This invention relates to an air treatment device using a volatile treating agent contained inside of a permeable container (1) and a cap (4) closing the container (1). The cap (4) comprises a reservoir (12) containing the active agent.
CAP FOR A CONTAINER CONTAINING A VOLATILE AIR TREATMENT AGENT

[0001] This invention relates to an air treatment device using a volatile treating agent housed inside of a permeable container, and more particularly the cap of such a device.

[0002] Such devices are used to ensure the disinfection, sterilisation and/or deodorisation of air, particularly in heating, ventilation and/or air-conditioning systems, and more particularly in the treatment of the interior of a vehicle. It is object is a cap for a container containing a volatile air treatment agent, in particular for treating the air circulating about such a system.

[0003] Devices are known for treating air by using a volatile treating agent placed inside a permeable container, in order to gradually diffuse the treating agent through the wall of the permeable container over a specific period of time. This treatment, for example, is a fungicidal, antimicrobial or odorising treatment.

[0004] According to a first known solution, the treating agent is a liquid contained inside a gas-permeable, liquid-impermeable pouch, itself packaged inside an impermeable container that is closed off from the outside environment by an inner seal. It may therefore contain an active agent.

[0011] According to an alternative embodiment, the interior wall and the bottom have thicknesses defined so as to prevent the treating agent from migrating towards the exterior of the reservoir.

[0012] This invention also proposes an air treatment device using a volatile treating agent contained inside of a permeable container that is closed by a cap having one of the characteristics specified above.

[0013] Thus, an embodiment such as this makes it possible to control the treatment process triggering phase simply and quickly, since it occurs after insertion of the cap into the permeable container. In addition, this invention makes it possible to store the products without any risk of reducing the treating power of the treating agent.

[0014] According to a first additional characteristic of the invention, the reservoir is closed by an inner seal.

[0015] According to a second characteristic of the invention, the device comprises perforating means making it possible to pierce the inner seal.

[0016] According to another embodiment, the device comprises a body for supporting the treating agent.

[0017] Another characteristic of the invention consists of the fact that the permeable container comprises ribs that clamp tightly around the body.

[0018] Alternatively, the cap occupies at least one first and one second position in relation to the permeable container.

[0019] According to one alternative of the present invention, the permeable container comprises a wall having an interior face including at least one indexing groove.

[0020] It is then preferentially coupled with a boss that is arranged on an exterior wall of the cap and that cooperates with the indexing grooves in order to define various positions of the cap in relation to the permeable container.

[0021] According to another embodiment, the permeable container comprises a wall having an interior face including an internal thread that cooperates with a thread made on an exterior wall of the cap in order to screw the cap into the permeable container.

[0022] Shifting from the first position to the second position is done by transversely displacing or rotating the cap in relation to the permeable container.

[0023] The first position, referred to as the high position, is such that seal of the reservoir is preserved. The second position, referred to as the low position, is such that the seal of the reservoir is broken.

[0024] This invention is such that the seal of the reservoir is broken by the perforating means, which may consist of the body comprising a perforator at its upper portion and an additional perforator mounted inside the permeable container.

[0025] Ideally, the perforator rests on the ribs of the permeable container.

[0026] Other advantages and characteristics of the invention will become apparent upon reading the following description. This description is purely illustrative, is given by way of example, and must be read while referring to the appended drawings in which.
FIG. 1 shows an exploded view of a device for treating air with a treating agent according to this invention.

FIGS. 2 and 3 show a sectional view of a closing cap for the device of this invention, according to a first embodiment.

FIGS. 4 and 5 show a sectional view of a closing cap for the device of this invention, according to a second embodiment.

FIGS. 6 and 7 show a sectional view of a closing cap for the device of this invention, according to a third embodiment, and

FIG. 8 shows a top view of the perforator for a closing cap of the device of this invention, according to the third embodiment.

Reference is made first to FIG. 1, which shows a device for treating air with a treating agent.

The device according to this invention is designed for treating air with a volatile treating agent contained inside of a permeable container 1.

According to this invention, the treating agent is preferentially kept in the liquid state, or similarly, in a state in which it is capable of being absorbed by a spongy mass.

The treating agent is packaged by absorption into a spongy body 2 serving as a support for the treating agent housed inside the permeable container 1. The body 2 has the characteristic of being spongy while having the property of being able to easily soak up the treating agent.

The body 2 is, in particular, formed from a porous mass arranged like a plug, the volume of which occupies at least partially, e.g., almost all, of the volume of a chamber 6 formed by an internal hollowed-out portion of the permeable container 1.

