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Address: COMMISSIONER FOR PATENTS
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/353,951	10/09/2018	10092918	1.106B.16	5613

4219 7590 09/19/2018
MALLOY & MALLOY
2800 S.W. THIRD AVENUE
HISTORIC CORAL WAY
MIAMI, FL 33129

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Air Essentials Inc., Miami, FL
Marc Levy, Palmetto Bay, FL;
Craig Huck, Waterford, PA;
Steven Semoff, New City, NY;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.



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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/353,951	11/17/2016	Marc Levy	1.106B.16	5613

4219 7590 09/06/2018
MALLOY & MALLOY
2800 S.W. THIRD AVENUE
HISTORIC CORAL WAY
MIAMI, FL 33129

EXAMINER

HWU, DAVIS D

ART UNIT	PAPER NUMBER
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3744

NOTIFICATION DATE	DELIVERY MODE
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09/06/2018

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATENTS@MALLOYLAW.COM

Response to Rule 312 Communication	Application No.	Applicant(s)
	15/353,951	LEVY ET AL.
	Examiner	Art Unit
	Davis Hwu	3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. ☒ The amendment filed on 27 August 2018 under 37 CFR 1.312 has been considered, and has been:

- a) ☒ entered.
- b) ☐ entered as directed to matters of form not affecting the scope of the invention.
- c) ☐ disapproved because the amendment was filed after the payment of the issue fee.

Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.

- d) ☐ disapproved. See explanation below.
- e) ☐ entered in part. See explanation below.

	/Davis Hwu/ Primary Examiner, Art Unit 3744
--	--

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Air Essentials Inc.

Inventors: Marc Levy, Craig Huck and Steven Semoff

Serial No.: 15/353,951

Filing Date: November 17, 2016

For: FLUID DISPERSION ASSEMBLY

Confirmation No. 5613
Customer No. 04219
Examiner Davis D. Hwu
Group Art Unit 3744

2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AFTER ALLOWANCE UNDER RULE 312

In response to the Notice of Allowance and Issue Fee Due and in accordance with the provisions of Rule 312, it is respectfully requested that the following amendments be made to the above-referenced patent application:

Amendments to the Specification begin on page 2 of this paper.

Remarks begin on page 3 of this paper.

Amendments to the Specification:

Please replace the paragraph beginning on page 22, line 14 with the following amended paragraph:

As illustrated in Figure 6, the diffusion assembly 200 comprises an air inlet 210 and an atomizer assembly 220. The atomizer assembly 220 comprises an atomizer air inlet channel 222, a mixing chamber 226, and an atomizer exhaust aperture 228''. The atomizer air inlet channel 222 is interconnected to the compressed air source via the air inlet 210. Moreover, the atomizer air inlet channel 222 includes an inlet aperture 223 and an outlet aperture 223'', as may be seen in Figure 6. As may also be seen in the illustrative embodiment of Figure 6, the inlet aperture 223 and outlet aperture 223'' are substantially equal in diameter, [[and]] as is the channel 223' disposed therebetween.

REMARKS

It is respectfully requested that the above noted amendments to the specification be made under the provisions of Rule 312. The requested changes are for the purpose of correcting informalities and/or inconsistencies in the language of the specification. Care was taken not to add any new subject matter. Due to the nature of the changes requested, it is believed that there will be no additional searching or other significant amount of time required of the Examiner in the review and entering of this Amendment.

Respectfully submitted,

MALLOY & MALLOY, P.L.
Attorneys for Applicant
2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129
(305) 858-8000

By: /John Fulton, Jr./
John Fulton, Jr.
Reg. No. 46,716
Email: patents@malloylaw.com

Date: August 27, 2018

Electronic Patent Application Fee Transmittal

Application Number:	15353951			
Filing Date:	17-Nov-2016			
Title of Invention:	FLUID DISPERSION ASSEMBLY			
First Named Inventor/Applicant Name:	Marc Levy			
Filer:	John Fulton/Denise Morales			
Attorney Docket Number:	1.106B.16			
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	2501	1	500	500

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				500

Electronic Acknowledgement Receipt

EFS ID:	33552143
Application Number:	15353951
International Application Number:	
Confirmation Number:	5613
Title of Invention:	FLUID DISPERSION ASSEMBLY
First Named Inventor/Applicant Name:	Marc Levy
Customer Number:	4219
Filer:	John Fulton/Denise Morales
Filer Authorized By:	John Fulton
Attorney Docket Number:	1.106B.16
Receipt Date:	27-AUG-2018
Filing Date:	17-NOV-2016
Time Stamp:	17:34:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 500
RAM confirmation Number	082818INTEFSW17355300
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	2018_08_27_EFS_Cert_Issue_Fee_1106B.pdf	12038	no	1
			b809fa59059aaf8852bdae3cfe1f87cd0de6cf33		
Warnings:					
Information:					
2	Issue Fee Payment (PTO-85B)	2018_08_27_Issue_Fee_Transmittal_1106B.pdf	674616	no	1
			e2fc36865eb22b03ab592304ccd0bd210a9917f8		
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
3		2018_08_27_312_Amend_File_d_1106B.pdf	19591	yes	3
			b7ee2de16188056664fde17cb37d21d490cd59853		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment after Notice of Allowance (Rule 312)		1	1	
	Specification		2	2	
	Applicant Arguments/Remarks Made in an Amendment		3	3	
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	29928	no	2
			207fa4e6a6d7ce67e33040de3b8f8b604dd3cf9b		
Warnings:					
Information:					
Total Files Size (in bytes):			736173		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Air Essentials Inc.

Inventors: Marc Levy, Craig Huck and Steven Semoff

Serial No.: 15/353,951

Filing Date: November 17, 2016

For: FLUID DISPERSION ASSEMBLY

Confirmation No. 5613
Customer No. 04219
Examiner Davis D. Hwu
Group Art Unit 3744

2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF EFS-WEB TRANSMISSION

I HEREBY CERTIFY that this correspondence is being transmitted via the U.S. Patent and Trademark Office (USPTO) electronic filing system (EFS-Web) to the USPTO this 27 day of August, 2018.

Respectfully Submitted,

MALLOY & MALLOY, P.L.
Attorneys for Applicant
2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129
(305)858-8000

By: /John Fulton, Jr./
John Fulton, Jr.
Reg. No. 46,716
Email: patents@malloylaw.com

Date: August 27, 2018

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 or **Fax** (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

4219 7590 05/29/2018
MALLOY & MALLOY
 2800 S.W. THIRD AVENUE
 HISTORIC CORAL WAY
 MIAMI, FL 33129

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/353,951	11/17/2016	Marc Levy	1.106B.16	5613

TITLE OF INVENTION: FLUID DISPERSION ASSEMBLY

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$500	\$0	\$0	\$500	08/29/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
HWU, DAVIS D	3744	239-427000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
 (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1. Malloy & Malloy, P.L.

2. _____

3. _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

Air Essentials Inc.

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Miami, Florida

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
☐ Applicant asserting small entity status. See 37 CFR 1.27
☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Typed or printed name _____

John Fulton, Jr.

Date _____

Registration No. _____

8/27/18
46,716



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/353,951	11/17/2016	Marc Levy	1.106B.16

4219
MALLOY & MALLOY
2800 S.W. THIRD AVENUE
HISTORIC CORAL WAY
MIAMI, FL 33129

CONFIRMATION NO. 5613
POA ACCEPTANCE LETTER



Date Mailed: 06/06/2018

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/01/2018.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/dfisher/

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number

Filing Date

15/353,951

November 17, 2016

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)



I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

04219

OR



I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:



The address associated with the above-mentioned Customer Number

OR



The address associated with Customer Number:

OR

Firm or
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Air Essentials Inc.



