIGS. **2**A to **2**D and **5**B, as a user inhales the gas in an internal space **39** of the center channel **26** in the radon extractor **14** via the gas channel **15**: the liquid level of the center channel **26** rises; the liquid level of the pair of the side channels **27**, **27** falls to a level a little lower than the upper edge of the connection port **28**; when a small gap appears between the liquid surface of the pair of the side channels **27**, **27** and the upper edge of the connection port **28**, a pressure rapidly falls at a part between the liquid **34** lifted in the center channel **26** and the liquid **34** remaining on the bottom side of the radon extractor **14**; the surrounding gas rapidly flows into the part where the pressure rapidly falls; and the gas rapidly flows into the liquid **34** in the center channel **26** like being blown. As a result, in the radon inhalation device **1**, the gas containing the radon passes through the liquid **34** in the center channel **26** of the radon extractor **14** as bubbles, and is discharged at the top of the liquid **34** of the center channel **26** like popping. At this time, the liquid splashing on the liquid surface hits the liquid splash prevention wall **36** of the center channel **26** and falls, and therefore it does not flow into the gas channel **15**. In the radon inhalation device **1**, the gas containing radon passes through the gap between the liquid splash prevention wall **36** and the channel wall **38**, and a user inhales the gas containing radon via the gas channel **15**. At this time, unwanted materials such as minute particle in the gas passing through the liquid **34** in the center channel **26** are trapped in the liquid **34**.

[0064] FIG. **6** shows a second use state of the radon inhalation device **1** with the container main body **4** partially cut out. As shown in FIG. **6**, in the radon inhalation device **1**, in a case where the gas inside the radon reservoir **8** decreases and the volume of the radon reservoir **8** divided by the bag **11** decreases (if the bag **11** is deformed as shown in two dotted line), as the user inserts their hand through the operation hole **22** of the bag fixer **13** fixed to the opening **12** of the container main body **4** (see FIGS. **2**A to **2**D) and lifts the bag **11** holding its operation part **60**, the volume of the radon reservoir **8** rapidly increases and the pressure inside the radon reservoir **8** rapidly decreases. As a result, in the radon inhalation device **1**, the liquid **34** in the side channels **27** of the radon extractor **14** rapidly rises and the liquid **34** in the center channel **26** of the radon extractor **14** rapidly falls (see FIG. **7**B).

[0065] FIGS. **7**A and **7**B show a third use state of the radon inhalation device **1** according to the present embodiment. FIG. **7**A shows the state of use of the radon inhalation device **1** before introduction of external air. FIG. **7**B shows a state of use of the radon inhalation device **1** during introduction of external air.

[0066] As shown in FIGS. **7**A and **7**B, in the radon inhalation device **1**, as the lower level of the liquid **34** inside the center channel **26** of the radon extractor **14** moves to the upper edge of the connection port **28** and a small gap appears between the lower level of the liquid **34** and the liquid **34** remaining on the bottom side of the radon extractor **14**, the pressure rapidly decreases at the gap and the gas in the center channel **26** flows into the liquid **34** in the side channels **27** through the connection port **28** like being blown. The gas flowing into the side channels **27** like being blown rises through the liquid **34** in the side channel **27** as bubbles, and is discharged at the top of the liquid **34** of the side channels **27** like popping. At this time, the liquid **34** splashing on the liquid surface hits the liquid splash prevention wall **37** of the side channel **27**, being prevented from flowing into the radon reservoir **8** (see FIGS. **3**B and **3**C). The radon inhalation device **1** is not limited to the embodiment shown in FIGS. **3**B and **7**B, and the vents **33** of the side channels **27** may be omitted. The radon inhalation device **1** is not limited to the embodiment shown in FIGS. **3**B and **7**B, and the liquid splash prevention wall **37** may be equipped at a part lower than the vents **33** which are positioned at the lowest part of the side channels **27**.

[0067] FIG. **8** shows a fourth use state of the radon inhalation device **1** according to the present embodiment with the container main body **4** partially cut out.

[0068] As shown in FIG. **8**, in a state where the radon inhalation device **1** has finished introducing external air into the radon reservoir **8**, the bag **11** is pushed to the vicinity of the opening **12** of the container main body **4**, being squeezed by the introduced external air and most of the inside of the container main body **4** becomes the radon reservoir **8**. In the radon inhalation device **1**, when the radon is reserved in the radon reservoir **8**, the valve **16** of the gas channel **15** is closed and the circulation of the gas inside the gas channel **15** is blocked (see FIG. **2**A). A lid member **61** is preferably engaged to the operation hole **22** of the inner fixture **20** and the outer fixture **21** of the bag fixer **13** attached to the opening **12** of the container main body **4** to prevent foreign materials from falling inside the container main body **4** (see FIG. **2**D).