The body 2 is dry and is introduced into the receiving chamber 6 that the permeable container 1 comprises. It is subsequently soaked with a treating agent in the liquid state, in particular allyl isothiocyanate.

Advantageously, the shape of the body 2 is substantially complimentary to that of the chamber 6, in order to optimise the occupation of the useful volume of the permeable container 1, with the exception of a thin layer of air arranged between the body 2 and the wall of the permeable container 1. For this purpose, centring ribs 20 are arranged on the interior wall of the permeable container 1. The ribs 20 are positioned over a small angular portion. Thus, this arrangement makes it possible to reduce the overall exterior dimensions of the permeable container 1. Owing to these arrangements, and to the rigid nature of the permeable container 1, its installation is facilitated. In the embodiment example shown, the body 2 is shaped like a cylindrical plug. For example, it may be formed from a textile felt.

The volume of the chamber 6 is substantially equivalent to the volume of the body 2. However, a residual space between the body 2 and the lateral wall of the permeable container 1 is created by the ribs 20, in order to have thin layer of air available for the diffusion process.

After having soaked the body 2 in liquid form, the treating agent changes into a gas in the residual space between the body 2 and the lateral wall of the permeable container 1. As a result, the diffusion process enables gas migration of the treating agent through the lateral wall of the permeable container 1 so that it is released into the outside environment. The permeable container 1 ensures gradual diffusion of the treating agent over a specific period of time.

The thickness and the surface of the lateral wall of the permeable container 1 are defined so as to ensure optimal diffusion of the treating agent via migration through the lateral wall.

In particular, a wall thickness ranging between 0.5 mm and 2 mm offers an acceptable compromise for ensuring optimal diffusion. More particularly, for an annual diffusion of 45 mg/day of treating agent, in particular allyl isothiocyanate, at a constant temperature on the order of 40°C, it is preferable to have a permeable container 1 thickness of the order of 0.9 mm, plus or minus 20%, for an overall surface area of 4200 mm², plus or minus 10%.

However, these dimensions are dependant on the surrounding outside environment; more particularly, they are based on the temperature, and the required intensity of the diffusion process.

The permeable container 1 is equipped with a cap 4 for plugging the chamber 6. According to this invention, the cap 4 comprises a reservoir 12 containing the treating agent. In an initial arrangement, the treating agent is stored in the cap 4 and separated from the body 2.

As concerns the permeable container 1, it is rigid and is formed from a permeable plastic material, e.g., 20% talc-filled polypropylene.

According to an alternative embodiment, the permeable container 1 comprises a protuberance 8 that makes it possible to fasten the air treatment device onto the filtering medium or peripheral edge by means of a suitable clamp or clip. It is also possible to fasten the permeable container 1 onto the heating, ventilation and/or air-conditioning apparatus.

FIG. 2 shows a first embodiment according to this invention. According to this arrangement, the cap 4 comprises a reservoir 12 containing the treating agent. The reservoir 12 contains a sufficient amount of treating agent to impregnate the body 2 for optimal functioning of the air treatment device.

This reservoir 12 is made by the interior wall 14 and the bottom 16 of the cap 4. It thus defines a volume ranging between 2 and 10 millilitres. Preferentially, it has a volume of 4.4 millilitres. However, these volumes are capable of being varied in order to correspond to the airflow treatment needs, in particular the desired service life of the treatment device and the climate surrounding the permeable container 1.

Preferentially, the interior wall 14 is cylindrical. However, it is possible to consider providing a reservoir having a different internal geometry.

The cap 4 is made of plastic, in particular polypropylene. However, the thicknesses of the walls 14 and 16 are defined so that the cap 4 does not allow the treating agent to migrate towards the exterior of the cap 4.
The reservoir 12 is sealed off from the outside environment by an inner seal 18. Similarly, the inner seal 18 provides a perfect seal between the interior of the reservoir 12 and the outside environment. In this way, it is ensured that the treating agent is not able to migrate towards the exterior of the cap 4.

Thus made, the cap 4 contains a specific amount of treating agent that is insolated in a perfectly leak-proof manner from the outside environment. It is therefore possible to store these caps 4 for a long period of time without any reduction in the amount of treating agent due to uncontrolled migration through the walls 14 and 16 or the inner seal 18.

Preferentially, the inner seal 18 is a sheet of aluminium that is firmly fastened onto the interior wall 14 of the cap 4, by gluing or welding, for example. However, the inner seal 18 may be made of a multilayer aluminium film.