Inventor or Joint Inventor (title not required below)



Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)



Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)



Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature

Date (Optional)

5/31/17

Name

Spence J. Levy

Title

President

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.



Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	32785053
Application Number:	15353951
International Application Number:	
Confirmation Number:	5613
Title of Invention:	FLUID DISPERSION ASSEMBLY
First Named Inventor/Applicant Name:	Marc Levy
Customer Number:	4219
Filer:	John Fulton/Kristine Miranda
Filer Authorized By:	John Fulton
Attorney Docket Number:	1.106B.16
Receipt Date:	01-JUN-2018
Filing Date:	17-NOV-2016
Time Stamp:	16:21:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	2018_06_01_EFS_Cert_POA_Filed_1106B.pdf	12037 9ae6e0d5fcc364c9e7b0358f2e8641764ab14184	no	1

Warnings:

Information:					
2	Transmittal Letter	2018_06_01_Transmittal_POA_Filed_1106B.pdf	91678 73f3b04ad54bc80736abb505b11599c12769c73	no	1
Warnings:					
Information:					
3	Power of Attorney	2018_06_01_POA_Filed_1106B.pdf	90197 5a050b422583d9d5d118ec0db29474326b8282e0	no	1
Warnings:					
Information:					
Total Files Size (in bytes):			193912		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Air Essentials Inc.

Inventors: Marc Levy, Craig Huck and Steven Semoff

Serial No.: 15/353,951

Filing Date: November 17, 2016

For: FLUID DISPERSION ASSEMBLY

Confirmation No. 5613
Customer No. 04219
Examiner Davis D. Hwu
Group Art Unit 3744

2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF EFS-WEB TRANSMISSION

I HEREBY CERTIFY that this correspondence is being transmitted via the U.S. Patent and Trademark Office (USPTO) electronic filing system (EFS-Web) to the USPTO this 1 day of June, 2018.

Respectfully Submitted,

MALLOY & MALLOY, P.L.
Attorneys for Applicant
2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129
(305)858-8000

By: /John Fulton, Jr./
John Fulton, Jr.
Reg. No. 46,716
Email: patents@malloylaw.com

Date: June 1, 2018

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	15/353,951
Filing Date	November 17, 2016
First Named Inventor	Marc Levy
Title	FLUID DISPERSION ASSEMBLY
Art Unit	3744
Examiner Name	Davis D. Hwu
Attorney Docket Number	1.106B.16

SIGNATURE of Applicant or Patent Practitioner

Signature	/John Fulton, Jr./	Date (Optional)	June 1, 2018
Name	John Fulton, Jr.	Registration Number	46,716
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.



*Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

4219 7590 05/29/2018
MALLOY & MALLOY
2800 S.W. THIRD AVENUE
HISTORIC CORAL WAY
MIAMI, FL 33129

EXAMINER

HWU, DAVIS D

ART UNIT

PAPER NUMBER

3744

DATE MAILED: 05/29/2018

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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15/353,951

11/17/2016

Marc Levy

1.106B.16

5613

TITLE OF INVENTION: FLUID DISPERSION ASSEMBLY

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$500	\$0	\$0	\$500	08/29/2018

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

4219 7590 05/29/2018
MALLOY & MALLOY
2800 S.W. THIRD AVENUE
HISTORIC CORAL WAY
MIAMI, FL 33129

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/353,951	11/17/2016	Marc Levy	1.106B.16	5613

TITLE OF INVENTION: FLUID DISPERSION ASSEMBLY

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$500	\$0	\$0	\$500	08/29/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
HWU, DAVIS D	3744	239-427000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached. ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.	2. For printing on the patent front page, list (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____ (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____ 3 _____
---	---

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
☐ Applicant asserting small entity status. See 37 CFR 1.27
☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____
 Typed or printed name _____ Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/353,951	11/17/2016	Marc Levy	1.106B.16	5613

4219 7590 05/29/2018
MALLOY & MALLOY
2800 S.W. THIRD AVENUE
HISTORIC CORAL WAY
MIAMI, FL 33129

EXAMINER

HWU, DAVIS D

ART UNIT	PAPER NUMBER
----------	--------------

3744

DATE MAILED: 05/29/2018

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 15/353,951	Applicant(s) LEVY ET AL.	
	Examiner Davis Hwu	Art Unit 3744	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment of 4/20/2018.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 1,3-6 and 8-17. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some *c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

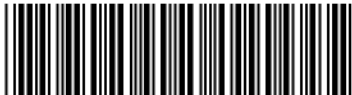
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. ☐ Notice of References Cited (PTO-892) | 5. ☐ Examiner's Amendment/Comment |
| 2. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 6. ☐ Examiner's Statement of Reasons for Allowance |
| 3. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 7. ☐ Other _____. |
| 4. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____. | |

/Davis Hwu/
Primary Examiner, Art Unit 3744

Search Notes 	Application/Control No. 15353951	Applicant(s)/Patent Under Reexamination LEVY ET AL.
	Examiner DAVIS HWU	Art Unit 3744

CPC- SEARCHED		
Symbol	Date	Examiner
B05B 7/2405, 15/00, 7/0425, 7/005, 7/006, 17/0646, 17/04, 7/0012, 7/2494, 7/2491, 15/0406, 11/08, 11/3042	1/15/18	dh
A61M 15/0036, 16/14, 16/201, 11/06	"	"
A61L 9/14	"	"

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
239	427, 310	1/15/18	dh

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
east	1/15/18	dh
search updated	5/16/18	dh

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	all of above	5/16/18	dh

	/D.H./ Primary Examiner.Art Unit 3744
--	--

Issue Classification 	Application/Control No. 15353951	Applicant(s)/Patent Under Reexamination LEVY ET AL.	
	Examiner DAVIS HWU	Art Unit 3744	

CPC					
Symbol				Type	Version
B05B		7	2424	F	2013-01-01
B05B		7	2491	I	2013-01-01
B05B		7	2494	I	2013-01-01
A61L		9	14	I	2013-01-01
B05B		15	0406	I	2013-01-01
B05B		14	00	I	2018-02-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		Total Claims Allowed:	
		15	
(Assistant Examiner)	(Date)		
/DAVIS HWU/ Primary Examiner.Art Unit 3744	05/16/2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Issue Classification 	Application/Control No. 15353951	Applicant(s)/Patent Under Reexamination LEVY ET AL.
	Examiner DAVIS HWU	Art Unit 3744

☐ Claims renumbered in the same order as presented by applicant								☐ CPA		☒ T.D.		☐ R.1.47			
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1														
2	3														
3	4														
4	5														
5	6														
6	8														
7	9														
8	10														
9	11														
10	12														
11	13														
12	14														
13	15														
14	16														
15	17														

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 15	
/DAVIS HWU/ Primary Examiner.Art Unit 3744 (Primary Examiner) _____ (Date) _____		O.G. Print Claim(s) 1	O.G. Print Figure 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Air Essentials Inc.

Inventors: Marc Levy, Craig Huck and Steven Semoff

Serial No.: 15/353,951

Filing Date: November 17, 2016

For: FLUID DISPERSION ASSEMBLY

Confirmation No. 5613

Customer No. 04219

Examiner Davis D. Hwu

Group Art Unit 3744

2800 S.W. Third Avenue

Historic Coral Way

Miami, Florida 33129

Mail Stop Amendment

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

A M E N D M E N T

In response to the Office Action of January 22, 2018,
please amend the above-referenced application as follows:

Amendments to the Claims begin on page **2** of this paper.

