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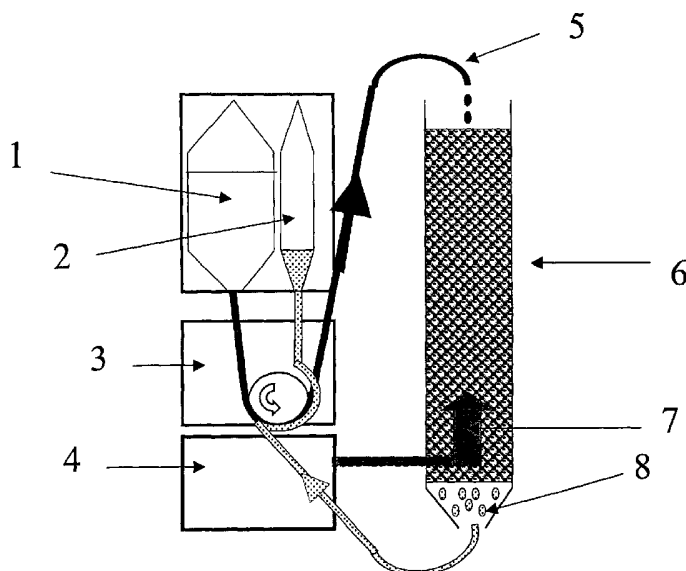
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- (71) Applicant (for all designated States except US): **NESTEC S.A.** [CH/CH]; P.O. Box 353, CH-1800 Vevey (CH).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **LANGOURIEUX, Sylvie** [US/US]; 140 Taylor Road, New Milford, CT 06776 (US). **SCOVILLE, Eugene** [US/US]; Cornwall Drive 29, New Milford, CT 06776 (US). **CHRISMAN, Randall, C.** [US/US]; 325 Sanford Road, Southbury, CT 06488 (US).
- (74) Agent: **BORNE, Patrice**; Av. Nestlé 55, CH-1800 Vevey (CH).
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Declarations under Rule 4.17:

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[Continued on next page]

(54) Title: AROMA DISPENSER



(57) Abstract: The invention refers to an aroma dispensing device comprising - first storage means (1) for storing an aroma containing solvent, - extraction means (6) for extracting the aroma from the solvent to substantially remove aroma from the solvent and for dispensing the aroma out of the dispensing device, wherein - second storage means (2) are provided to salvage the solvent when depleted in aroma after extraction by the extraction means. It also relates to a process for dispensing aromas comprising the steps of extracting aroma from a fluid non volatile solvent by contacting the fluid non volatile solvent containing aroma with gas in an extracting mean, and salvaging the solvent when depleted in aromas, and to a method wherein aromas are dispersed in a liquid solvent characterized in that the solvent is salvaged when depleted in aromas.



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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

AROMA DISPENSER

Field of the invention

- 5 The present invention relates to an apparatus dedicated to dispense aromas, and to a process for dispensing aromas.

Background of the invention

- 10 Aroma dispensers and air fresheners are known in the prior art.
US 6029901 relates to an air freshener dispenser comprising a housing having a hole, a porous bladder adapted for holding a scented liquid, the housing having a plurality of spaced apart vent slits to permit the passage of the aroma. This apparatus presents the disadvantage that all the aroma is released very rapidly, and also that the quantity
15 of the aroma delivered is not controlled.

- GB 2358587 discloses an aroma dispenser that allows an aroma to be carried by air circulated by a heater. The aroma dispenser comprises a layer of absorbent for a volatisable aromatic substance placed between a pair of parallel plates, and a central
20 boss located on one of the plates, preventing compression of the absorbent layer and engaging with a threaded projection. This system traps the absorbent layer between plates so that the absorbent layer is closely adjacent, and in contact with at least one plate, the emission of vapour is constrained to take place through the peripheral edge of the absorbent. This is an attempt to control the emission of aromas, but this system
25 is not easy to use as being messy when the absorbent has to be changed, and still presenting the problems of convector heaters (that is to say an impression of stale air).

- GB 2253733 concerns a display apparatus for displaying advertising posters and further comprising an aroma dispenser and/or an audio playback system. The aroma
30 concentrate, for example a coffee aroma concentrate, is released intermittently in fine spray form into the atmosphere, using atomising heads. The aroma concentrate is replenished by removing a concentrate bottle, unscrewing the atomising head before pouring the refill down the neck of the concentrate bottle. The aroma displaying system is a spraying system, not convenient when the aroma is in an oil solvent, for
35 example. Furthermore, it is messy and difficult to refill.