[0069] In the state shown in FIG. **8** of the radon inhalation device **1**, the inside of the container main body **4** is heated by the heater **6**, the vapor generated from the liquid **34** inside the radon extractor **14** flows into the radon reservoir **8**. And when the temperature and humidity inside the radon reservoir **8** get appropriate, the radon is effectively released from the radioactive material containing ores **7** to the radon reservoir **8**.

[0070] In the radon inhalation device **1** according to the present invention described above, as the inside of the radon generation container **5** can be heated with the heater **6** to reach the temperature appropriate for radon production, users can inhale radon at any time at a stable concentration regardless of the surrounding atmospheric temperature to gain effects similar to those of radon hot spring.

[0071] As shown in FIGS. **5**B and **7**B, in the radon inhalation device **1** according to the present embodiment, as the filtering gravel **35** is stored at the lower part of the center channel **26** of the radon extractor **14**, the bubbles passing through the liquid in the center channel **26** can be prevented

from getting bigger by the filtering gravels **35**, which further suppress liquid splash. In the radon inhalation device **1** according to the present embodiment, what is stored at the lower part of the center channel **26** is not limited to the filtering gravel **35**, and may be anything that is expected to have the same effects as the filtering gravel **35**, such as a stainless steel brush, for example.

[0072] In the radon inhalation device **1** according to the present embodiment, as shown in FIG. **5**B, the liquid splashes when bubbles of the gas passing through the liquid in the center channel **26** are collapsed on the liquid surface, but the liquid splashing on the liquid surface hits the liquid splash prevention wall **36**, being prevented from flowing into the gas channel **15**.

[0073] In the radon inhalation device **1** according to the present embodiment, the pair of the side channels **27**, **27** is formed in the radon extractor **14**, but the present invention is not limited to this example, and one of the side channels **27**, **27** may be omitted.

[0074] In the present embodiment, as unwanted materials such as minute particles are trapped by the liquid **34**, there is not much necessity for a filter, but in order to improve the effectiveness of trapping unwanted materials, a filter may be provided in the radon extractor **14** or/and the gas channel **15** as necessary.

Variation 1 of First Embodiment

[0075] As shown in FIG. **2**A, in the radon inhalation device **1**, an external air intake **65** through which the inside of the radon reservoir **8** and the outside of the container main body **4** communicate is formed on the upper wall part **64** pf the container main body **4** surrounding the opening **12** of the container main body **4**. The external air intake **65** is positioned at the corner part of the upper wall part **64** of the container main body **4** facing the bushing **55**, and is blocked and opened with a stopper **66** (e.g., rubber stopper, plastic stopper) being fitted thereto and being removed therefrom.

[0076] In the radon inhalation device **1** according to the present variation, as shown in FIGS. **6** and **7**B, in a case where external air is to be introduced into the radon reservoir **8** of the container main body **4**, external air can be introduced into the radon reservoir **8** more easily and in a shorter time the external air intake **65** when the stopper **66** is removed from the external air intake **65** and the external air intake **65** is opened in comparison to when external air is introduced into the radon reservoir **8** through the gas channel **15** and the radon extractor **14** only, because external air can be introduced into the radon reservoir **8** through the gas channel **15** and the radon extractor plus the external air intake **65**.

[0077] The radon inhalation device **1** according to the present variation, the amount of external air introduced via the radon extractor **14** can be suppressed, and liquid splashing on the liquid surface of the side channels **27** can thereby be suppressed (see FIG. **7**B).

[0078] In the radon inhalation device **1** according to the present variation, after external air is introduced to the radon reservoir **8**, the external air intake **65** is blocked by the stopper **66**.

Variation 2 of First Embodiment

[0079] In the radon inhalation device **1** according to the first embodiment, the radioactive material containing ores **7** are directly spread inside the radon generation container **5**, but the radioactive material containing ores **7** are preferably powdered so that radon is effectively released for the surface area of the radioactive material containing ores **7** to be enlarged. In a case where the radioactive material containing ores **7** are powdered, radon can be effectively released to the radon reservoir **8**, but the powders easily enter the radon extractor **14**. Therefore, as shown in FIGS. **9**A and **9**B, the powdered radioactive containing ores **7** are preferably put into a bag **70** made of non-woven fabric or the like to be stored in the radon reservoir **8**.

