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The document is designated as:

Exhibit 1015 - FR 2886160A1 (Goubet)



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(56) List of documents cited in the preliminary
search report: Please refer to the end of this
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(73) Holder(s):

(60) References to other related national
documents:

(74) Agent(s): GERMAIN & MAUREAU

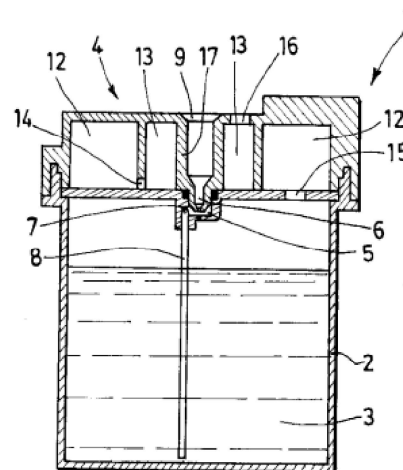
(54) ESSENTIAL OIL DIFFUSER.

(57) The present invention relates to an essential oil
diffuser (1) comprising:

- an oil (3) reservoir (2),
- a diffuser head (4) comprising a diffusion chamber (5) in which oil droplets are produced, said chamber (5) comprising a compressed air inlet (9), a venturi cone (7), and an oil inlet (10),

characterized in that:

- the diffusion chamber (5) is arranged to initially direct the flow of oil droplets created within it towards the inside of the reservoir (2),
- said diffuser head (4) further comprises vaporization means (12, 13, 14), arranged to break the oil droplets into microdroplets and diffuse said microdroplets into the ambient air in the form of an oil vapor. The invention also relates to an essential oil diffusion device, characterized in that it comprises one or more diffusers as above, said diffuser(s) being connected to a pneumatic compressed air distribution system.



The present invention relates to an essential oil diffuser.

In certain public places, with little ventilation or frequented by large numbers of people, it is sometimes necessary to diffuse scented air to improve or purify the quality of the atmosphere or simply to make it more pleasant.

5 Essential oil diffusers may be used for this purpose. Indeed, in addition to their particularly pleasant, refreshing fragrance, essential oils have beneficial properties for well-being.

Known essential oil diffusers take the form of oil reservoirs fitted with a diffuser head to which a compressed air supply is connected to trigger the diffusion.

10 However, due to its pressurized state, the compressed air generally arrives in the diffuser head rather abruptly, with the result that a large quantity of oil droplets is rapidly and abruptly diffused into the ambient atmosphere under high pressure with no real control over this diffusion. Furthermore, such diffusion is also noisy.

Such diffusion may be felt as harsh by those present and is detrimental to
15 establishing a refreshing, relaxing atmosphere. In this way, the oil diffusion system and process run counter to the beneficial effects expected from the intrinsic properties of the oil itself.

The present invention aims to remedy this problem by offering an essential oil diffuser which diffusion, although triggered by a compressed air supply, is controlled,
20 in particular by enabling the oil to be diffused in the form of an oil vapour, for example in the form of particularly fine microdroplets.

The present invention relates to an essential oil diffuser comprising:

- an oil reservoir,
- a diffuser head comprising a diffusion chamber in which oil droplets are
25 produced, said chamber comprising a compressed air inlet, a venturi cone, and an oil inlet,

characterized in that:

- the diffusion chamber is arranged to initially direct the flow of oil droplets into the reservoir,

- said diffuser head further comprises vaporization means, arranged to break the oil droplets into microdroplets and to diffuse said microdroplets into the ambient air in the form of an oil vapor.

The specific arrangement of the diffuser according to the invention enables the size of the oil microdroplets diffused into the ambient air to be reduced to a minimum. As a result, the oil mist diffused at the outlet of the diffuser is not harsh. Furthermore, due to the fineness of the microdroplets, this mist is non-flammable. The diffusion is controlled, gentle, and particularly quiet.