US 2001/0012495 relates to dispensers for active materials employing heat conductive elements to distribute heat from a burning flame at a wick to a simmer

plate and to the body of a solid fuel containing the active material, so as to more rapidly liquefy the solid fuel and to more uniformly and intensely heat such fuel to volatilise the active material. The fuel may be paraffin wax and may contain fragrances, air fresheners, odour interactants, herbal and medicinal substances, among
5 others. The dispenser is quite simple and easy to handle, but the aromas can be damaged or ruined by being heated and can suffer from being in close contact with a fuel.

DE 29708840 discloses a perfume-dispensing equipment in metered quantities. A
10 vaporising dish is contained in a housing, etherical materials being drip-fed to it with quantity and timing of the drip-feed being regulated by a controller unit. The latter also regulates a pump delivering from one or more interchangeable storage bottles. Each bottle can be sealed by a membrane which can be punctured by a needle. Two needles with side slots can be mounted in the end face of the bottle mounting.
15 The vaporising dish can be interchangeable. An insert in the housing can have a rotary regulator for the drip frequency, this also actuating a ventilation system.

As can be understood, different approaches have been tempted to obtain a satisfactory aroma dispenser. Different techniques, listed in the above-mentioned patents, have
20 been used, all having disadvantages. One of the common disadvantages lies in the filling up of the aroma, which is usually uneasy and messy. Another disadvantage relates to the release of oil based components that can soil the place of dispense. Another disadvantage relates to the inconstant intensity and/or discontinuous release of aroma according to the known techniques. It is a purpose of the invention to
25 provide a new aroma delivery system, and a new process to deliver aroma, bypassing the problems of the known apparatus and processes.

Summary of the invention

30 The present invention relates to an aroma dispenser salvaging a carrier solvent after it has delivered the aroma, and an extracting means being in an embodiment a stripping column. The invention also relates to a process for dispensing aromas, characterised by a salvage of the aroma carrying solvent.

Brief description of the drawings

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Fig.1 is a schematic view of the aroma dispenser according to the invention.

Detailed description of the invention

Referring to Fig. 1, the dispenser is referenced under number 1 which represents the supply container and 2 the waste container, number 3 represents the liquid pump, preferably a dual peristaltic pump, and 4 the gas pump, number 5 represents the solvent containing aroma, number 6 the stripping column, number 7 the gas flow, and number 8 the spent oil free of aromas.

According to a first aspect of the invention, there is provided an aroma dispenser. It mainly has three characteristics that can be used alone or in combination.

The first characteristic lies in salvaging a carrier solvent after it has delivered aroma and has become depleted in aroma. For that, the apparatus comprises two containers or more, at least one being a supply container (1) containing a solvent combined with aroma(s) and at least one being a waste container (2) containing the solvent after extraction of the aroma(s), containing at the most residual aroma. Preferably, the containers have the same volume but volumes can also be different as long as the volume of the waste container is at least equal to the volume of the supply container.

The solvent is preferably a non aqueous and non volatile liquid phase, and is in a most preferred embodiment an oil phase. It can also be water, among others. For coffee applications, for example, the aromatized substrate is suitably a coffee oil or an emulsion of coffee oil and water or coffee extract. However coffee oil which contains as little moisture as possible is preferred; for example less than 4% moisture by weight. The coffee oil which is used may be any desirable coffee oil; it can be for example coffee oil obtained from commercial sources or produced by extracting it from spent coffee grounds and the like using procedures which are well known in the art. For example, the coffee oil may be expelled from freshly roasted coffee beans using commercially available oil expellers. This technique and other suitable techniques for extracting coffee oil from coffee beans are described in Sivetz (1979), pages 452 to 460. The source and the exact composition of the coffee oil used are not critical. Other oils may be used in full or partial replacement of coffee oil.

For coffee applications, the aroma carried by the substrate is preferably coffee aroma. Conveniently, coffee aroma is made up of natural coffee aroma gases. The coffee aroma gases may be collected at any of several points in the processing of coffee, for example gases evolved during roasting of green coffee ("roaster gases"), gases

evolved during grinding of roasted whole beans ("grinder gases") and those evolved during infusion of ground roasted coffee ("infusion gases").