Variation 3 of First Embodiment

[0080] In the first embodiment, the gas channel **15** attached to the radon extractor **14** is equipped with the valve **16** to open/close it, and a filter is provided as necessary in the radon extractor **14** and/or the gas channel **15**. However, when the gas containing radon is inhaled from a radon extractor **62** via the gas channel **15**, the valve **16** and a filter may easily act as a ventilation resistance. Thus, for those with weak inhalation, there will be a concern that the gas containing radon cannot be inhaled sufficiently.

[0081] Accordingly, the radon extractor **14** and the gas channel **15** connected thereto according to the first embodiment are not necessarily equipped with a valve or a filter so that a ventilation resistance is reduced as much as possible. Even if a valve and a filter are omitted and the gas channel **15** is left open, the radon extractor **14** stores the liquid **34** inside and this stored liquid **34** seals the part between the flow path to the radon reservoir **8** and the flow path to the gas channel **15**. Thus, there will not be a problem that the gas containing radon leaks through the gas channel **15**.

Variation 4 of First Embodiment

[0082] Further, the filtering gravel **35** stored in the radon extractor **14** shown in FIGS. **5**A, **5**B, **7**A, and **7**B may be omitted as shown in FIG. **10** to reduce a ventilation resistance of the gas containing radon. In a case where the filtering gravel **35** is omitted, bubbles passing through the liquid may get bigger and splash more easily, but it is easier to inhale the gas containing radon with water vapor and take radon deep inside the human body.

Variation 5 of First Embodiment

[0083] As shown in FIG. **11**, the gas channel **15** may be equipped with a joint tube **19** instead of the valve **16**, and through the joint tube **19** the suction member **58** may be detachably installed. Assuming that the suction member **58** is frequently replaced, the suction member **58** should be easily replaced using the joint tube **19** provided at the end of the gas channel **15** and connected to the suction member **58** in an easily attachable/detachable manner.

Second Embodiment

[0084] FIG. **12** shows the radon inhalation device **1** according to a second embodiment of the present invention with the container main body **4** partially cut out. In the radon inhalation device **1** according to the present embodiment shown in FIG. **9**, the components common to the radon inhalation device **1** according to the first embodiment shown in FIG. **2**C are omitted as appropriate. The common components have the same reference signs to those of the radon inhalation device **1** according to the first embodiment shown

in FIG. **2**C, and the description overlapping with that of the radon inhalation device **1** in the first embodiment is omitted.

[0085] As shown in FIG. **12**, in the radon inhalation device **1** according to the present embodiment, the radon extractor **62** is different from the radon extractor **14** in the radon inhalation device **1** according to the first embodiment.

[0086] The radon extractor **62** in the radon inhalation device **1** according to the present embodiment is a cylindrical body with its tip branched into two, and is equipped with a filter **63** at its upper part connected to the gas channel **15**. In this radon inhalation device **1**, when the user inhales the gas containing radon inside the radon reservoir **8** via the gas channel **15**, unwanted materials are filtered out by the filter **63**.

[0087] The radon inhalation device described above according to the present embodiment has similar effects as those of the radon inhalation device according to First Embodiment.

Third Embodiment

[0088] The radon inhalation device **1** according to the first and second embodiments has the heater **6** that heats the inside of the radon generation container **5** placed inside the container main body **4** for example, but is not limited thereto. The inside of the radon generation container **5** may be heated by a heater placed outside the radon generation container **5** (e.g., in the box **2**, the lower side of the exterior of the container main body **4** or the lateral side of the exterior of the container main body **4**).

Fourth Embodiment

[0089] lighting means (e.g., LED lighting device) for visually checking the remaining amount of the liquid **34** in the radon extractor **14**, the state of the filtering gravel **35**, the state of the radioactive material containing ores **7**, and the like may be provided inside the container main body **4**.

[0090] The lighting means can be attached at a position facing the radon extractor **14** at substantially the center of the inside of the container main body **4**.

Fifth Embodiment

[0091] In the radon inhalation device **1** according to the first embodiment, the center channel **26** is connected to the gas channel **15** so that the side channels **27** communicate with the radon reservoir **8**, but the configuration is not limited to this. The side channels **27** may be connected to the gas channel **15** so that the center channel **26** communicates with the radon reservoir **8**. In this embodiment, the vents **32**, **33** are formed in the center channel **26** and not in the side channels **27**. Furthermore, in this embodiment, the filtering gravel **35** is preferably positioned at the lower part of the side channels **27**.