Remarks begin on page **8** of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of the claims in the application:

Listing of Claims:

1. (Currently Amended) A fluid dispersion assembly operatively engages a container of an operative fluid and a compressed air source and generates and discharges a fluid dispersion into a surrounding airspace, said fluid dispersion assembly comprising:

a diffusion unit at least partially defining an enclosed diffusion chamber, wherein said diffusion chamber comprises an upper chamber and a lower chamber,

a discharge port disposed in fluid communication between said diffusion chamber and the surrounding airspace,

a diffusion assembly disposed in an operative engagement with said diffusion unit, wherein said diffusion assembly comprises an atomizer assembly,

said diffusion assembly is disposed between said upper chamber and said lower chamber,

said atomizer assembly comprising an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture, and

said atomizer air inlet channel interconnected to the

compressed air source and said fluid inlet disposed in fluid communication with the operative fluid in the container, wherein the compressed air and the operative fluid are mixed together in said mixing chamber to form the fluid dispersion.

2. (Cancelled).

3. (Original) The fluid dispersion assembly as recited in claim 1 further comprising a cap cooperatively configured and disposed in a sealing engagement with said diffusion unit.

4. (Original) The fluid dispersion assembly as recited in claim 1 wherein said atomizer exhaust aperture is disposed in a communicating relation between said mixing chamber and said lower chamber to facilitate transfer of the fluid dispersion therebetween.

5. (Original) The fluid dispersion assembly as recited in claim 1 wherein said diffusion chamber facilitates formation of the fluid dispersion prior to discharge of the fluid dispersion from said diffusion chamber through said discharge port and into the surrounding airspace.

6. (Currently Amended) A fluid dispersion assembly is operatively interconnected to a container of an operative fluid and a compressed air source to generate and discharge a fluid dispersion into a surrounding airspace, said fluid dispersion assembly comprising:

a diffusion unit at least partially defining a diffusion chamber, wherein said diffusion chamber comprises an upper chamber and a lower chamber,

a discharge port disposed in fluid communication between said diffusion chamber and the surrounding airspace, and

a diffusion assembly disposed in an operative engagement with said diffusion unit, wherein said diffusion assembly comprises an atomizer assembly, said diffusion assembly is disposed between said upper chamber and said lower chamber.

7. (Cancelled).

8. (Original) The fluid dispersion assembly as recited in claim 6 wherein said atomizer assembly comprising an atomizer air inlet channel, a fluid inlet, a mixing chamber, and an atomizer exhaust aperture.

9. (Original) The fluid dispersion assembly as recited in claim 8 wherein said atomizer air inlet channel is interconnected to the compressed air source and said fluid inlet disposed in fluid communication with the operative fluid in the container, wherein the compressed air and the operative fluid are mixed together in said mixing chamber to form the fluid dispersion.

10. (Original) The fluid dispersion assembly as recited in claim 9 wherein said diffusion chamber facilitates formation of

the fluid dispersion prior to discharge of the fluid dispersion from said diffusion chamber through said discharge port and into the surrounding airspace.

11. (Original) The fluid dispersion assembly as recited in claim 6 further comprising a container interconnect operatively interconnecting said diffusion unit to the container, wherein said container interconnect comprises a sealing washer disposed between said diffusion unit and the container.

12. (Original) The fluid dispersion assembly as recited in claim 11 further comprising a drip tube, said drip tube disposed in an interconnecting relation between said diffusion chamber and the container through said sealing washer, wherein said drip tube minimizes contact between said sealing washer and the operative fluid.

13. (Original) A fluid dispersion assembly interconnects to a container of an operative fluid and a compressed air source and generates and discharges a fluid dispersion into a surrounding airspace, said fluid dispersion assembly comprising:

a diffusion unit having an enclosed diffusion chamber, said diffusion chamber comprising oppositely disposed portions therein,

said diffusion chamber comprises an upper chamber and a lower chamber,

a diffusion assembly disposed in an operative engagement with said diffusion unit between said upper chamber and said lower chamber,

said diffusion assembly comprises an atomizer assembly having an atomizer exhaust aperture,

said lower chamber disposed below and adjacent said atomizer exhaust aperture, and

said diffusion chamber structured to facilitate formation of the fluid dispersion prior to discharge of the fluid dispersion from said diffusion chamber, wherein the fluid dispersion discharged from said atomizer exhaust aperture into said diffusion chamber is interrupted and redirected in said lower chamber, thereby dampening sound waves generated during operation of said fluid dispersion assembly.

14. (Original) The fluid dispersion assembly as recited in claim 13 wherein said atomizer assembly further comprises an atomizer air inlet channel, a fluid inlet, and a mixing chamber.

15. (Original) The fluid dispersion assembly as recited in claim 14 wherein said atomizer air inlet channel is interconnected to the compressed air source and said fluid inlet is disposed in fluid communication with the preselected fluid in the container, wherein the compressed air and the preselected fluid are mixed together in said mixing chamber to form the

fluid dispersion.

16. (Original) The fluid dispersion assembly as recited in claim 13 further comprising a drip tube.

17. (Original) The a fluid dispersion assembly as recited in claim 16 wherein said drip tube is disposed to direct coalesced fluid from the diffusion chamber back into the container of operative fluid.

REMARKS

This Amendment is submitted in full response to the Office Action dated January 22, 2018, and as such, reconsideration of the present application is respectfully requested.

To begin, Applicant acknowledges with appreciation the Examiner's indication that claims 2, 7 and 12 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In the present Office Action, claims 1, 3-6 and 8-10 stand rejected under 35 U.S.C. §102 as being unpatentable over U.S. US Patent Application Publication No. 2014/0202457 to Addington et al. ("Addington"), and claim 11 stands rejected as unpatentable over Addington under 35 U.S.C. §103. Additionally, claims 1, 3-6, 8-11 and 13-17 stand rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-20 of Applicant's U.S. Patent No. 9,527,094 and claims 1-9 of Applicant's U.S. Patent No. 9,126,215.

As an initial matter, e-Terminal Disclaimers are filed concurrently herewith, therefore, the rejection of claims 1, 3-6, 8-11 and 13-17 on the grounds of nonstatutory double patenting is fully traversed.

Further, and although Applicant respectfully disagrees with the characterization of Addington in the present Office Action, in the interest in moving the present application to allowance,

independent claim 1 has been amended herein to recite the subject matter of allowable dependent claim 2, now cancelled, As such, as amended herein, independent claim 1, and each claim dependent therefrom is in condition for immediate allowance. Similarly, independent claim 6 has been amended herein to recite the subject matter of allowable dependent claim 7, now cancelled. Likewise, as amended herein, independent claim 6, and each claim dependent therefrom is in condition for immediate allowance.

Based on the foregoing, this application is believed to be in condition for immediate allowance, and such action is respectfully requested. If for any reason the Examiner does not agree, the undersigned respectfully asks the Examiner to call the undersigned at the number listed below to discuss.