Moreover, as the entire diffusion operation prior to the final release of the oil microdroplets takes place entirely inside the reservoir and the diffuser head, there is no loss of product. This embodiment also allows the problem of air inlet clogging caused by drops of essential oil to be avoided.

The diffuser according to the invention may operate within a compressed air pressure range of 0.05 bar to 0.5 bar. In particular, very low-pressure operation significantly reduces the noise of the diffusion.

In a preferred embodiment of the invention, said vaporization means comprise at least two concentric circular enclosures, an outer enclosure and an inner enclosure, communicating with each other via a passage, said two enclosures and said passage forming at least one baffle.

Advantageously, said outer enclosure, respectively said inner enclosure, comprises an inlet for said droplet flow, said inlet being substantially diametrically opposed to said passage between the two enclosures.

Preferably, therefore, the inner enclosure, respectively the outer enclosure, comprises an outlet for said microdroplets, said outlet being substantially diametrically opposed to said passage between the two enclosures.

Thus, due to the particular circular shape and the specific arrangement of the inlet, passage, and outlet of the two enclosures, the droplets follow a very particular path, allowing their size to be reduced as much as possible and subsequently controlling their diffusion into the ambient air. In particular, this reduction in droplet size enables a non-harsh, highly atomized oil mist or vapour to be silently diffused.

Preferably, the diffuser head is permanently attached to the oil reservoir, said diffuser thus forming a one-piece device.

In this way, it is possible to increase the pressure of the compressed air and therefore the intensity of diffusion, without causing an increase in unwanted external oil splashes. Moreover, such an embodiment avoids the problems of clogging and stoppage of the diffuser due to the viscosity of the oils. At the same time, leakage of liquids, particularly essential oils, due to internal pressure is prevented. The one-piece device thus formed constitutes a self-contained diffusion unit capable of operating on any air supply, by a simple connection to the pneumatic system.

Such an embodiment allows disposable or recyclable diffusers to be produced, which is advantageous for the environment.

Another subject-matter of the invention is an essential oil diffusion device, characterized in that it comprises one or more diffusers as above, said diffuser(s) being connected to a pneumatic compressed air distribution system.

Further advantages and variants of the present invention will be clarified with the aid of the following description and the appended drawings in which:

- Fig. 1 is a cross-sectional view of a diffuser according to the invention,
- Fig. 2 is a partial view of the diffuser head of a diffuser according to the invention,
- Fig. 3 is a simplified diagram showing the path taken by the flow of droplets in the concentric chambers of the diffuser according to the invention until they exit into the ambient air.

Fig. 1 shows an essential oil diffuser 1 according to the invention. This diffuser 1 comprises an oil 3 reservoir 2 and a diffuser head 4, permanently attached to the reservoir 2 in the example shown. This diffuser head may be attached to the reservoir 2 by ultrasonic welding or by any other means, such as gluing or screwing. The reservoir may have a capacity of 400 ml, for example. Preferably, the reservoir 2 is made of glass or plastic.

As shown in Fig. 1 and 2, the diffuser head 4 comprises a diffusion chamber 5 within which oil droplets are produced. The diffusion chamber 5 comprises a

compressed air inlet 6, a venturi cone 7, and an oil inlet in the form of the upper end 10 of a dip tube 8 connected to the essential oil 3 contained in the reservoir 2.

The diffuser head 4 also comprises, as shown in Fig. 1, two concentric circular enclosures, an outer enclosure 12 and an inner enclosure 13, communicating with
5 each other via a passage 14, said two enclosures and said passage forming at least one baffle, as shown in Fig. 3.

As shown in Fig. 1, the outer chamber 12 communicates with the inside of the reservoir 2 via a droplet flow inlet 15. This droplet flow inlet is substantially diametrically opposed to the passage 14 between the two enclosures 12 and 13.

10 The inner chamber 13 comprises an outlet 16 for the microdroplets to the ambient air. This outlet 16 is substantially diametrically opposed to the passage 14 between the two enclosures 12 and 13.

The compressed air and droplet flow path will now be explained with reference to Fig. 1-3.