Sixth Embodiment

[0092] In the configurations described above, the radon inhalation device **1** with a small capacity (e.g., a device with a capacity of the radon generation container **5** of 5 L) is assumed as an example. However, in the radon inhalation device **1** with a large capacity, in the radon inhalation device **1** with a capacity of the radon generation device **5** of 50 L, for example, the bag **11** gets larger. When the capacity of the radon reservoir **8** divided by the bag **11** is reduced, it is hard for the user to lift the bag **11** by inserting the hand into the container main body **4**. In a case where the radon inhalation device **1** is installed in a commercial facility, a hotel, or the like, it is undesirable that the inside of the radon inhalation device **1** is not operated by a number of unspecified users.

[0093] As shown in FIGS. **13**A and **13**B, it is preferable that the gas in the external air opening chamber **10** is suctioned by an air suction machine **110** to depressurize the external air opening chamber **10** to lift the bag **11** so that the capacity of the radon reservoir **8** may be increased without operating the bag **11** by a user inserting the hand therein.

[0094] Specifically, the radon generation container **5** includes: the container main body **4** formed with a lower case member **71** storing therein the radioactive material containing ores **7** (e.g., dried radium ores or the like powdered and stored in the bag **70** made of a non-woven fabric), the heater **6**, and the like, and an upper case member **81** as a cover member removably attached to the lower case member **71**; the bag **11** dividing the space inside the container main body **4** (the space surrounded by the lower case member **71** and the upper case member **81**) into the radon reservoir **8** and the external air opening chamber **10**; the radon extractor **14** that communicates with the radon reservoir **8** and the outside of the container main body **4**; the gas channel **15** attached to the radon extractor **14**; an air suction channel **82** to which the air suction machine **110** suctioning the air in the external air opening chamber **10** is attachable; and an external air introducing channel **72** that can introduce external air to the radon reservoir **8**.

[0095] The lower case member **71** is formed in a substantially rectangular parallelepiped shape with an open top, and the upper case member **81** is formed in a substantially rectangular parallelepiped shape with an open bottom. The lower case member **71** and the upper case member **81** are assembled with their respective open ends facing each other to form the container main body **4**. The lower case member **71** and the upper case member **81** are preferably made of a transparent or translucent material so that the inside is visible. A locking mechanism **90** of a buckle or the like is preferably provided to fix the state where the lower case member **71** is assembled to the upper case member **81**.

[0096] The bag **11** is preferably made of a synthetic resin or thin-film rubber, similarly to the former embodiments, so that it can be easily deformed, and is in a bottomed cylindrical shape. As the bag **11** is fixed with its opening end being open between the upper opening of the lower case member **71** and the lower opening of the upper case member **81**, the space surrounded by the lower case member **71** and the upper case member **81** is divided into the radon reservoir **8** and the external air opening chamber **10**.

[0097] That is, as shown in FIG. **14**, the periphery of the opening end of the bag **11** is tucked between a male flange **71***f* formed protruding outward at the periphery of the upper opening of the lower case member **71** and a female flange **81***f* formed protruding outward at the periphery of the lower end of the upper case member **81** to be fitted to the male flange **71***f*, and in order to maintain this state, the lower case member **71** and the upper case member **81** are locked with the lock mechanism **90**. Further, the radon reservoir **8** is formed between the inner surface of the lower case member **71** and the bag **11** (at a part lower than the bag **11** in the space surrounded by the lower case member **71** and the upper case member **81**), and the external air opening chamber **10** is formed between the inside of the upper case member **81** and

the bag **11** (at a part upper than the bag **11** in the space surrounded by the lower case member **71** and the upper case member **81**).

[0098] The bag **11** can be shifted vertically by the part sandwiched between the male flange **71***f* and the female flange **81***f*, as the bag **11** is shifted from the state in which its bottom is brought to the inner bottom wall of the lower case member **71** or the vicinity thereof to the state in which its bottom is brought to the inner top wall of the upper case member **81** or the vicinity thereof. That is, the bag **11** can be moved inside the case to cause the inside of the case to be almost entirely the external air opening chamber **10** (the state shown in FIG. **20**B described later) and cause the inside of the case to be almost entirely the radon reservoir **8** (the state shown in FIG. **20**A described later).

[0099] As shown in FIG. **15**, the lower case member **71** includes a protrusion **73** protruding upward at the four corners of a bottom wall **71***a*, and is provided with a heater (panel heater) **6** in a sheet form of a predetermined width on the inner surface of the pair of lateral walls **71***b*, **71***c* facing each other and on the upper surface of the bottom wall **71***a*, the heater avoiding the protrusion **73**. As described above, with the heater **6** placed from the inner surface of one of the pair of lateral walls **71***b*, **71***c* facing each other to the inner surface of the other one of the pair of lateral walls **71***b*, **71***c* facing each other via the upper surface of the bottom wall **71***a* (as the heater is installed on the three sides of the lower case member **71** of: the inner surfaces of the lateral walls **71***b*, **71***c*; and the upper surface of the bottom wall **71***a*), even when the container main body **4** with a large capacity is used, the entire inside of the container can be evenly and effectively heated and temperature unevenness in the container is not easily caused by the surrounding atmospheric temperature. As a result, radon at a stable concentration can be provided at any time regardless of the surrounding atmospheric temperature.

