

# PATENT SPECIFICATION

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## (54) VAPOUR EMITTER

(71) We, SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V., a company organised under the laws of The Netherlands, of 30 Carel van Bylandtlaan, The Hague, The Netherlands, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a vapour-emitter.

It is known to incorporate a volatile compound, i.e. a compound which is volatile at ambient temperature, such as an odorant or a pesticide, in a solid carrier. Exposure of the resulting composition to the atmosphere results in the slow emission of vapours of the volatile compound from the surface of the composition into the atmosphere. It is also known that such compositions may be moulded, extruded or otherwise formed into articles such as strips, and rods. Such articles are referred to herein as slow release generators.

It is further known, e.g. from British patent specification No. 1,461,445, that such slow release generators may be positioned within a container to form articles which are referred to herein as vapour-emitters. Such vapor-emitters include air-fresheners, and pesticides. The vapour-emitter may be in the form of a closable container. Such closable containers, when open, slowly release vapours into the atmosphere surrounding the holder and, when closed, slowly release vapours into the atmosphere surrounding the holder and, when closed, slowly releases vapours into the space or reservoir within the holder, and which subsequently slowly diffuse into the atmosphere surrounding the container when the closed holder is opened.

There are situations when it would be highly desirable if such vapour-emitters

could be capable of repeatedly and rapidly expelling a boost of vapours into the atmosphere over and above those vapours which are being continuously and slowly emitted from the slow release generator. This would be desirable if the vapour-emitter was an air-freshener and was located in a room where the production of obnoxious odours is periodic. This is not possible using known vapour-emitters. It is possible to provide periodic boosts of vapours into the atmosphere if use is made of a pressurized container of volatile compound but such containers are not capable of providing a continuous and slow emission of vapours whilst they are not being activated.

It would therefore be desirable if a vapour-emitter could be found which combines the feature of known slow release vapour-emitters in that it is capable of continuously and slowly emitting vapours into the surrounding atmosphere and the feature of pressurized containers in that it is also capable of repeatedly and rapidly expelling a boost of vapours into the surrounding atmosphere.

Such a vapour-emitter has now been found by the Applicants and forms the basis of the present invention.

According to the present invention a vapour-emitter capable of continuously and slowly emitting vapours, and repeatedly and rapidly expelling a boost of vapours, into the surrounding atmosphere, comprising a container having positioned therein at least one slow release generator as hereinbefore defined, the container being provided with at least one opening at each of two different locations, and the slow release generator being part of or forming a vapour-tight partition moveable between the locations and being in contact with the atmosphere on both sides of the partition.

In use the orientation of the vapour-emitter will be such that the vapour-tight

partition will be in a substantially horizontal position. Thus the slow release generator will emit vapours upwardly and downwardly which will either diffuse into the atmosphere surrounding the container or forms a reservoir of stored vapour-containing air within the container as a result of the weight difference between the emitted vapours and air. The vapour-containing air may be expelled from the reservoir into the atmosphere, when desired, by movement of the slow release generator towards one of the openings.

The container may be of any convenient shape but is preferably in the form of a hollow cylinder having a substantially oval, polygonal or circular cross-section with the last-mentioned being particularly preferred. The generator suitably has a cross-section corresponding to that of the container and a maximum diameter just less than that of the inner diameter of the container. In preferred embodiments of the present invention the generator is a reciprocally mounted piston or a slidably or rotatably mounted solir or hollow sphere.

In the case of a slidably or rotatably mounted spherical generator positioned in a hollow cylindrical container, stops, e.g., inwardly projecting flanges, are suitably provided on the upper and lower inner surface of the container upon which the spherical generator is capable of being supported or nestled and thereby may partly protrude outwardly from the container into the surrounding atmosphere. The stops also prevent the generator from falling out of the container when the container is in either of its vertical positions. The stops together with a nestled generator effectively close that end of the container. A nestled generator thereby forms a reservoir in the upper part of the container and can continuously and slowly emit vapours simultaneously outwardly into the surrounding atmosphere and inwardly into the reservoir to form a reservoir of stored vapour-containing air.

In the case of a reciprocally mounted piston generator the piston itself effectively closes one end of the container and thus also forms a reservoir in the remaining part of the container. Stops may be provided for preventing the piston from moving out of the container.

In both cases it is desirable that the length and diameter of the holder are such that the loss of stored vapour-containing air from the reservoir, by slowly diffusing through the end of the container into the surrounding atmosphere, is practically negligible.