In FIG. 2, the device is described in a first position. In this configuration, the cap 4 is inserted into the permeable container 1 in the high position.

The permeable container 1 comprises a lateral wall 22. According to the embodiment example, the wall 22 is cylindrical. The inside diameter of the wall 22 is identical to the outside diameter of the cap 4. An assembly such as this ensures a perfect fit between the cap 4 and the permeable container 1. In this way, a perfect seal is made between the cap 4 and the permeable container 1.

On its interior face, the wall 22 comprises indexing grooves 24 and 26. Groove 26 is arranged above groove 24. The distance separating the grooves 24 and 26 determines the placement of the cap 4 in the high position and low position respectively.

The indexing grooves 24 and 26 cooperate with a boss 28 arranged on the exterior wall 17 of the cap 4. In high position, the boss 28 cooperates with the indexing groove 26. In low position, the boss cooperates with the indexing groove 24. The boss 28 serves as an index that is inserted into the indexing grooves 24 and 26.

The embodiment described comprises two indexing grooves 24 and 26. As needed, particularly in order to provide several intermediate positions between the high position and the low position, it is possible to have a larger number of indexing grooves.

In the same way, in order to simplify the embodiment, it is possible to consider having a single indexing groove. In this configuration, it indicates either the high position or the low position.

Ribs 20 are also arranged on the internal face of the permeable container 1. They are distributed evenly around the periphery and, ideally, over small angular portions.

The ribs 20 ensure centring of the body 2, so that the latter is perfectly centred inside the permeable container 1. Furthermore, by distributing the ribs 20 around the periphery, over small angular portions, this arrangement aims to facilitate the insertion of the body 2 into the chamber 6 while providing a space between the body 2 and the permeable container 1. A layer of air occupies this space and promotes the release of the treating agent by allowing diffusion of the treating agent.

According to an alternative, these ribs 20 are arranged over a portion of the height of the permeable container 1, and preferentially at the upper portion of the permeable container 1, so as to ensure centring of the body 2 in relation to the cap 4 and the reservoir 12.

The body 2 is a dry stabilising material placed inside the chamber 6 of the permeable container 1. According to this invention, the stabilising material is a spongy body, e.g., made of felt. However, it is possible for this stabilising material to be a mineral, plant or even animal material.

Additionally, the role of the body 2 is to prohibit direct contact between the treating agent, in liquid form, and the lateral wall 22 of the permeable container 1. In the opposite case, contact between the treating agent and the lateral wall 22 would have effects on the migration path of the treating agent through the wall 22 and would therefore alter the diffusion rate of the treating agent.

At its upper portion, the body 2 comprises a perforator 30. According to the embodiment example, the perforator 30 is made directly from a stabilising material. Ideally, it assumes a cone shape.

The role of the perforator 30 is to ensure the opening of the reservoir 12 and to release the treating agent when the cap 4 is in the low position, by piercing the inner seal 18.

In the arrangement of FIG. 2, the cap 4 is placed on the permeable container 2 in a high position. It corresponds, in particular, to a storage position of the air treatment device prior to its final installation in an air treatment apparatus, such as a heating, ventilation and/or air-conditioning system. In this configuration, the boss 28 cooperates with the indexing groove 26. The reservoir 12 is hermetically sealed by the inner seal 18, because the perforator 30 is distant from the inner seal 18.

FIG. 3 shows the device in a second position, according to the first embodiment. In this configuration, the cap 4 is inserted into the permeable container 1 in the low position.

The low position is the configuration that enables triggering of the process of diffusing the treating agent through the opening of the inner seal 18.

In comparison with the high position described in FIG. 2, the cap has been pushed in, specifically by a transverse movement of the cap 4 along the axis of the permeable container 1, so that the boss 28 cooperates with the indexing groove 24.

FIGS. 2 and 3 show the same device in two different positions. Consequently, the elements common to both figures have identical references to those described in relation to FIG. 2.

In this transition phase between the high position and the low position, the distance separating the tip 32 of the perforator 30 and the inner seal 18 gradually decreases. When the tip 32 of the perforator 30 comes into contact with the inner seal 18, it tears it while creating an opening 34.

The treating agent present in the reservoir 12 sealed by the inner seal 18 is released. It then impregnates the body...
2 by capillary attraction and is diffused into the stabilising material. In this way, the entire volume of the body 2 contains the treating agent.

[0074] In this position, the opening 34 is at its maximum. The diffusion of the treating agent is therefore optimal.