[0100] An aluminum plate **74** (shown by a dot line in FIG. **15**) is placed above the heater spreading along the bottom wall **71***a* to bridge the protrusions **73** at the four corners of the bottom wall **71***a*. The radioactive material containing ores **7** are disposed on the upper surface of the aluminum plate **74**. The radioactive material containing ores **7** are powdered and stored in the bag **70**, and a necessary number of the bags **70** are placed on the aluminum plate **74**.

[0101] At the corners inside the lower case member **71**, the radon extractor **14** shown in FIGS. **3**A to **3**D and **4**A to **4**E is fixed with an appropriate means such as double-faced tape, and the gas channel **15** attached to the top **30** of the radon extractor **14** is stretched out of the container main body **4**. In this example, the radon extractor **14** is installed without interfering with the heater **6**. The heater **6** is provided over the three sides of the lower case member as described above to have a large surface area and sufficient heating capacity. The inside of the container main body **4** can be sufficiently warmed without the radon extractor **14** being in direct contact, making it possible to warm the liquid inside the radon extractor and increase the humidity.

[0102] The extractor **14** used here is the same as that shown in the first embodiment (FIGS. **3**A to **3**D, **4**A to **4**E) and the description thereof is omitted. However, the gas channel **15**, as shown in FIG. **16**, has an L-shaped joint member (elbow joint **91**) attached with a bushing **67** to the gas channel attachment hole **31** (see FIGS. **3**A and **3**B) formed at the top **30** of the radon extractor **14**, and the elbow joint **91** penetrates through the through hole **75** formed on the lateral wall **71***b* of the lower case member **71** via the bushing **92** to protrude outward from the lateral wall **71***b* of the lower case member **71**.

[0103] An L-shaped elbow joint **76** as a joint member that forms part of the external air introducing channel **72** is attached to the lateral wall **71***b* of the lower case member **71** to penetrate therethrough via a bushing **77**, as shown in FIG. **17**. The external air introducing channel **72** is formed of the elbow joint **76** and an external air introducing pipe **78** connected to the part, of the elbow joint **76**, protruding outside of the lower case member **71**. The part, of the elbow joint **76**, protruding inside of the case is bent downward and is extended downward along the inner surface of the lateral wall **71***b* of the lower case member **71** so as not to obstruct the movement of the bag **11**. The opening end of the external air introducing pipe **78** is detachably sealed with a stopper **79**.

[0104] On the other hand, at the substantial center of a lateral wall **81***b* (see FIGS. **13**A and **13**B) of the upper case member **81** positioned directly above the lateral wall **71***b* through which the gas channel **15** and the external air introducing channel **72** of the lower case member **71** penetrate, an L-shaped elbow joint **83** as a joint member that forms part of the air suction channel **82** is attached to the upper case member **81** to penetrate therethrough via a bushing **84**, as shown in FIG. **18**. The air suction channel **82** includes the elbow joint **83**, an air suction pipe **85** connected to the part, of the elbow joint **83**, protruding outside of the upper case member **81**, and a support pipe **86** connected to the part, of the elbow joint **83**, protruding inside of the upper case member **81**.

[0105] In order to prevent air suction from being blocked by attachment of the bag **11** as well as not to obstruct the movement of the bag **11** inside the container main body **4**, the part, of the elbow joint **83**, protruding inside the upper case member **81** is bent upward substantially at 90 degrees and the support pipe **86** is extended upward along the inner surface of the lateral wall **81***b* of the upper case member **81**. The shape of the support pipe **86** is not limited, but an end opening **86***a* thereof is directed upward to prevent the bag **11** from attaching to and blocking the end opening even when the air inside the external air opening chamber **10** is suctioned from the outside of the case via the air suction pipe **85**. A plurality of through holes **86***b* are formed at appropriate spots on the peripheral surface of the support **86** so that the air can be suctioned through the through holes **86***b*, and the air can be suctioned through the through holes **86***b* on the periphery of the support pipe **86** even when the end opening **86***a* is blocked by the bag **11**.