Respectfully submitted,

MALLOY & MALLOY, P.L.
Attorneys for Applicant
2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129
(305) 858-8000

By: /John Fulton, Jr./
John Fulton, Jr.
Reg. No. 46,716
Email: patents@malloylaw.com

Date: April 20, 2018

Electronic Acknowledgement Receipt

EFS ID:	32401608
Application Number:	15353951
International Application Number:	
Confirmation Number:	5613
Title of Invention:	FLUID DISPERSION ASSEMBLY
First Named Inventor/Applicant Name:	Marc Levy
Customer Number:	4219
Filer:	John Fulton/Denise Morales
Filer Authorized By:	John Fulton
Attorney Docket Number:	1.106B.16
Receipt Date:	20-APR-2018
Filing Date:	17-NOV-2016
Time Stamp:	16:05:35
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	2018_04_20_EFS_Cert_Amd_1 106B.pdf	12016 ce917079931f0a713b9df1206b35beda2ac1 0f74	no	1

Warnings:

Information:					
2		2018_04_20_Amendment_File d_1106B.pdf	36061	yes	9
			787c15e1d568e8002525aa1eff93fde7adf57878		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	7	
	Applicant Arguments/Remarks Made in an Amendment		8	9	
Warnings:					
Information:					
Total Files Size (in bytes):			48077		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Air Essentials Inc.

Inventors: Marc Levy, Craig Huck and Steven Semoff

Serial No.: 15/353,951

Filing Date: November 17, 2016

For: FLUID DISPERSION ASSEMBLY

Confirmation No. 5613
Customer No. 04219
Examiner Davis D. Hwu
Group Art Unit 3744

2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF EFS-WEB TRANSMISSION

I HEREBY CERTIFY that this correspondence is being transmitted via the U.S. Patent and Trademark Office (USPTO) electronic filing system (EFS-Web) to the USPTO this 20 day of April, 2018.

Respectfully Submitted,

MALLOY & MALLOY, P.L.
Attorneys for Applicant
2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129
(305)858-8000

By: /John Fulton, Jr./
John Fulton, Jr.
Reg. No. 46,716
Email: patents@malloylaw.com

Date: April 20, 2018

**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)

1.106B.16

In re Application of: Air Essentials Inc.

Application No.: 15/353,951

Filed: November 17, 2016

For: FLUID DISPERSION ASSEMBLY

The applicant, Air Essentials Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 9,527,094 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;

is held unenforceable;

is found invalid by a court of competent jurisdiction;

is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;

has all claims canceled by a reexamination certificate;

is reissued; or

is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 46,716

/John Fulton, Jr./

Signature

April 20, 2018

Date

John Fulton, Jr.

Typed or printed name

Title

305-858-8000

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**TERMINAL DISCLAIMER TO OBIATE A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)

1.106B.16

In re Application of: Air Essentials Inc.

Application No.: 15/353,951

Filed: November 17, 2016

For: FLUID DISPERSION ASSEMBLY

The applicant, Air Essentials Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 9,126,215 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

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- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 46,716

/John Fulton, Jr./

Signature

April 20, 2018

Date

John Fulton, Jr.

Typed or printed name

Title

305-858-8000

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	15353951			
Filing Date:	17-Nov-2016			
Title of Invention:	FLUID DISPERSION ASSEMBLY			
First Named Inventor/Applicant Name:	Marc Levy			
Filer:	John Fulton/Denise Morales			
Attorney Docket Number:	1.106B.16			
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	2814	2	160	320
Total in USD (\$)				320

Electronic Acknowledgement Receipt

EFS ID:	32402333
Application Number:	15353951
International Application Number:	
Confirmation Number:	5613
Title of Invention:	FLUID DISPERSION ASSEMBLY
First Named Inventor/Applicant Name:	Marc Levy
Customer Number:	4219
Filer:	John Fulton/Denise Morales
Filer Authorized By:	John Fulton
Attorney Docket Number:	1.106B.16
Receipt Date:	20-APR-2018
Filing Date:	17-NOV-2016
Time Stamp:	16:34:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 320
RAM confirmation Number	042318INTEFSW16352600
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	2018_04_20_EFS_Cert_Term_Disc_1106B.pdf	12045	no	1
			e7603cbd0b5430d0690a8d3f3e9be93ee829592f		
Warnings:					
Information:					
2	Terminal Disclaimer Filed	2018_04_20_Term_Disc_094_Filed_1106B.pdf	155754	no	2
			986f34faa75464cf050f10f25bafec82b4f05ca		
Warnings:					
Information:					
3	Terminal Disclaimer Filed	2018_04_20_Term_Disc_215_Filed_1106B.pdf	155694	no	2
			c1d13366821edc9a9c2e03a5a5301a5cc7627e89		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30272	no	2
			b8d7c314ec2c3ddd17b3187735e3352a559bcc9f		
Warnings:					
Information:					
Total Files Size (in bytes):			353765		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Air Essentials Inc.

Inventors: Marc Levy, Craig Huck and Steven Semoff

Serial No.: 15/353,951

Filing Date: November 17, 2016

For: FLUID DISPERSION ASSEMBLY

Confirmation No. 5613
Customer No. 04219
Examiner Davis D. Hwu
Group Art Unit 3744

2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF EFS-WEB TRANSMISSION

I HEREBY CERTIFY that this correspondence is being transmitted via the U.S. Patent and Trademark Office (USPTO) electronic filing system (EFS-Web) to the USPTO this 20 day of April, 2018.

Respectfully Submitted,

MALLOY & MALLOY, P.L.
Attorneys for Applicant
2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129
(305)858-8000

By: /John Fulton, Jr./
John Fulton, Jr.
Reg. No. 46,716
Email: patents@malloylaw.com

Date: April 20, 2018

Application Number 	Application/Control No. 15/353,951	Applicant(s)/Patent under Reexamination LEVY ET AL.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 4/20/18	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
2/Tds both approved. Lawana Hixon



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/353,951	11/17/2016	Marc Levy	1.106B.16	5613

4219 7590 01/22/2018
MALLOY & MALLOY
2800 S.W. THIRD AVENUE
HISTORIC CORAL WAY
MIAMI, FL 33129

EXAMINER

HWU, DAVIS D

ART UNIT	PAPER NUMBER
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3744

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

01/22/2018

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATENTS@MALLOYLAW.COM

Office Action Summary	Application No. 15/353,951	Applicant(s) LEVY ET AL.	
	Examiner Davis Hwu	Art Unit 3744	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2016.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-17 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) _____ is/are allowed.
- 7) ☒ Claim(s) 1,3-6,8-11 and 13-17 is/are rejected.
- 8) ☒ Claim(s) 2,7 and 12 is/are objected to.
- 9) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) ☒ Notice of References Cited (PTO-892) | 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date <u>8/8/2017</u> . | 4) ☐ Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