15 Compressed air is supplied by a compressor, not shown, and penetrates the diffuser head 4 via an air inlet channel 9, connected to said diffusion chamber 5, said inlet channel 9 being arranged inside said inner enclosure 13, concentrically to this inner enclosure. The path of the compressed air is shown in Fig. 2 by the arrows F. When the compressed air flows into the diffusion chamber 5, the essential oil 3 is
20 drawn into the diffusion chamber 5 by the vacuum created and flows into this diffusion chamber 5 through the upper end 10 of the dip tube 8. Air and essential oil are mixed within the diffusion chamber 5 and a flow of oil droplets is created.

This flow of oil droplets is then carried along by the compressed air and exits the diffusion chamber 5 through an outlet 11 towards the inside of the reservoir 2.

25 The droplet flow path is marked by the arrows G in Fig. 3.

Under the effect of the compressed air pressure, the droplets leaving the diffusion chamber 5 are pushed towards the inside of the reservoir 2 and then towards the inlet 15 of the outer enclosure 12, into which they emerge. Within this outer enclosure 12, they collide with the walls separating the outer enclosure 12
30 from the inner enclosure 13 and, under the pressure of the compressed air, are made to follow a baffled path, as shown by the arrows G in Fig. 3. The droplets thus

pass through the passage 14, then strike the walls separating the inner enclosure 13 from the walls 17 of the compressed air inlet channel 9. Along this path, and as a result of the many shocks they receive, the droplets are broken up into micro-droplets.

5 Still under the pressure of the compressed air, the microdroplets are pushed towards the outlet 16 of the inner enclosure 13. The microdroplets are diffused into the ambient air in the form of essential oil vapour.

10 In another embodiment of the invention, the droplet flow inlet is located in the inner enclosure, and the microdroplet outlet to the ambient air is located in the outer enclosure. In one such embodiment, the droplets are also made to follow a baffled path similar to that described above.

15 Thus, due to the particular circular shape and the specific arrangement of the inlet, passage, and outlet of the two enclosures, the droplets follow a very particular path, allowing their size to be reduced as much as possible and subsequently controlling their diffusion into the ambient air. In particular, this reduction in droplet size enables a non-harsh, highly atomized oil mist or vapour to be silently diffused.

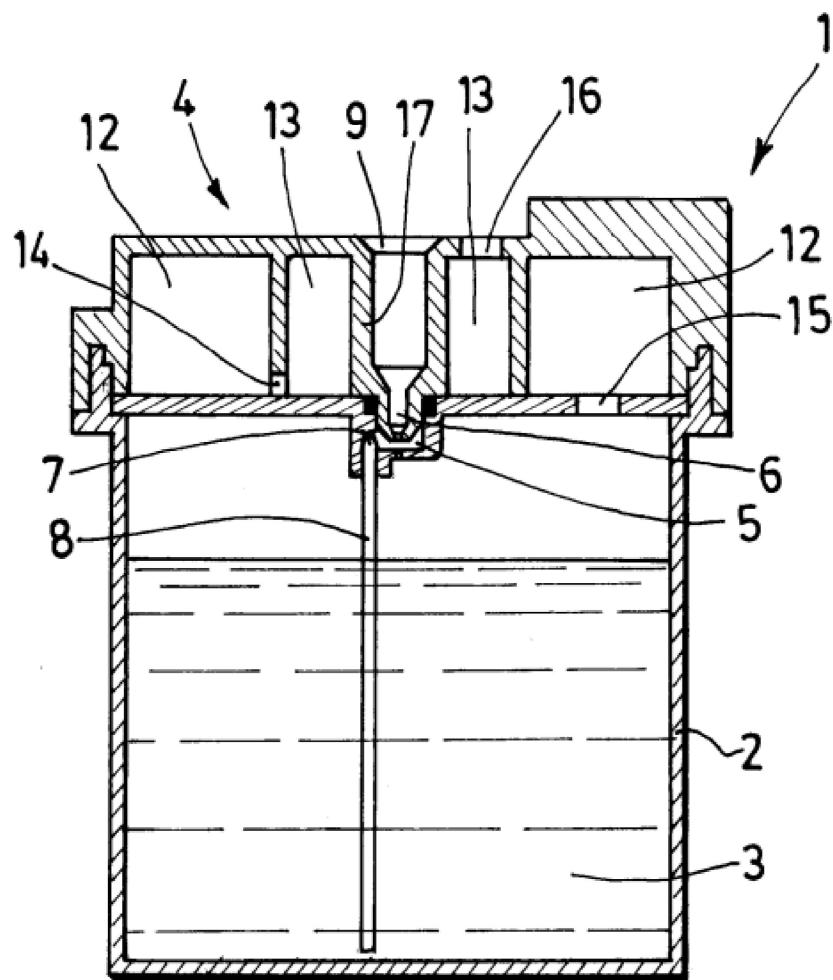
20 The essential oil diffuser according to the invention may be coupled to other diffusers on a compressed air distribution network, enabling essential oils to be diffused at several different locations simultaneously. The compressed air distribution network may be electrically controlled to trigger diffusions of a given duration at selected intervals.