[0106] The radon inhalation device **1** described above can be used in a state where it is installed in a cabinet **100** (bedside cabinet) beside a bed in a hotel or the like, and in that case, as shown in FIGS. **19**A and **19**B, the radon inhalation device **1** is installed inside the cabinet **100** as a door **101** on the front of the cabinet **100** is opened, and the gas channel **15**, the external air introducing pipe **78** of the external air introducing channel **72**, the air suction pipe **85** of the air suction channel **82** are drawn out in front of the cabinet **100** through the door **101**.

[0107] The door **101** is a single swinging door which opens/closes with a hinge not shown in the drawings on the left or the right of the front opening of the cabinet **100**, and the air suction pipe **85** is drawn out through a through hole

111 formed substantially at the center in the upper part of the door **101** facing the air suction pipe **85**. The external air introducing pipe **78** is drawn out through a through hole **112** formed at the part of the door **101** facing the external air introducing pipe **78**.

[0108] When the door **101** is opened, the air suction pipe **85** and the external air introducing pipe **78** are off the through holes **111**, **112** in the door **101**, and when the door **101** is closed, the air suction pipe **85** and the external air introducing pipe **78** are inserted through the through holes **111**, **112** in the door **101** to protrude forward from the door **101**.

[0109] When external air is not to be introduced into the radon reservoir **8**, the external air introducing pipe **78** is sealed with the stopper **79** being inserted to the end opening. On the other hand, the end opening of the air suction pipe **85** need not be sealed by a stopper, but it may be sealed with a stopper or a cap to prevent dust ingress or the like.

[0110] As shown in FIG. **16**, the gas channel **15** includes: in addition to the elbow joint **91** fixed on the side wall **71***b* of the lower case member **71** of the radon generation container **5**; an L-shaped first elbow joint **93** connected to a part, of the elbow joint **91**, protruding from the side wall **71***b* and bent at approximately 90 degrees upward; an L-shaped second elbow joint **95** fixed at an upper central part of the door **101** via a bushing **94** and bent at approximately 90 degrees downward on the inside of the door **101**; a joint hose **96** connecting the upper end opening of the first elbow joint **93** and the lower end opening of the second elbow joint **95**; a T-shaped hose joint **97** connected to a part, of the second elbow joint **95**, protruding outside of the door **101**; a long flexible tube **98** connected via the T-shaped hose joint **97**; an L-shaped third elbow joint **99** attached to the tip of the tube **98** and bent at approximately 90 degrees; and the suction member **58** having a collar and connected to the tip of the third elbow joint **99**. Therefore, in this example, the tube **98** is connected to the joint members (the second elbow joint **95** and the T-shaped hose joint **97**) fixed to the door **101** and arranged outside the cabinet **100**.

[0111] On the T-shaped hose joint **97**, a cap **97***b* is detachably attached to the opening end of an intermediate joint **97***a* which is not connected to the second elbow joint **95** or the tube **98** so that the cap **97***b* can be removed and liquid can be added through the intermediate joint **97***a* when it is necessary to replenish the radon extractor **14** with liquid. The joint hose **96** is provided with sufficient extra length so that the first elbow joint **93** and the second elbow joint **95** can stay connected even when the door **101** is opened and closed with the radon generation container **5** being stored in the cabinet **100**.

[0112] The tube **98**, the third elbow joint **99**, or the suction member **58** with a collar of the gas channel **15** can be hooked and held by a hanging hook **102** at an appropriate position at the upper part of the door **101**.

[0113] Furthermore, a gap **103** is formed between the upper end of the door **101** and the upper panel **100***a* of the cabinet **100**, and the tube **98** can be stored in a space **104** formed between the upper surface of the radon generation container **5** and the upper panel **100***a* of the cabinet **100** via the gap **103**.

[0114] In the configuration described above, when external air is introduced into the radon reservoir **8** to use the radon inhalation device **1**, the stopper **79** attached to the end, of the external air introducing pipe **78**, protruding outside the door **101** is removed, and from that state, the air suction machine **110** is inserted to the opening part, of the air suction pipe **85**, protruding outside the door **101**. Then the air inside the external air opening chamber **10** is suctioned by activating the air suction machine **110**.

[0115] Then, as the air inside the external air opening chamber **10** is suctioned by the air suction machine **110** through the air suction channel **82** and released outside the radon generation container **5**, the pressure inside the external air opening chamber **10** is decreased to be negative. And as the air inside the external air opening chamber **10** decreases, air is introduced inside the radon reservoir **8** via the radon extractor **14** and the external air introducing pipe **78**, and the bag **11** is lifted. In the state where the air inside the external air opening chamber **10** is suctioned sufficiently, as shown in FIG. **20**A, the bag **11** is in contact with the inner surface of the upper case member **81** in a wide range, and the space inside the radon reservoir **8** is at its maximum (almost 50 liters).