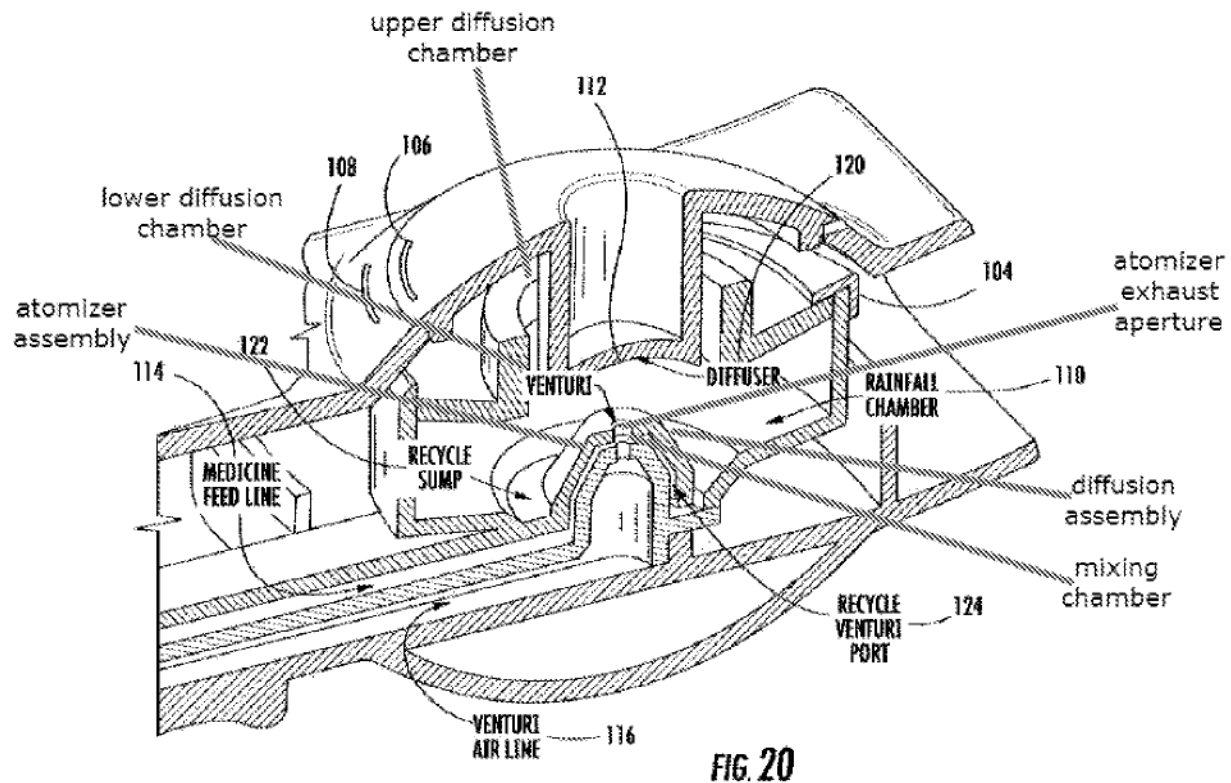
1. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1, 3-6, and 8-10 are rejected under pre-AIA 35 U.S.C. 102a as being anticipated by Addington et al.

Addington et al. shows a fluid dispersion assembly operatively engages a container (medicine reservoir) and a compressed air source 72 and generates and discharges a fluid dispersion into a surrounding airspace, the assembly comprising: a diffusion unit 120 defining a diffusion chamber wherein the diffusion chamber comprises an upper chamber and a lower chamber (see Fig. 20 below); a discharge port 60 in fluid communication between the diffusion chamber and the surrounding airspace; a diffusion assembly disposed in an operative engagement with the diffusion unit (see Fig. 20 below), wherein the diffusion unit comprises an atomizer assembly in which the atomizer assembly comprise an atomizer inlet into 116, a fluid inlet into 114, a mixing chamber, and an atomizer exhaust aperture (see Fig. 20 below), and the atomizer air inlet channel interconnected to the compressed air source and the fluid inlet disposed in fluid communication with the operative fluid in the container, wherein the compressed air and the operative fluid are mixed in the mixing chamber to form the fluid dispersion. The device also has a cap (a mouthpiece) as recited in claim 3.



The atomizer exhaust aperture is in a communication relation between the mixing chamber and the lower chamber as recited in claim 4. The diffusion chamber facilitates formation of the fluid dispersion prior to discharge of the fluid as recited in claim 5.

Claim Rejections - 35 USC § 103

3. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 11 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Addington et al.

Since Addington et al. discloses filling and sealing the device, the use of a sealing washer would have been obvious to one having ordinary skill in the art at the time the invention was made to prevent leakages from the device.

Allowable Subject Matter

5. Claims 2, 7, and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

7. Claims 1, 3-6, 8-11. And 13-17 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 9,527,094. Although the claims at issue are not identical, they are not patentably distinct from each other because they are broader recitations of the claims of '094.

8. Claims 1, 3-6, 8-11, and 13-17 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 9,126,215. Although the claims at issue are not identical, they are not patentably distinct from each other because they are broader recitations of the claims of '215.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Davis Hwu whose telephone number is (571)272-4904. Examiner interviews are available via telephone. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Len Tran can be reached on (571)272-1184. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Davis Hwu/
Primary Examiner, Art Unit 3744

Notice of References Cited	Application/Control No. 15/353,951		Applicant(s)/Patent Under Reexamination LEVY ET AL.	
	Examiner Davis Hwu		Art Unit 3744	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2014/0202457 A1	07-2014	ADDINGTON; W. Robert	A61M15/0036	128/200.21
	B	US-				
	C	US-				
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

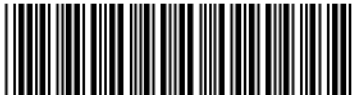
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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes 	Application/Control No. 15353951	Applicant(s)/Patent Under Reexamination LEVY ET AL.
	Examiner DAVIS HWU	Art Unit 3744

CPC- SEARCHED		
Symbol	Date	Examiner
B05B 7/2405, 15/00, 7/0425, 7/005, 7/006, 17/0646, 17/04, 7/0012, 7/2494, 7/2491, 15/0406, 11/08, 11/3042	1/15/18	dh
A61M 15/0036, 16/14, 16/201, 11/06	"	"
A61L 9/14	"	"

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
239	427, 310	1/15/18	dh

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
east	1/15/18	dh

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/D.H./ Primary Examiner.Art Unit 3744
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BIB DATA SHEET

CONFIRMATION NO. 5613

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
15/353,951	11/17/2016	239	3744	1.106B.16		
RULE						
APPLICANTS Air Essentials Inc., Miami, FL INVENTORS Marc Levy, Palmetto Bay, FL; Craig Huck, Waterford, PA; Steven Semoff, New City, NY;						
** CONTINUING DATA ***** This application is a CIP of 14/844,650 09/03/2015 PAT 9527094 which is a CON of 13/838,364 03/15/2013 PAT 9126215 which claims benefit of 61/694,500 08/29/2012						
** FOREIGN APPLICATIONS *****						
** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 11/23/2016						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and /DAVIS D HWU/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY FL	SHEETS DRAWINGS 6	TOTAL CLAIMS 17	INDEPENDENT CLAIMS 3
ADDRESS MALLOY & MALLOY 2800 S.W. THIRD AVENUE HISTORIC CORAL WAY MIAMI, FL 33129						
TITLE FLUID DISPERSION ASSEMBLY						
FILING FEE RECEIVED 730	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

Doc code: IDS

PTO/SB/08a (03-15)

Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

Application Number	15353951
Filing Date	2016-11-17
First Named Inventor	Marc Levy
Art Unit	5613
Examiner Name	
Attorney Docket Number	1.106B.16

U.S.PATENTS

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Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7878418		2011-02-01	Sevy	
	2	7913933		2011-03-29	Van Roemburg	
	3	7930068		2011-04-19	Robert et al.	
	4	D645947		2011-09-27	Sevy	
	5	9126215		2015-09-08	Levy et al.	
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Application Number	15353951
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Art Unit	5613
Examiner Name	
Attorney Docket Number	1.106B.16

1	20090025794	2009-01-29	Dorendorf et al.
2	20090317504	2009-12-24	Rajala et al.

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FOREIGN PATENT DOCUMENTS

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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	15353951		
Filing Date	2016-11-17		
First Named Inventor	Marc Levy		
Art Unit	5613		
Examiner Name			
Attorney Docket Number	1.106B.16		

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/John Fulton, Jr./	Date (YYYY-MM-DD)	2017-08-08
Name/Print	John Fulton, Jr.	Registration Number	46716

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15353951
	Filing Date	2016-11-17
	First Named Inventor	Marc Levy
	Art Unit	5613
	Examiner Name	
	Attorney Docket Number	1.106B.16

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Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7878418		2011-02-01	Sevy	
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	5	9126215		2015-09-08	Levy et al.	
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2	20090317504	2009-12-24	Rajala et al.