According to one preferred embodiment of the present invention a vapour-emitter capable of continuously and slowly emitting

vapours, and repeatedly and rapidly expelling a boost of vapours, into the atmosphere surrounding the container, comprises

- (a) a hollow cylindrical container, 70
- (b) a piston reciprocally mounted within the holder, the whole or part of each exposed surface of the piston being a slow release generator. 80

Thus when the above embodiment is being used as a vapour-emitter the piston is located at one end of the container. Both of the exposed surfaces thereof may have located thereon a slow release generator or the piston head itself may be a slow release generator. The slow release generator slowly emits vapours outwardly into the atmosphere surrounding the cylinder and inwardly into the container to form a reservoir of stored vapour-containing air. When a boost of vapours is required the piston is moved along the container to expel at least part of the stored vapour-containing air from the reservoir into the surrounding atmosphere. The piston is suitably moved along the container by means of shafts attached to at least one of the exposed surfaces thereof. Stops may be provided at both ends of the container to prevent the piston from being moved out of the container. The slow release generator, now positioned at the other end of the container, again continuously and slowly emits vapours outwardly into the surrounding atmosphere and inwardly into the container to form a further reservoir of stored vapor-containing air. 85 90 95 100

According to another preferred embodiment of the present invention a vapour-emitter capable of continuously and slowly emitting vapours, and repeatedly and rapidly expelling a boost of vapours, into the surrounding atmosphere, comprises

- (a) a hollow cylindrical container, having a circular cross-section, 110
- (b) a spherical slow release generator slidably or rotatably mounted within the container, and
- (c) stops located at the upper and lower ends of the inner surface of the container, upon which the spherical generator is supported when the container is in either of its vertical positions. 115

Thus when the above embodiment is being used as a vapour-emitter, the container is located in one vertical position and the generator, supported by the stops, slowly emits vapours outwardly into the atmosphere and inwardly into the container to form a reservoir of stored vapour-containing air. When a boost of vapours is required the container is simply turned over to its other vertical position and the spherical generator slides or rolls down the con- 120 125 130

tainerd to expel rapidly at least part of the stored vapour-containing air from the reservoir into the surrounding atmosphere. The generator is prevented from falling out of the container by the stop located at the other end of inner surface of the holder. The thus again supported generator continuously and slowly emits vapours outwardly into the surrounding atmosphere and inwardly into the cylinder to form another reservoir of stored vapour-containing air. Suitably the stops are in the form of flanges although other forms of stop, such as the ends of the container having a smaller diameter than the generator, may be used.

The vapour-emitter of the present invention may be provided with closing means e.g. caps so that the container may be completely closed when not in use.

As stated above slow release generators comprise carriers having incorporated therein a volatile compound.

Suitable carriers are solid materials and compounds, thermoplastic materials, ... include inorganic materials such as silica-compounds, thermoplastic materials, thermosetting materials and rubbers, as well as mixtures thereof. Suitable thermoplastic carrier materials are, for example, polyethylene, polypropylene, copolymers of ethylene and propylene, polymethacrylate, "Cellophane (Registered Trade Mark), polyamides, polyesters, polyacrylates, polystyrene, polyvinyl chloride, polyvinylidene chloride, polyvinylacetate, copolymers of vinyl chloride and vinyl acetate, polyurethanes or polyaldehydes. Particularly suitable carriers are block copolymers of the polystyrene-polybutadiene-polystyrene type.

Suitable volatile compounds include pesticides and odourants. Examples of pesticides include the volatile organic phosphorous containing compounds. Suitable odourants, which may be a substance that emits a pleasant odour (a perfume) or a substance which destroys or masks obnoxious odours (a deodorant) include the perfumes known as HX4530 or Everfresh (ex IFF, Holland). Suitable slow release generators comprise 5 to 35 %w, preferably 15 to 25 %w, of the volatile compound.

In addition to the volatile compounds, the slow release generator may have incorporated therein fillers, oils, dyes, antioxidants, stabilizers or plasticizers.

The invention will now be illustrated with reference to the drawings accompanying the provisional specification in which:

Figure 1 is a vertical cross-section of one preferred embodiment of the present invention,

Figure 2 is a vertical cross-section of

another preferred embodiment of the present invention, and

Figure 3 is a vertical cross-section of a further preferred embodiment of the present invention.

Figure 1 shows a vapour-emitter comprising a container 1 in the form of hollow cylinder having flanges 3 upon which a hollow spherical slow release generator 2, having a wall of about 2 mm thicknesses, is nestled thereby closing the lower end of the container 1 and forming a reservoir 4 in the upper part thereof. The container 1 is rotatably mounted about the axis 5 on a wall 6. The hollow spherical generator comprises 80 %w of a thermoplastic carrier and 20 %w of a perfume (HX 4530 ex IFF, Holland).

Figure 2 is similar to Figure 1 except that the container 1 is not rotatably mounted on a wall but is provided at the upper and lower ends thereof perforations 7 which enables the container 1 to be supported on a support, e.g. on a shelf 8, without the spherical generator 2 being dislodged from its nestled position.