5 In another embodiment, it is possible to use an oil enriched with coffee aroma as protected in EP 0526766, the process consisting in transferring coffee aromas to an oil comprising the steps of:

transporting a condensation product frost of carbon dioxide charged with coffee aromas and water into a heat-regulated enclosure having a lower part for containing an oil bath and having an upper part for containing the frost and for venting sublimed
10 carbon dioxide;

regulating a temperature of the oil bath at a temperature above a freezing point of the oil and regulating a temperature in the enclosure above the oil bath so that during introduction of the frost into the enclosure, a layer of frost is formed and maintained above the bath, carbon dioxide of the frost is sublimated and water of the frost is
15 melted;

venting carbon dioxide sublimated from the frost from the enclosure upper part, removing aroma- and water-laden oil bath from the enclosure lower part, and adding oil to the bath to replace the oil removed from the enclosure, while introducing frost into the enclosure and regulating the temperatures; and

20 separating the bath removed from the enclosure to obtain separated aroma-laden oil and aroma-laden water components.

The content of EP 0526766 is incorporated to the present application by reference.

Preferably, the aroma is a food or beverage related aroma. The aroma may either be a
25 natural aroma or synthetic aroma, or a combination thereof. For example, the aroma can be chosen among the group consisting of vanilla, almond, chocolate, whisky, brandy, irish cream, bread, pastries, mushrooms, candies, liquorice, nougat, grenadine, mint, peppermint, spices as well as fruit aromas such as cherry, raspberry, strawberry, pineapple, blackcurrent, or even maple syrup aromas, cooked meat aromas,
30 and combinations thereof.

The containers are preferably removable flexible containers, such as pouches and the like. The pouches can be equipped with connection means of the fitment type. The connection means typically comprise a snap fitment that complementary engages a
35 connection means of the receiving member of the dispenser, e.g., a portion of hose. The connection means of the pouches and dispensers are of a complementary male-female type with latch means to allow a quick, secure and reliable interconnection. The fitment of the pouch may further comprise closing means, such as a plug

engaging a seat, closing off the bore of the fitment. Therefore, the pouches can conveniently and quickly be plugged to the dispenser by the operator. The closing means of the fitment also allows reclosing of the pouch once removed, so that the waste pouch does not leak and no precaution has to be taken by the user when
5 removing the pouch. Suitable examples of such connection means are the fitment system "Clean Clic[®]" commercialized by I.P.N Company in the Netherlands.

The fact that the carrier solvent is salvaged presents several advantages, including beneficial effects on the environment because it avoids release of the solvent in the
10 atmosphere during dispensing. It also allows proper disposal of oil, and reduced costs because the used oil located in the "waste" pouch can be remixed with aroma. Furthermore, another advantage can be seen in the fact that changing the bags can be achieved in a very clean way by changing an empty or almost empty supply pouch by a new and full supply pouch, and by changing a full "waste pouch" by a new and
15 empty one.

The second characteristic lies in the extracting mean (6) of the aroma from the solvent. According to an aspect of the invention, the extraction is carried out by a gas (7) that extracts aroma from the oil. The extraction is preferably carried out by
20 contacting aroma containing oil as a film, droplets, spray or combinations thereof with a current of gas. As a result of the gas contacting the aroma containing oil, the volatile aroma compounds are captured by the current of gas while the oil molecules, which are not vaporizable in volatile compounds, are not. These volatile aroma compounds are then released in suspension in the gas out of the dispenser.

25 For that, the extracting mean preferably comprises a stripping column (6) allowing a contact gas/oil. In a preferred embodiment, the column may be made of a hollow plastic member that contains mixing elements allowing the oil to make a falling film, and thus optimising the contact between oil and gas. Such mixing elements may be, for example, in-line static mixers such as marbles.

30 Preferably, gas is an extracting gas that can be safely and economically released in the atmosphere. Air is the preferred gas, and as the oil is running through the column, the aroma is more and more extracted by the air flow.

The liquid film should not be too thick in order to perform a good aroma extraction.
35 Accordingly, an optimal has to be found between parameters such as the column length, its diameter, the elements inside the column that slow down the liquid, and flows of air and oil. The column can be, for example, an in-line static mixer.