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Name/Print	John Fulton, Jr.	Registration Number	46716

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Electronic Acknowledgement Receipt

EFS ID:	30016215
Application Number:	15353951
International Application Number:	
Confirmation Number:	5613
Title of Invention:	FLUID DISPERSION ASSEMBLY
First Named Inventor/Applicant Name:	Marc Levy
Customer Number:	4219
Filer:	John Fulton/Chanel Long
Filer Authorized By:	John Fulton
Attorney Docket Number:	1.106B.16
Receipt Date:	08-AUG-2017
Filing Date:	17-NOV-2016
Time Stamp:	13:58:22
Application Type:	Utility under 35 USC 111(a)

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Warnings:					
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3	Information Disclosure Statement (IDS) Form (SB08)	2017_08_08_IDS_Filed_1106B.pdf	1034947 7c3ce9bb71392b17d2ccca6c083436f2194bc39a	no	4
Warnings:					
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Total Files Size (in bytes):			1058910		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Air Essentials Inc.

Inventors: Marc Levy, Craig Huck and Steven Semoff

Serial No.: 15/353,951

Filing Date: November 17, 2016

For: FLUID DISPERSION ASSEMBLY

Confirmation No.5613
Customer No. 04219
Group Art Unit 1715

2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF EFS-WEB TRANSMISSION

I HEREBY CERTIFY that this correspondence is being transmitted to the U.S. Patent and Trademark Office (USPTO) via the USPTO electronic filing system (EFS-Web) this 8th day of August, 2017.

Respectfully Submitted,

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Date: August 8, 2017

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Air Essentials Inc.

Inventors: Marc Levy, Craig Huck and Steven Semoff

Serial No.: 15/353,951

Filing Date: November 17, 2016

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Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

In accordance with Applicant's duty of disclosure, the attached information is provided for consideration by the U.S. Patent and Trademark Office in connection with the above-captioned application. The information is identified on the attached form PTO/SB/08A. In accordance with 37 C.F.R. §1.98(a)(2)(ii), copies of U.S. patents or U.S. patent application publications have not been enclosed.

The Examiner is respectfully requested to return a copy of an initialed form PTO/SB/08A evidencing consideration of this information with the next Office communication.

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Date: August 8, 2017



UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
15/353,951	11/17/2016	1715	730	1.106B.16	17	3

4219
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CONFIRMATION NO. 5613
UPDATED FILING RECEIPT



Date Mailed: 01/10/2017

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

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Craig Huck, Waterford, PA;
Steven Semoff, New City, NY;

Applicant(s)

Air Essentials Inc., Miami, FL

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CIP of 14/844,650 09/03/2015 PAT 9527094
which is a CON of 13/838,364 03/15/2013 PAT 9126215
which claims benefit of 61/694,500 08/29/2012

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

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Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/353,951**

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

**** SMALL ENTITY ****

Title

FLUID DISPERSION ASSEMBLY

Preliminary Class

427

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number
15/353,951

APPLICATION AS FILED - PART I

(Column 1)		(Column 2)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(j))	17 minus 20 = *	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	730		TOTAL	

APPLICATION AS AMENDED - PART II

(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
Total (37 CFR 1.16(i))	* Minus **	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	* Minus ***	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))						OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						OR		
				TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
Total (37 CFR 1.16(i))	* Minus **	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	* Minus ***	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))						OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						OR		
				TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Air Essentials Inc.

Inventors: Marc Levy, Craig Huck, and Steven Semoff

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Alexandria, VA 22313-1450

RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS

In response to the Notice to File Corrected Application Papers dated November 25, 2016, filed herewith is a substitute specification with markings and a clean version (without markings) as set forth in 37 CFR 1.125(c). The substitute specification contains no new matter.

Respectfully submitted,

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By: /John Fulton, Jr./
John Fulton, Jr.
Reg. No. 46,716
Email: patents@malloylaw.com

Date: January 6, 2017

1 FLUID DISPERSION ASSEMBLY

2
3 BACKGROUND OF THE INVENTION

4 Field of the Invention

5 This invention relates generally to the field of dispersion of
6 various fluids including, but not limited to, fragrant oils,
7 essential oils, odor neutralizers, disinfectants, e.g., triethylene
8 glycol, air sanitizers, and the like, into a generally enclosed
9 airspace.

10
11 DESCRIPTION OF THE RELATED ART

12 There are various devices that can be used to deliver fragrant
13 oils, essential oils, as well as other fluids into the air. Spray
14 cans are commonly used, however, such devices require a user to
15 repeatedly and manually spray when and where necessary. Plug-in
16 devices that heat oils for dispersion into the air are also
17 commonly used, but they require constant heating of the oil via an
18 electrical outlet, which consumes energy and poses a potential fire
19 hazard.

20 Fluid diffusion devices utilizing forced and/or compressed air
21 for delivery of fragrant oils, essential oils, or other liquids are
22 desirable alternatives to spray cans and plug-in devices since they
23 do not require heating or constant user interaction, however, they
24 have drawbacks as well. One drawback of many known fluid diffusion
25 devices utilizing forced air is that they tend to make an

1 undesirable and often, depending on the location, such as an office
2 of other place of business, a disruptive amount of noise when in
3 operation. In particular, the release of a fluid dispersed in the
4 forced and/or compressed air from such a device is often
5 unacceptably noisy.

6 As such, there is a need for a fluid dispersion assembly that
7 is designed to significantly reduce the amount of noise generated
8 during operation. A further need exists for such a fluid dispersion
9 assembly to not only operate more quietly, but to operate quietly
10 while generating a fluid dispersion in air having a uniform
11 particle size distribution, such that dosing of an airspace with a
12 particular liquid, whether it be oil, sanitizer, disinfectant,
13 etc., can be predicted within acceptable limits.

14 15 SUMMARY OF THE INVENTION

16 The present invention addresses the need for a forced air
17 diffusion and dispersion assembly for fluids such as fragrant oils,
18 essential oils, odor neutralizers, disinfectants, air sanitizers,
19 etc., that significantly reduces the amount of noise generated
20 during operation. In at least one embodiment, the present invention
21 is directed to a fluid dispersion assembly which operatively
22 engages a fluid container, and is powered by a compressed air
23 source. The fluid dispersion assembly includes a diffusion unit
24 having oppositely disposed ends, which at least partially defines a
25 diffusion chamber. The diffusion chamber is structured so as to

1 facilitate formation of a fluid dispersion comprising a plurality
2 of substantially uniform droplets prior to discharge from the
3 diffusion chamber.

4 In at least one embodiment, a cap is cooperatively configured
5 in sealing engagement with one of the oppositely disposed ends of
6 the diffusion unit. Furthermore, the cap may be removably attached
7 to the diffusion unit. The cap includes a discharge port disposed
8 in communication with the diffusion chamber such that the fluid
9 dispersion can exit the diffusion chamber and into an airspace
10 surrounding the fluid dispersion assembly, while the assembly is in
11 use. In some embodiments, the cap may include a service access port
12 disposed therethrough. The service access port may also include a
13 service access plug removably disposed therein, wherein removal of
14 the service access plug allows for removal, repair, and/or cleaning
15 of the internal components of the fluid dispersion assembly.