[0075] The diffusion process is then initiated and the treating agent migrates as a gas through the lateral wall 22 of the permeable container 1, so as to be released into the outside environment.

[0076] According to this invention, the perforator 30 is made from the stabilising material of the body 2. The latter is dimensioned to ensure perforation of the inner seal 18. In order to do this, the dimensions, shape, hardness and rigidity are selected for piercing the inner seal 18 under known conditions of pressure on the cap 4.

[0077] In the embodiment example, the perforator 30 is cone-shaped. However, it is possible to likewise consider giving it a pyramidal shape, a cylindrical shape truncated along an inclined plane or an off-centred cone. In addition, depending on the pressure exerted by the perforator 30 on the inner seal 18, it is also possible to consider using a small-diameter cylinder or a parallelepiped having a narrow cross-section.

[0078] Henceforth, reference will be made to FIG. 4, which shows a second embodiment of the device. The embodiment example of FIG. 4 has numerous similarities with the previously described embodiments. The elements common to both examples are taken up again using similar references.

[0079] The device is described here in a first position. In this configuration, the cap 4 is inserted into the permeable container 1 in the high position.

[0080] The embodiment of FIG. 4 differs from that described in FIG. 2 by the manner in which the cap 4 is set into motion. The indexing mechanism comprising a boss 28 and indexing grooves 24 and 26 is replaced by a thread 25.

[0081] FIGS. 4 and 5 show the same device as that described in FIGS. 2 and 3, with different means of assembly. Consequently, the common elements in the figures have identical references to those described in relation to FIGS. 2 and 3.

[0082] The exterior wall 17 of the cap 4 is threaded while the interior face of the wall 22 is tapped. Thus, the placement of the cap 4 in the permeable container 1 is accomplished by a screw-nut type of assembly.

[0083] The high position is therefore defined by a specific number of rotations of the cap 4, in order to ensure that the assembly engages with a selected number of threads.

[0084] The low position is defined in an identical way, by a specific number of rotations of the cap 4. However, provisions may also be made for the low position to be reached when the thread comes to a stop inside the internal thread.

[0085] The thread assembly offers the advantage of being able to more accurately define the position of the cap 4 in relation to the perforator 30. Thus, it is possible to control the flow rate of the treating agent into the body 2. As a matter of fact, depending on the movement of the cap 4, the perforator 30 pierces the inner seal and creates an opening 34. The treating agent is diffused through the opening 34 into the stabilising material of the body 2. As a result of the shape of the perforator 30 and the degree of penetration of the tip 32 of the perforator 30, it is possible to have a larger or smaller opening ensuring a greater or lesser diffusion of the treating agent into the stabilising material of the body 2.

[0086] FIG. 5 shows the device according to the second embodiment, in a second position. In this configuration, the cap 4 is inserted into the permeable container 1 in the low position.

[0087] In this position, the opening 34 is at its maximum. The diffusion of the treating agent is therefore optimal.

[0088] In the transition phase between the high position and the low position, the distance separating the tip 32 of the perforator 30 and the inner seal 18 gradually decreases. When the tip 32 comes into contact with the inner seal 18, it tears it while creating an opening 34.

[0089] The treating agent present in the reservoir 12 sealed by the inner seal 18 is released. It then impregnates the body 2 by capillary attraction and is diffused into the stabilising material. In this way, the entire volume of the body 2 contains the treating agent.

[0090] The diffusion process is then initiated and the treating agent migrates as a gas through the interior wall 22 of the cap 4 so as to be released into the outside environment.

[0091] According to this invention, the perforator 30 is made from the stabilising material of the body 2. The latter is dimensioned to ensure perforation of the inner seal 18. In order to do this, the dimensions, shape, hardness and rigidity are selected for piercing the inner seal 18 under known conditions of pressure on the cap 4.

[0092] In the embodiment example, the perforator 30 is cone-shaped. However, it is possible to likewise consider giving it a pyramidal shape, a cylindrical shape truncated along an inclined plane or an off-centred cone. In addition, depending on the pressure exerted by the perforator 30 on the inner seal 18, it is also possible to consider using a small-diameter cylinder or a parallelepiped having a narrow cross-section.

[0093] FIGS. 6 and 7 show a third embodiment of the device in the high position and low position respectively. The alternative embodiment of FIGS. 6 and 7 shows a device very similar to that described in FIGS. 2 and 3 with different perforating means. Consequently, the common elements in the figures have identical references to those described in relation to FIGS. 2 and 3.