Of course, the extracting mean is not limited to a stripping column and can be any other suitable mean allowing to extract the aromas from the solvent such as bubbling of air in an oil reservoir, for example.

- 5 In the third characteristic of the invention, the extracting means is connected to at least two pumping means; i.e., a liquid pumping means (3) and a gas pumping means (4). The liquid pump(s) transport the solvent containing aroma (5) to the top of the extracting means and release the liquid by gravity into the extracting means, whereas the gas pump delivers gas upward from the bottom of the extracting means to the top.
- 10 The liquid pumping means can be further arranged to collect the waste oil (8) from the bottom of the extracting means to the waste container. For example, the liquid pump can be a two heads pump (3 bis), one head pushing the supply liquid into the extracting means and the other head helping the solvent free from aromas to go into the waste pouch. This can also be achieved by two different pumps, one pushing the
- 15 solvent containing aromas in the extracting mean and one pushing the solvent free of aromas in the waste pouch.

When the extracting mean is a column, for example, the air pump connected to the bottom of the column allows a rising air current and the liquid pump connected to the top of the column allows the liquid to go down the column, either by gravity or more

20 rapidly. The combination of these two pumps allows a countercurrent which facilitates the extraction of the volatile aroma from the solvent, for example a liquid fat phase. Consequently, the air leaving the column comprises the volatile aroma molecules.

- 25 The air pump can be any type of air pump available; however, it does not have to be a pump neither with a high flow nor with a very controlled flow, as slow variations of the airflow do not significantly modify the quality of the extraction and the intensity of the aroma release. The air pump can be replaced by any equivalent means known by the skilled person, such as a fan, for example.

30 The liquid pump can be any type of pump capable of pushing liquids; it can be for example a peristaltic pump, a pump with pistons or a diaphragm pump compatible with oil phases. Preferably, the pump pushing the liquid comprises a flow rate control means enabling to regulate the liquid flow rate on request.

- 35 This air pump and liquid pump system achieves many advantages. First of them, the extracting mean can be supplied continuously or intermittently; preferably, the extracting means is continuously fed in order to have a constant aroma released. Also, the fact that the liquid solvent is pumped allows a precise regulation of the liquid

flow, and consequently a regulated concentration of aroma in the air. Of course, if the third characteristic of the invention is not used, a drop to drop system is also suitable.

According to the invention, oil flow rates can be comprised of from 0.25 to 2g/min, preferably of from 0.35 to 1.0 g/min, even more preferably of about 0.5g/min, and airflow rates can be comprised of from 1 and 10 L/min, preferably of from 1.5 to 5 L/min, even more preferably of about 2L/min.

According to another aspect of the invention, there is provided a process for dispensing aromas. The process comprises the steps of extracting the aromas from a fluid fat phase, namely a solvent. Preferably, the extraction is achieved by way of inversed currents of solvent and a gas, preferably air, in an extracting means which can comprise a stripping column. Accordingly, the extraction is a gas-oil extraction, preferably air-oil extraction. Another step of the process lies in salvaging the solvent after aromas have been extracted. In a preferred embodiment, inversed currents are created by means of pumps connected to each end of the extracting mean. For example, an air pump can be connected to the bottom of the extracting mean and another pump can be connected to the top of the said extracting mean, this second pump being able to push liquids (namely the fat phase solvent).

20

Another aspect of the process according to the invention lies in the refilling with aroma of the depleted solvent which has gone through at least one extraction. Accordingly aromas are blent together with the salvaged oil until an homogeneous mixture is obtained. When the aroma contains water, some water can remain in the salvaged oil and it is necessary to remove it, for example by achieving a decanting step.

25

The dispenser of the invention may serve to dispense food or beverage related aroma in foodservice areas such as restaurants, catering, convenient stores, bakery, kitchens and other commercial establishments. The dispenser may also be mounted to dispense aroma in foodservice devices such as vending machines and the like.

30

Examples

The following examples are illustrative of some of the products and methods of making the same falling within the scope of the present invention. They are not to be considered in any way limitative of the invention. Changes and modifications can be made with respect to the invention. That is, the skilled person will recognise many

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variations in these examples to cover a wide range of formulas, ingredients, processing, and mixtures to rationally adjust the naturally occurring levels of the compounds of the invention for a variety of applications.