16 The present fluid dispersion assembly, in at least one
17 embodiment, further includes a container interconnect affixed to a
18 different one of the oppositely disposed ends of the diffusion unit
19 which is cooperatively structured to interconnect the diffusion
20 unit to the fluid container in a substantially sealed relationship.
21 In at least one embodiment, a sealing washer is provided to
22 facilitate formation of the substantially sealed relationship, and
23 a drip tube is disposed in an interconnecting relation between the
24 diffusion chamber and the fluid container, in at least one further
25 embodiment, to protect the sealing washer from contact with the

1 operative fluid(s).

2 In one embodiment, a diffusion assembly is disposed in an
3 operative engagement with the diffusion unit via a cartridge port.
4 The diffusion assembly is removably engaged with the cartridge
5 port, in at least one embodiment. In some embodiments, the
6 cartridge port is disposed directly through the diffusion unit
7 between the oppositely disposed ends. The cartridge port may be
8 oriented on the diffusion unit such that the diffusion assembly is
9 at a substantially perpendicular orientation to the diffusion unit
10 upon engagement therewith. In at least one other embodiment, a
11 cartridge port is disposed through the cap. The diffusion assembly
12 comprises an atomizer assembly, which in one embodiment comprises
13 an inlet channel, a mixing chamber, and an atomizer exhaust
14 channel, wherein the inlet channel is interconnected to the
15 compressed air source and the mixing chamber comprises a fluid
16 inlet disposed in fluid communication with the fluid in the fluid
17 container. Compressed air and fluid are initially mixed together in
18 the mixing chamber to form a fluid dispersion.

19 These and other objects, features and advantages of the
20 present invention will become clearer when the drawings as well as
21 the detailed description are taken into consideration.

22 23 BRIEF DESCRIPTION OF THE DRAWINGS

24 For a fuller understanding of the nature of the present
25 invention, reference should be had to the following detailed

1 description taken in connection with the accompanying drawings in
2 which:

3 Figure 1 is a cross-sectional elevation illustrative of one
4 embodiment of a fluid dispersion assembly as disclosed in the
5 present specification.

6 Figure 2 is a cross-sectional elevation illustrative of
7 another embodiment of a fluid dispersion assembly as disclosed in
8 the present specification.

9 Figure 3 is a cross-sectional view illustrative of yet another
10 embodiment of a fluid dispersion assembly as disclosed in the
11 present specification.

12 Figure 4 is a plan view illustrative of an embodiment of a
13 fluid dispersion assembly as disclosed in the present invention.

14 Figure 5 is a cross-sectional elevation illustrative of one
15 further embodiment of a fluid dispersion assembly in accordance
16 with the present specification.

17 Figure 6 is a cross-sectional elevation illustrative of yet
18 another further embodiment of a fluid dispersion assembly in
19 accordance with the present specification.

20 Like reference numerals refer to like parts throughout the
21 several views of the drawings.

22
23 DETAILED DESCRIPTION

24 As illustrated in the accompanying figures, and with initial
25 reference to Figures 1 and 2, the present invention is directed to

1 a fluid dispersion assembly, generally indicated as 10, powered by
2 a compressed air source. In at least one embodiment, the fluid
3 dispersion assembly 10 is further structured to operatively engage
4 a fluid container (FC). The fluid dispersion assembly 10 is
5 structured to combine an amount of an operative fluid with
6 compressed air to generate a fluid dispersion.

7 More in particular, a "fluid dispersion" in accordance with
8 the present specification shall mean a mixture of an operative
9 fluid in air comprising a plurality of substantially uniform
10 droplets of the operative fluid dispersed throughout the air.
11 Further, and once again, as used in the present specification,
12 "substantially uniform droplets" shall mean droplets having
13 substantially the same diameter. In at least one embodiment, the
14 plurality of "substantially uniform droplets" each have a diameter
15 in the range of about one micron (1 μm), in another embodiment, the
16 diameter of the droplets is in the range of about three microns (3
17 μm), and, in one further embodiment, droplet diameter is in the
18 range of about five microns (5 μm).

19 The fluid dispersion assembly 10 includes a diffusion unit 100
20 having oppositely disposed ends, as at 110 and 113, in at least one
21 embodiment. The diffusion unit 100 at least partially defines a
22 diffusion chamber 112, and in at least one embodiment, the
23 diffusion chamber 112 is substantially enclosed within diffusion
24 unit 100. The diffusion unit 100 may be constructed of any rigid
25 material or materials which are chemically inert, or at least

1 chemically resistant to the intended operative fluid(s) which
2 include, but once again are not limited to, fragrant oils,
3 essential oils, essential oil extracts, odor neutralizers,
4 disinfectants, e.g., triethylene glycol, air sanitizers, etc.
5 Further, the material of construction selected for the diffusion
6 unit 100 must be capable of withstanding compressed air at
7 operative pressures, which may range anywhere from about 5 to 50
8 psig, in most embodiments of the present fluid dispersion assembly
9 10. In one lower pressure embodiment, the operating pressure of the
10 present fluid dispersion assembly 10 is in the range of about 5 to
11 10 psig, and in one further embodiment, the operating pressure is
12 in a range of between about 5 to 7 psig. Conversely, a higher
13 pressure embodiment of the present fluid dispersion assembly 10
14 operates at pressures in the range of about 20 to 25 psig, and in
15 the range of between about 23 to 24 psig in yet one further
16 embodiment. As such, the material or materials of construction of a
17 diffusion unit 100 in accordance with the present invention may
18 include metals, engineered plastic materials, e.g., polyvinyl
19 chloride, high-density polyethylene, etc., and/or composite
20 materials, just to name a few.

21 In one embodiment, a cap 130 is cooperatively configured and
22 disposed in a sealing engagement with one of the oppositely
23 disposed ends 110, 113 of the diffusion unit 100. The cap 130
24 includes a discharge port 132 therethrough in communication with
25 the diffusion chamber 112, and provides a point of release of the

1 fluid dispersion from the diffusion chamber 112 into the airspace
2 surrounding the fluid dispersion assembly 10. In at least one
3 embodiment, the cap 130 is removably attached in a sealing
4 engagement to the diffusion unit 100. Figure 4 is a plan view of
5 the embodiment of the fluid dispersion assembly 10 as shown in
6 Figures 1 and 2, and shows the cap 130 having a discharge port 132
7 disposed therethrough. As shown in the embodiment of Figure 3, the
8 cap 130 may include a service access port 160 disposed
9 therethrough. The service access port 160 includes a service access
10 plug 162 removably disposed therein, wherein removal of the service
11 access plug 162 allows access for removal and cleaning or repair of
12 a diffusion assembly 200, as disclosed in greater detail below.

13 The fluid dispersion assembly 10, in at least one embodiment,
14 includes a container interconnect 140 which is cooperatively
15 structured to interconnect the diffusion unit 100 to the fluid
16 container (FC) in a substantially sealed relationship. In one
17 embodiment, the container interconnect 140 is disposed at a
18 different one of the oppositely disposed ends 110, 113, opposite of
19 cap 130 of the diffusion unit 100. A sealing washer 170 is disposed
20 between the diffusion unit 100 and the fluid container (FC), in at
21 least one embodiment, so as to provide a substantially sealed
22 relationship between the diffusion unit 100 and the fluid container
23 (FC). The sealing washer 170 may be constructed from any of a
24 variety of materials such as, but not limited to, rubber, nylon,
25 plastic, PVC, TEFLON, or a composite material, once again, provided

1 the material of construction is chemically inert or at least
2 chemically resistant to the operative fluid(s).