CLAIMS.

1. Essential oil diffuser (1) comprising:
 - an oil (3) reservoir (2),
 - a diffuser head (4) comprising a diffusion chamber (5) in which oil droplets are produced, said chamber (5) comprising a compressed air inlet (9), a venturi cone (7), and an oil inlet (10),characterized in that:
 - the diffusion chamber (5) is arranged to initially direct the oil droplet flow created therein towards the inside of the reservoir (2),
 - said diffusion head (4) further comprises vaporization means (12, 13, 14), arranged to break the oil droplets into microdroplets and to diffuse said microdroplets into the ambient air in the form of an oil vapor.
2. Diffuser (1) according to claim 1, characterized in that said vaporization means comprise at least two concentric circular enclosures, an outer enclosure (12) and an inner enclosure (13), communicating with each other via a passage (14), said two enclosures and said passage forming at least one baffle.
3. Diffuser (1) according to the preceding claim, characterized in that said outer enclosure (12), respectively said inner enclosure, comprises an inlet (15) for said droplet flow, said inlet (15) being substantially diametrically opposed to said passage (14) between the two enclosures (12, 13).
4. Diffuser (1) according to the preceding claim, characterized in that the inner enclosure (13), respectively the outer enclosure, comprises an outlet (16) for said microdroplets, said outlet (16) being substantially diametrically opposed to said passage (14) between the two enclosures (12, 13).

5. Diffuser (1) according to any of the preceding claims, characterized in that the diffuser head (4) is permanently attached to the oil reservoir (2), said diffuser thus forming a one-piece device.
6. Essential oil diffusion device, characterized in that it comprises one or more diffusers (1) according to any of claims 1 to 5, said diffuser(s) (1) being connected to a pneumatic compressed air distribution system.