5 **Example 1: Range of flows used and effect on aroma concentration delivered.**

An apparatus is built including the three aspects (characteristics) of the invention. Oil flows and airflows are modified to find the best performance of aroma extraction. Volatile organic compounds (VOC) are measured on the top of the extracting mean
10 which is here a stripping column.

Oil flow (g/min)	Air flow (g/min)	VOC on top of the column (mg/min)	Extraction efficiency (%)
0.92	4.78	1.14	54
0.92	2.50	1.88	62.8
0.46	5.10	1.39	73.5
0.46	2.55	1.43	69.6
0.23	5.01	1.18	82.1
0.23	2.83	0.94	89

15 **Example 2: Preparation of aromatized oil with coffee aroma**

The aroma containing oil is prepared according to the following method.
1034 g/h frost are introduced into an enclosure from 300 kg/h roasted coffee. The frost contain 85.5% carbon dioxide, 12.6% ice and 1.9% aromas. Accordingly, the
20 aromas are introduced into the enclosure at a rate of 19.6 g/h. A 17 cm deep layer of frost is formed, the temperature of the frost during sublimation being -78.5.degree. C. and the average residence time 54 minutes.

The oil bath (formed by an emulsion of oil and water) has a volume of 0.8 liter and a
25 temperature of 30.degree. C. with an average residence time of the oil of 34 minutes, the oil supply rate being 1.275 kg/h.

The oil-water emulsion was removed at a rate of 1.424 kg/h with an aroma output of

19 g/h. The water content of the emulsion was 9.1%. 95% of the aromas present in the frost are thus recovered in the emulsion by means of the process disclosed.

5 **Example 3: Composition of the liquid contained by the supply pouch, when aromas are bakery aromas.**

Aroma solution:

The breadcrust aroma is prepared as follows: in one litre ethanol are added, to make solution 1:

10 50 g 2-acetyl pyrazine

 10 g 2-acetyl thiazole

 30 g diacetyl

 5 g 2-ethyl-3-methyl pyrazine.

 0.1 g of this composition is added to 1 litre water salted beforehand with 3 g NaCl per
15 litre to make solution 2. 1.0 mL of an aqueous solution containing 50 g/l 2-carbomethoxy-1-pyrroline is added to solution 2.

The delivered aroma has strong notes of the "cereal" and "breadcrust" type and a rounded "grilled" note.

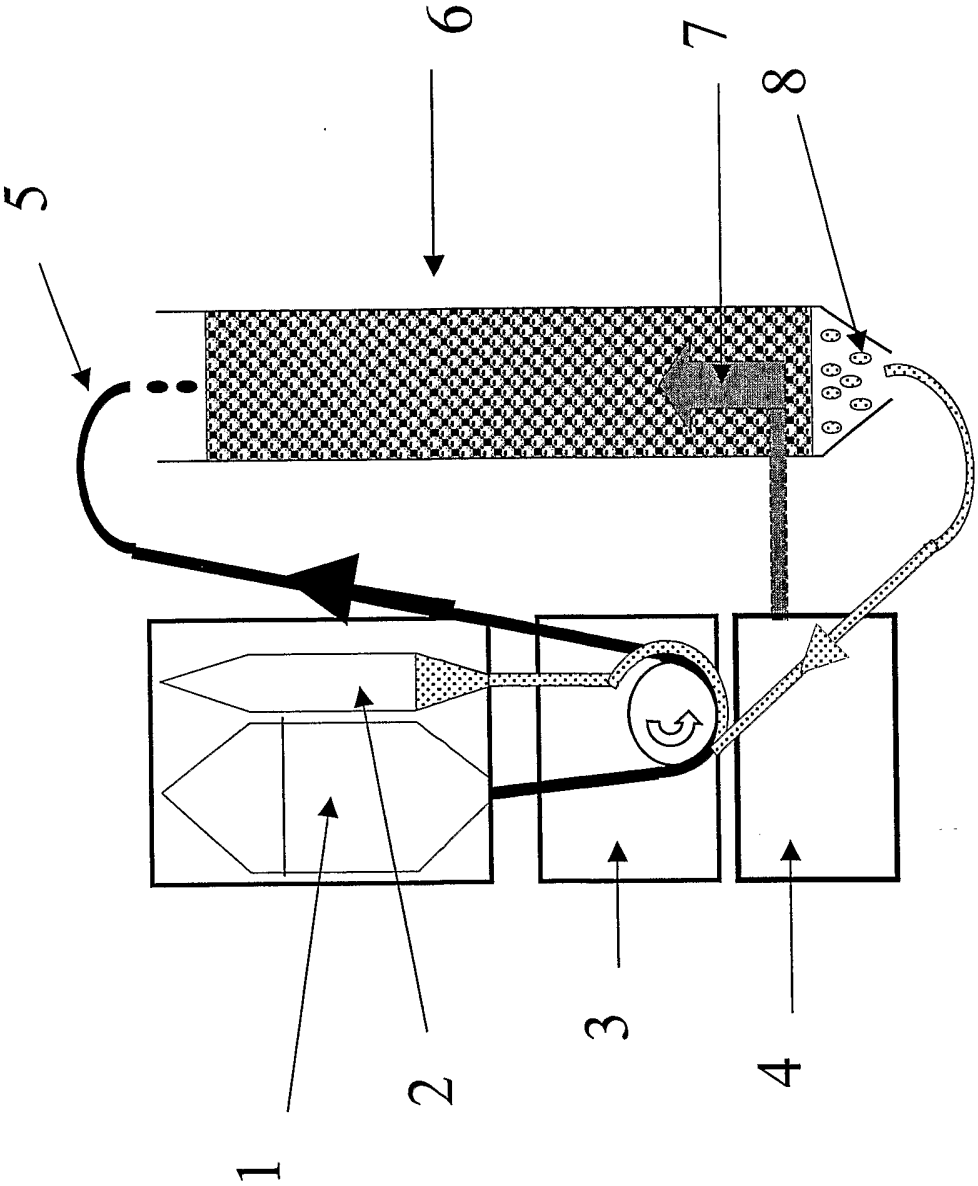
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Claims