[0116] Here, the inside of the case of the elbow joint **83** to which the air suction pipe **85** is connected is bent upward, and the support pipe **86** is extended upward along the inner surface of the side wall **81***b*. Thus, the bag **11** does not get caught by the elbow joint **83** and the support pipe **86** or block the end opening **86***a* of the support pipe **86**. In addition, as the plurality of through holes **86***b* are provided on the peripheral wall of the support pipe **86**, even when part of the through holes **86***b* is blocked by the bag **11**, the air inside the external air opening chamber **10** can be continuously suctioned via the other through holes or the upper opening.

[0117] After external air is introduced into the external air opening chamber **10** as described above, the stopper **79** is attached to the opening end, of the external air introducing pipe **78**, protruding from the door **101** to seal the external air introducing channel **72**. This prevents the gas containing radon from being leaked from the radon reservoir **8** and prevents the radon concentration inside the radon reservoir **8** from being reduced by introduction of external air into the radon reservoir **8** at the time of inhalation of the gas containing radon in the radon reservoir **8**.

[0118] In a case where the gas containing radon is inhaled thereafter, the part of the gas channel **15** hooked on the hanging hook **102** is detached and the tube **98** stored in the space **104** between the radon generation container **5** (container main body **4**) and the top panel **100***a* of the cabinet **100** is pulled out to be guided to a desired position. Then, a user put their mouth at the suction member **58** to inhale the gas. This makes it possible to inhale the gas containing radon from the radon reservoir **8** via the radon extractor **14** and the gas channel **15** on the principle similar to that of the former embodiments.

[0119] As the gas containing radon reserved in the radon reservoir **8** is continuously inhaled via the gas channel **15**, the amount of air inside the radon reservoir **8** is decreased, causing the bag **11** to descend, and external air is flown into the external air opening chamber **10** via the air suction pipe **85**.

[0120] After the gas containing radon in the radon reservoir **8** is almost completely gone, as shown in FIG. **20**B, the bag **11** is pulled down to the bottom of the lower case member **71**, and the space inside the radon reservoir **8** is almost gone. In a case where a user wants to inhale the gas containing radon after that, the stopper **79** attached to the opening end of the external air introducing pipe **78** is

removed again, and from that state, the air suction machine **110** is inserted to the opening end of the air suction pipe **85**, and the air inside the external air opening chamber **10** is suctioned by activating the air suction machine **110**, which is a repetition of the operation described previously.

[0121] Therefore, in the sixth embodiment described above, the bag **11** is lifted by suction of the air inside the external air opening chamber **10** by the air suction machine **110**, which can increase the volume of the radon reservoir **8**, and a user need not take out the radon generation container **5** out of the cabinet **100** and open the upper case member **81** to lift the bag **11**. As it is unnecessary for the user to access the radon generation container **5**, the door **101** may be provided with a lock **120** (shown in FIG. **19**B) which keeps the door **101** closed during usual use.

[0122] As described above, the gas containing radon is sucked with vapor (water droplets), which reduces the remaining amount of the liquid **34** stored at the lower part of the radon extractor **14**. The radon extractor **14** may be replenished with the liquid via the intermediate joint **97***a* of the T-shaped hose joint **97** provided on the gas channel **15**. Even though the liquid may be supplied from anywhere on the gas channel **15**, the radon extractor **14** can be replenished easily via the joint hose **96** and the elbow joints **91**, **93**, **95**: as the intermediate joint **97***a* of the T-shaped hose joint **87** provided on the gas channel **15** outside and near the door **101** is directed upward; the cap **97***b* attached to the tip of the intermediate joint **97***a* is removed; and the liquid is added via the intermediate joint **97***a* of the T-shaped hose joint **97** with a spuit or the like.

[0123] A viewing window **105** (shown in FIG. **13**B) may be formed in the side wall **71***b* of the lower case member **71** of the radon generation container **5** at a part facing the radon extractor **14** so that the remaining amount of the liquid inside the radon extractor **14** can be visually seen.