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FIG.1

2/2

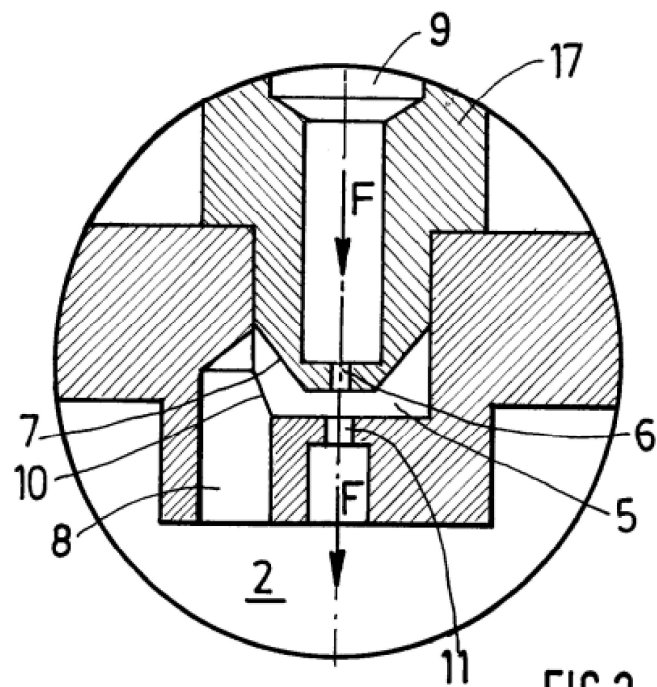


FIG. 2

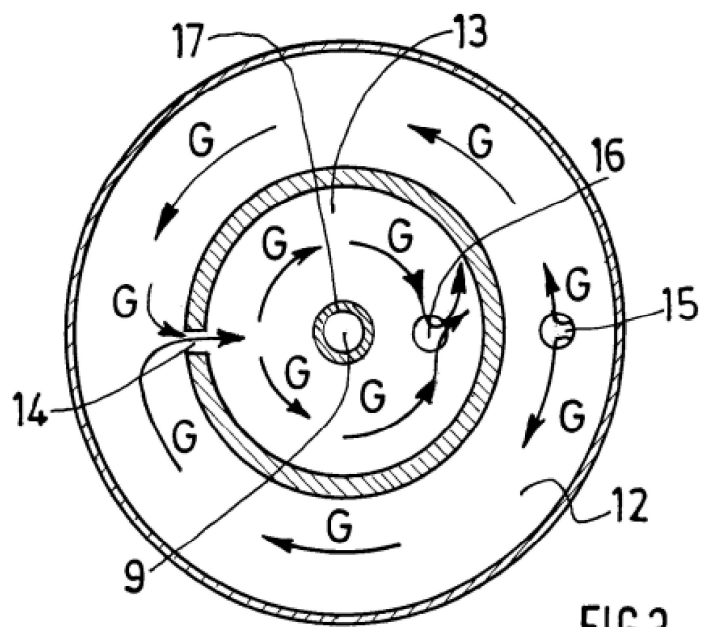


FIG. 3

FRENCH REPUBLIC



PRELIMINARY SEARCH REPORT
established on the basis of the last claims filed
before the start of the search

National Registration No.

FA 664747
FR 0505444

DOCUMENTS CONSIDERED RELEVANT		Claim(s) concerned	Classification assigned to the invention by The INPI
Category	Citation of the document with indication, where necessary, of the relevant parts		
A	US 6 405 944 B1 (BENALIKHOUDJA KARIM) June 18, 2002 (2002-06-18) * the entire document *	1-6	A61L9/14

A	GB 525 736 A (GEOFFREY WARNER PARR; CHARLES AUSTEN LIMITED) September 3, 1940 (1940-09-03) * the entire document *	1-6	

A	US 6 482 357 B1 (FOX RODNEY THOMAS ET AL) November 19, 2002 (2002-11-19) * the entire document *	1-6	

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			TECHNICAL AREAS SEARCHED (Int.CL.7)
			A61L
Search completion date August 12, 2005		Examiner Connor, M	
CATEGORY OF CITED DOCUMENTS X: particularly relevant on its own Y: particularly relevant in combination with another document in the same category A: technological background O: non-written disclosure P: inserted document		T: theory or principle behind the invention E: patent document with a date prior to the filing date and which was not published until the filing date or a later date. D: cited in the application L: cited for other reasons &: member of the same family, corresponding document	

ANNEX TO THE PRELIMINARY SEARCH REPORT RELATING TO FRENCH PATENT APPLICATION NO. FR 0505444 FA 664747

This appendix lists the members of the patent family relating to the patent documents cited in the preliminary search report referred to above.

The said members are contained in the computer file of the European Patent Office on the date of **Aug. 12, 2005**

The information provided is for guidance only and does not engage the responsibility of the European Patent Office or the French Administration

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For information on this annex: see Official Journal of the European Patent Office, No.12/82