[0094] The movement of the cap 4 in this third embodiment may be carried out either by an indexing device as described in FIGS. 2 and 3, or by a thread device as described in FIGS. 4 and 5.

[0095] The embodiment of FIG. 6 differs from the preceding embodiments by the deletion of the upper portion of the body 2 having the function of perforating the inner seal 18.

[0096] As a matter of fact, depending on the stabilising material used, it is possible that the rigidity of the perforator
might not be sufficient to enable it to penetrate into the inner seal 18 and to pierce it.

The alternative embodiment of FIGS. 6 and 7 shows an arrangement in which the perforator 40 is an additional part arranged inside of the permeable container 1.

The perforator 40 is preferentially made of metal, which imparts sufficient rigidity thereon to ensure perforation of the inner seal 18.

As shown in FIG. 8, the perforator 40 comprises a ring 38 defining a base from which rise arches 42. The arches 42 support the perforating head 44 having a tip 36.

The perforating head 44 also has ribs 46. The ribs 46 serve to create cutting edges on the smooth surface of the perforating head 44. Their role is to facilitate separation of the inner seal 18 and the perforating head 44 so that the treating agent flows easily towards the stabilising material of the body 2.

As shown in FIGS. 6 and 7, the base 38 of the perforator 40 rests on the centring ribs 20 of the permeable container 1. The outside diameter of the base 38 is slightly smaller than the inside diameter of the permeable container 1. This makes it possible to easily insert the perforator into the permeable container 1.

The process of triggering the diffusion of the treating agent is identical to that described in relation to FIGS. 2 to 5.

The embodiment of FIGS. 6 and 7 provides a broad standardisation of the devices for treating air with a treating agent. As a matter of fact, such devices may comprise a body 2 pre-impregnated with a treating agent, which is inserted into the permeable container 1, or else, like this invention, comprise a "dry" treating agent body 2 and a cap 4 containing the treating agent.

Whatever methods are concerned, it is possible to replace and/or refill the device by the one described above.

As a matter of fact, if the device that one wishes to refill comprises a body 2 pre-impregnated with a treating agent, it is possible to retain the existing body 2 and to replace the initial cap with a cap according to this invention, and to insert an additional perforator like the perforator 40, so as to render the device operative again.

If the device that one wishes to refill comprises a "dry" treating agent body 2 and a cap with a reservoir of the type of cap 4, it is possible to retain the existing body 2 and to replace the cap devoid of any treating agent with a new cap according to this invention, which contains an amount of treating agent that ensures prolongation of the treatment in order to render the device operative again.

According to the embodiments of this invention, the perforating means consist of either a particular geometry of the body made of a stabilising material, or an additional part inserted between the body made of a stabilising material and the cap.

The various examples described enable the cap 4 and the permeable container 1 to be assembled together. This assembly is carried out so as to ensure a perfect fit between the cap 4 and the permeable container 1. In this way, a perfect seal is produced between these two elements. During all of the steps for assembling the cap 4 together with the permeable container 1, the treating agent, in the liquid state in particular, is insulated from the outside environment.

As a matter of fact, prior to perforation of the inner seal 18 by the perforating means 30 or 40, the treating agent in liquid form is in the reservoir 12, insulated from the outside environment by the combination of the inner seal 18 and the interior wall 14 and the bottom 16 whose thicknesses are defined so that they prevent the migration of the treating agent towards the exterior of the reservoir.

After perforation of the inner seal 18 by the perforating means 30 or 40, the treating agent is diffused in liquid form and soaks the body 2. The perfect fit between the cap 4 and the permeable container ensures a perfect seal between these elements and constitutes a guarantee that the treating agent, in liquid form in particular, is insulated from the outside environment.

However, those skilled in the art will be able to design the perforating means by any other means that make it possible to pierce the inner seal closing the reservoir of the cap.

A device such as this is designed, in particular, to be applied to a heating, ventilation and/or air-conditioning system, in particular for a motor vehicle, taking into account the constraints of using and installing the device inside such a system, in particular with regard to the smallest possible overall dimensions desired for the device, the reliability, sustainability and stability of the diffusion of the treating agent, easy procedures for installing the device inside the system as well as procedures for replacing the device, in the case where it is expendable, or else, in the opposite case, procedures for replacing the treating agent.