Figure 3 shows a vapour-emitter comprising a container 1 in the form of a hollow cylinder having positioned at one end thereof the same slow release generator in the form of a reciprocally mounted piston head which closes the lower end of the container 1 and forms a reservoir 4 in the upper part thereof. Rods 9, 10 are provided on the exposed surface of the generator for moving the piston along the container 1. Instead of the generator being in the form of a piston head, a strip of generator may be provided on each of the exposed surfaces of a reciprocally mounted piston head.

The invention will now be illustrated by reference to the following example.

#### EXAMPLE

The vapour-emitter as illustrated in Figure 1 is supported on a wall in a room. The spherical generator continuously and slowly emits perfume downwardly into the atmosphere of the room and simultaneously continuously and slowly emits perfume inwardly into the reservoir to produce a store of perfume-laden air. The length and diameter of the container were such that the stored perfume does not diffuse, to any significant extent, through the upper end of the container into the atmosphere of the room. The container is then rotated and the spherical generator rolls or slides down the container thereby reducing the volume of the reservoir to expel rapidly a boost of stored perfume-containing air, from the lower end of the container, into the atmosphere of the room and thereby considerably increases the smell of perfume in the room. This rotation of the container

was repeated when necessary.

WHAT WE CLAIM IS:—

1. A vapour-emitter capable of continuously and slowly emitting vapours, and  
5 repeatedly and rapidly expelling a boost  
of vapours, into the atmosphere surrounding the container, comprising a container  
having positioned therein, at least one slow  
10 release generator as hereinbefore defined,  
the container being provided with at least  
one opening at each of two different locations, and the slow release generator being  
part of or forming a vapour-tight partition  
15 in contact with the atmosphere on both  
sides of the partition.

2. A vapour-emitter as claimed in claim  
1, wherein the container is a hollow cylindrical container.

20 3. A vapour-emitter as claimed in claim  
1 or 2, wherein a piston is reciprocally

mounted within the container, the whole  
or part of each exposed surface of the  
piston being a slow release generator.

4. A vapour-emitter as claimed in claim 25  
2, wherein the hollow cylindrical container  
has a substantially circular cross-section, a  
spherical slow release generator is slidably  
or rotatably mounted within the container,  
and stops are located at the upper and 30  
lower ends of the inner surface of the  
container.

5. A vapour-emitter as claimed in claim  
1, substantially as hereinbefore described  
with particular reference to Figures 1, 2 35  
or 3.

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PROVISIONAL SPECIFICATION

3 SHEETS

*This drawing is a reproduction of  
the Original on a reduced scale  
Sheet 1*

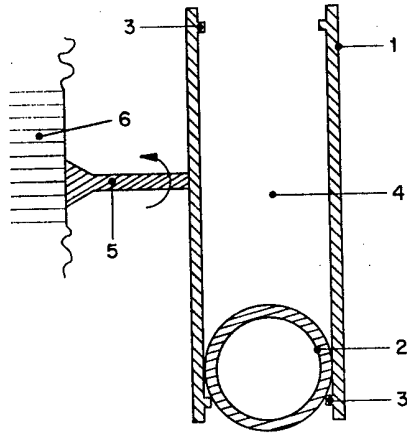


FIGURE 1

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PROVISIONAL SPECIFICATION

3 SHEETS

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the Original on a reduced scale*

Sheet 2

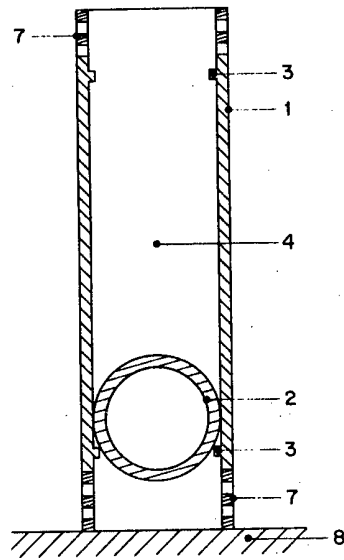


FIGURE 2

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PROVISIONAL SPECIFICATION

3 SHEETS

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Sheet 3*

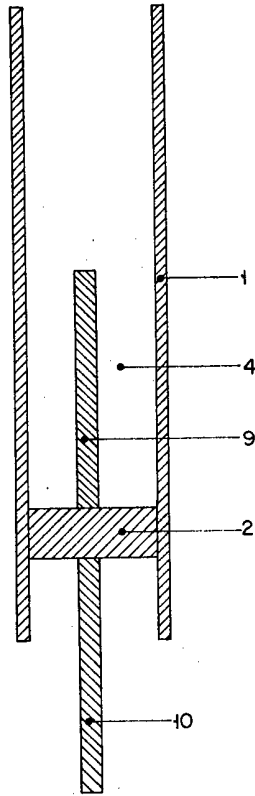


FIGURE 3