1. Aroma dispensing device comprising:
first storage means for storing an aroma containing solvent,
5 extraction means for extracting the aroma from the solvent to substantially remove aroma from the solvent and for dispensing the aroma out of the dispensing device, wherein
second storage means are provided to salvage the solvent when depleted in aroma after extraction by the extraction means.
10
2. Aroma dispenser according to claim 1, wherein the solvent is a non volatile phase.
3. Aroma dispenser according to claim 1 or claim 2, wherein the aromas is a food or beverage related aroma.
15
4. Aroma dispenser according to one of claims 1 to 3 wherein the extracting means is a stripping column.
5. Aroma dispenser according to claim 4 wherein the column works with inversed
20 currents of solvent/aroma mixture and gas.
6. Aroma dispenser according to one of claims 1 to 5 wherein the extracting mean is connected with at least two pumps.
- 25 7. Aroma dispenser according to claim 5 or claim 6 wherein an air pump is connected to the bottom of the extracting mean.
8. Aroma dispenser according to one of claims 5 to 7 wherein a pump is connected to the top of the extracting mean.
30
9. Process for dispensing aromas comprising the steps of extracting aroma from a fluid non volatile solvent by contacting the fluid non volatile solvent containing aroma with gas in an extracting mean, and salvaging the solvent when depleted in aroma.
35
10. Process according to claim 9, wherein the step of extracting comprises having inversed currents of solvent and gas.

11. Process according to claim 10, wherein inversed currents are created by a combination of at least two pumps.
12. Process according to claim 9 or claim 10, wherein oil flow rates are comprised
5 between 0.25 to 2g/min, preferably 0.5g/min and air flow rates are comprised between 1 and 10 L/min, preferably 2L/min.
13. Method wherein aromas are dispersed in a liquid solvent characterized in that the solvent is salvaged when depleted in aromas.
- 10 14. Method according to claim 13 wherein the salvaged solvent is refilled with aromas and re-used.

Fig.1



INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/08355

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61L9/12 A23F5/50 A23L1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61L A23F A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 647 466 A (VAN BROCKLIN LESTER P ET AL) 3 March 1987 (1987-03-03) figures 3-5; examples 1-6 ----	1-14
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X,P	US 6 435 419 B1 (DAVIS GORDON D) 20 August 2002 (2002-08-20) figure 1 ----	1,2,6,8, 9,11,13
X	DE 298 15 783 U (SIEGRIST LEOPOLD GMBH) 10 December 1998 (1998-12-10) the whole document -----	1,9 8

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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02/12/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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