The air treatment device according to this invention is suitable for being installed inside of a heating, ventilation and/or air-conditioning apparatus. In particular, for example, it may be fastened onto the filtering medium of the particulate type, active carbon type, or a combination of the two, for the passenger compartment of a motor vehicle, so as to be arranged in the air flow that circulates through the heating, ventilation and/or air-conditioning apparatus, and more particularly through the evaporator and the filter. The latter consists of a peripheral edge or rigid or deformable frame that holds the filtering medium in pleated form.

The air treatment device may also be fastened onto the peripheral edge of the filter.

These positions of the air treatment device on a filter, which is itself installed inside a ventilation, heating and/or air-conditioning system, make it possible to destroy the microbes and odours that may develop inside of this system.

In a storage phase, this invention thus ensures that the treating agent is kept leak-proof. Furthermore, the body serving as a support for the treating agent during diffusion is not impregnated. This makes it possible to preserve the active power of the device over a longer period of time.

The device according to the invention is suitable for being replaced each time that the passenger compartment filter of the vehicle is changed, or for being reused by repositioning it on the new filter medium or on a wall of the
system. This treatment device is thus particularly suited to use in manufacturers’ automobile repair chains or in independent after-sales chains.

[0118] This invention also applies to all equipment that involves air flows, the walls and components of which are to be treated.

[0119] Quite obviously, the invention is not limited to the previously described embodiments provided for illustrative purposes only, and encompasses other alternative embodiments that those skilled in the art will be able to anticipate within the scope of the claims.

1. Cap (4) for a container (1) comprising an interior wall (14) and a bottom (16), characterised in that the interior wall (14) and the bottom (16) form a reservoir (12).

2. Cap of claim 1, characterised in that the interior wall (14) is cylindrical.

3. Cap (4) as claimed in claim 1 or 2, characterised in that the reservoir (12) is sealed off from the outside environment by an inner seal (18).

4. Cap (4) as claimed in one of claims 1 to 3, characterised in that the reservoir (12) contains a treating agent.

5. Cap (4) of claim 4, characterised in that the interior wall (14) and the bottom (16) have thicknesses defined so as to prevent the migration of the treating agent towards the exterior of the reservoir.

6. Air treatment device using a volatile treating agent contained inside of a permeable container (1) and a cap (4) closing the container (1), characterised in that the device comprises a cap (4) as claimed in of the preceding claims.

7. Air treatment device of claim 6, characterised in that the reservoir (12) is closed by an inner seal (18).

8. Air treatment device of claim 7, characterised in that the device comprises perforating means (30, 40) suitable for piercing the inner seal (18).

9. Air treatment device as claimed in one of claims 6 to 8, characterised in that the device comprises a body (2) for supporting the treating agent.

10. Air treatment device of claim 9, characterised in that permeable container (1) comprises ribs (20) that clamp tightly around the body (2).

11. Air treatment device as claimed in one of claims 6 to 10, characterised in that the cap (4) occupies at least a first and a second position in relation to the permeable container (1).

12. Air treatment device as claimed in one of claims 6 to 11, characterised in that the permeable container (1) comprises a wall (22) having in interior face including at least one indexing groove (24, 26).

13. Air treatment device of claim 12, characterised in that the cap (4) comprises an exterior wall (17) including a boss (28) cooperating with the indexing groove (24, 26) in order to define various positions of the cap (4) in relation to the permeable container (1).

14. Air treatment device as claimed in one of claims 6 to 11, characterised in that the permeable container (1) comprises a wall (22) having an interior face including a internal thread cooperating with a thread made on an exterior wall (17) of the cap (4), in order to screw the cap (4) into the permeable container (1).

15. Air treatment device as claimed in one of claims 11 to 13, characterised in that shifting from the first position to the second position is done by transversely displacing the cap (4) in relation to the permeable container (1).

16. Air treatment device of claim 14, characterised in that shifting from the first position to the second position is done by rotating the cap (4) in relation to the permeable container (1).

17. Air treatment device as claimed in one of claims 11 to 16, characterised in that the first position, referred to as the high position, is such that the seal of the reservoir (12) is preserved, and in that the second position, referred to as the low position, is such that the seal of the reservoir (12) is broken.

18. Air treatment device of claim 17, characterised in that the seal of the reservoir (12) is broken by perforating means (30, 40).

19. Air treatment device of claim 17, characterised in that the perforating means are made from the body (2) comprising a perforator (30) at its upper portion.

20. Air treatment device of claim 17, characterised in that the perforating means are made by an additional perforator (40) mounted inside the permeable container (1).

21. Air treatment device of claim 20, characterised in that the perforator (40) rests on the ribs (20) of the permeable container (1).

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