REFERENCE SIGNS

[0124] **1** . . . . RADON INHALATION DEVICE
[0125] **4** . . . . CONTAINER MAIN BODY
[0126] **5** . . . . RADON GENERATION CONTAINER
[0127] **6** . . . . HEATER
[0128] **7** . . . . RADIOACTIVE MATERIAL CONTAINING ORES
[0129] **8** . . . . RADON RESERVOIR
[0130] **10** . . . . EXTERNAL AIR OPENING CHAMBER
[0131] **11** . . . . BAG
[0132] **14**, **62** . . . . RADON EXTRACTORS
[0133] **15** . . . . GAS CHANNEL
[0134] **26** . . . . CENTER CHANNEL
[0135] **27** . . . . SIDE CHANNEL
[0136] **28** . . . . CONNECTION PORT
[0137] **39** . . . . INTERNAL SPACE
[0138] **57**, **98** . . . . TUBES
[0139] **63** . . . . FILTER
[0140] **71** . . . . LOWER CASE MEMBER
[0141] **72** . . . . EXTERNAL AIR INTRODUCING CHANNEL
[0142] **76**, **83**, **91**, **93**, **94** . . . . ELBOW JOINTS
[0143] **78** . . . . EXTERNAL AIR INTRODUCING PIPE
[0144] **81** . . . . UPPER CASE MEMBER
[0145] **82** . . . . AIR SUCTION CHANNEL
[0146] **85** . . . . AIR SUCTION PIPE
[0147] **86** . . . . SUPPORT PIPE
[0148] **95** . . . . SECOND ELBOW JOINT
[0149] **97** . . . . T-SHAPED HOSE JOINT
[0150] **100** . . . . CABINET
[0151] **101** . . . . DOOR
[0152] **110**. AIR SUCTION MACHINE
[0153] **111**, **112** . . . . THROUGH HOLES

1. A radon inhalation device comprising: a radon generation container for producing radon; and a heater that heats an inside of the radon generation container,

wherein the radon generation container includes: a container main body an inside of which is divided into a radon reservoir and an external air opening chamber by a bag; a radioactive material containing ore stored inside the radon reservoir; and a radon extractor that communicates with an inside of the radon reservoir and an outside of the container main body,

wherein when the bag is deformed to increase a volume of the radon reservoir, the radon extractor can introduce external air to the radon reservoir, and when gas in an internal space is suctioned from the outside of the container main body, the radon extractor releases radon inside the radon reservoir to the outside of the container main body.

2. The radon inhalation device according to claim **1**,

wherein the radon extractor includes parallel channels lower parts of which communicate with each other via a connection port, one of the parallel channels being open to the radon reservoir, another one of the parallel channels being open to the outside of the container main body, and when liquid is contained at the lower part of the parallel channels, a liquid level of the liquid is above the connection port.

3. The radon inhalation device according to claim **1**,

wherein the radon extractor includes parallel channels,

wherein the parallel channels include a center channel and a pair of side channels positioned on both sides of the center channel, a lower part of the center channel and a lower part of the pair of the side channels communicating via a connection port, the center channel and one of the side channels being open to the radon reservoir, and the center channel and another one of the side channels being open to the outside of the container main body, and when liquid is contained at the lower part of the parallel channels, a liquid level of the liquid is above the connection port.

4. The radon inhalation device according to claim **1**,

wherein a filter to remove floating matter in gas is stored in the radon extractor.

5. The radon inhalation device according claim **1**,

wherein the container main body is formed with a lower case member and an upper case member which are fitted to each other in an up-down direction, and the bag is fixed by being sandwiched between the lower case member and the upper case member.

6. The radon inhalation device according to claim **1**, further comprising:

a gas channel through which the radon extractor communicates with the outside of the container main body;

an air suction channel that communicates with the external air opening chamber and the outside of the container main body; and

an external air introducing channel through which the radon reservoir and the outside of the container main

body communicate with each other and that can be opened and sealed with a stopper,

wherein air in the external air opening chamber can be suctioned by an air suction machine connected to the air suction channel.

7. The radon inhalation device according to claim **6**,

wherein the air suction channel includes:

a joint member fixed to the container main body;

an air suction pipe one end of which is connected to the joint member outside the container main body and another end of which can be connected to the air suction machine; and

a support pipe one end of which is connected to the joint member in the external air opening chamber inside the container main body and another end of which is open upward and extended upward.

8. The radon inhalation device according to claim **6**,

wherein the external air introducing channel includes:

a joint member fixed to the container main body; and

an external air introducing pipe one end of which is connected to the joint member outside the container main body and another end of which can be opened and sealed with a stopper.

9. The radon inhalation device according to claim **6**,

wherein the radon inhalation device is housed in a cabinet with a door,

wherein the gas channel, the air suction channel, and the external air introducing channel are drawn outside via the door.

10. The radon inhalation device according to claim **9**,

wherein the air suction channel includes an air suction pipe placed outside the container main body,

wherein the external air introducing channel includes an external air introducing pipe placed outside the container main body,

wherein the gas channel includes a tube placed outside the container main body,

wherein the air suction pipe and the external air introducing pipe are drawn outside the cabinet via a through hole formed in the door, and the tube is connected to a joint member fixed to the door and placed outside the cabinet.

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