3 In one further embodiment of a fluid dispersion assembly 10 in
4 accordance with the present invention, a drip tube 120 is disposed
5 in an interconnecting relation between the diffusion unit 100 and
6 the fluid container (FC). As shown in Figures 1 and 2, the drip
7 tube 120 is disposed through a sealing washer 170, and thus, the
8 drip tube 120 serves to minimize contact between the sealing washer
9 170 and the operative fluid, by essentially preventing the
10 operative fluid from making contact in and around the sealing
11 washer 170 disposed between the fluid container (FC) and the
12 container interconnect 140. More in particular, the drip tube 120
13 channels any operative fluid which may agglomerate and/or
14 accumulate in the diffusion chamber 112 through the drip tube 120
15 directly back into the fluid container (FC) without contacting the
16 sealing washer 170, once again, as shown in Figures 1 and 2.

17 The container interconnect 140 may be structured in a variety
18 of ways to allow interconnection to the fluid container (FC). As
19 one example, the container interconnect 140 may be threaded,
20 internally or externally, such that the diffusion unit 100 is
21 interconnected to the fluid container (FC) by screwing the
22 container interconnect 140 into place onto corresponding threads on
23 the neck of the fluid container (FC). In at least one other
24 embodiment, the container interconnect 140 comprises one portion of
25 a quick-connect type fitting and the fluid container (FC) comprises

1 a complimentary portion of such a quick-connect type fitting
2 whereby once operatively engaged, a substantially sealed
3 relationship is created between the diffusion unit 100 and the
4 fluid container (FC). In at least some embodiments, the
5 substantially sealed relationship is further enhanced by a sealing
6 washer 170, as disclosed above.

7 In at least one embodiment, a cartridge port 150 is provided
8 into the diffusion chamber 112 to facilitate operative engagement
9 of a diffusion assembly 200 with the diffusion chamber 112. The
10 diffusion assembly 200 may be removably engaged with the cartridge
11 port 150 to aid in removal and replacement and/or cleaning of the
12 diffusion assembly 200 and/or components thereof. In some
13 embodiments, the cartridge port 150 is disposed directly through
14 the diffusion unit 100 and into the diffusion chamber 112, and is
15 positioned between the oppositely disposed ends 110, 113. In at
16 least one embodiment, the cartridge port 150 is disposed on the
17 diffusion unit 100 such that the diffusion assembly 200 is disposed
18 in a substantially perpendicular orientation relative to the
19 diffusion unit 100 when operatively engaging the cartridge port
20 150, such as is shown in the illustrative embodiment of Figure 1.
21 The diffusion assembly 200 is also shown disposed substantially
22 perpendicular to the diffusion unit 100 in the plan view of Figure
23 4. In at least one other embodiment, the cartridge port 150 is
24 disposed through the cap 130. In yet another embodiment, the
25 diffusion assembly 200 comprises an integral component of the cap

1 130 itself, such as in the embodiment of Figure 3.

2 As illustrated in Figures 1 and 3, the diffusion assembly 200
3 comprises an air inlet 210 and an atomizer assembly 220. The
4 atomizer assembly 220 comprises an atomizer air inlet channel 222,
5 a mixing chamber 226, and an atomizer exhaust channel 228. The
6 atomizer air inlet channel 222 is interconnected to the compressed
7 air source via the air inlet 210. Moreover, the atomizer air inlet
8 channel 222 may also include an inlet aperture 223, a first portion
9 224 and a second portion 225. The first portion 224 and the second
10 portion 225 are collectively structured to facilitate delivery of
11 compressed air into the mixing chamber 226. The first portion 224
12 of the atomizer air inlet channel 222 may comprise a larger
13 diameter than the second portion 225, such as is shown in the
14 illustrative embodiment of Figure 1. Of course, it is within the
15 scope and intent of the present invention for the atomizer air
16 inlet channel 222 to comprise a constant diameter along its entire
17 length, i.e., a diameter of a first portion 224 is substantially
18 equal to a diameter of a second portion 225.

19 Further, the mixing chamber 226 comprises a fluid inlet 227
20 disposed in fluid communication with an operative fluid in the
21 fluid container (FC) via a fluid delivery tube 300. The fluid
22 delivery tube 300 is disposed in a fluid communicating relation
23 between the atomizer assembly 220 and the fluid container (FC) to
24 facilitate delivery of an amount of the operative fluid into the
25 atomizer assembly 220. In at least one embodiment, the fluid

1 delivery tube 300 connects to the atomizer assembly 220 via the
2 fluid inlet 227 into the mixing chamber 226.

3 As shown in Figures 1 and 2, the fluid inlet 227 is
4 substantially perpendicular to a compressed air flowpath through
5 the atomizer assembly 200. More in particular, and with reference
6 to Figure 1, the compressed air flowpath extends horizontally
7 through the air inlet 210, atomizer air inlet channel 222, mixing
8 chamber 226, and out through the atomizer exhaust 228.

9 As such, when compressed air is supplied to the diffusion
10 assembly 200, a corresponding amount of operative fluid is drawn
11 into the mixing chamber 226 through the fluid delivery tube 300 as
12 a result of the venturi effect of the compressed air flowing past
13 the opening of the fluid inlet 227 into the mixing chamber 226.
14 More in particular, at each different compressed air flowrate,
15 i.e., each "predetermined amount" of compressed air which is
16 dictated and fixed by a compressed air operating pressure supplied
17 to diffusion assembly 200, a different corresponding and
18 substantially constant amount, i.e., a "preselected amount" of an
19 operative fluid corresponding to each different predetermined
20 amount of compressed air, will be drawn into the mixing chamber
21 226. More importantly, the "predetermined amount" of compressed air
22 and the "preselected amount" of the operable fluid are initially
23 mixed together in the mixing chamber 226 to form a fluid
24 dispersion. The diffusion chamber 112 is further structured to
25 facilitate the formation of a plurality of substantially uniform

1 droplets, as defined herein, in the fluid dispersion prior to
2 discharge from the diffusion chamber 112 through discharge port
3 132.

4 As illustrated in Figures 1 and 2, the fluid dispersion
5 assembly 10 also includes a suppressor assembly 230 disposed in
6 communication with the diffusion assembly 200. The suppressor
7 assembly 230 comprises a suppression chamber 232, disposed in a
8 communicating relation with the atomizer exhaust channel 228 of the
9 atomizer assembly 220. More in particular, the suppression chamber
10 232 receives the fluid dispersion from the mixing chamber 226. The
11 suppressor assembly 230 helps to suppress the noise generated
12 during operation of the fluid dispersion assembly 10 as it disrupts
13 the path of flow of the fluid dispersion out of the atomizer
14 assembly 200 and into diffusion chamber 112, and therefore,
15 disrupts and dampens the sound waves associated therewith. Further,
16 the walls of the suppressor assembly 230 itself serve to absorb and
17 dampen the sound waves generated by the flow of the fluid
18 dispersion out of the mixing chamber 236 through atomizer exhaust
19 channel 238.

20 The suppressor assembly 230 may also include a suppressor
21 discharge port 234 to facilitate transfer of the fluid dispersion
22 from the suppressor chamber 232 into the diffusion chamber 112. In
23 at least one embodiment, such as is shown in Figure 1, the
24 suppressor discharge port 234 is located through a low point in the
25 suppressor chamber 232. Of course, as shown in the alternative

1 embodiment of Figure 2, the suppressor discharge port 234 is
2 located through the sides of the suppressor chamber 232.

3 Figure 5 is illustrative of an alternative embodiment of a
4 fluid dispersion assembly 10, wherein a modified diffusion chamber
5 112' is configured to suppress and/or dampen sound waves generated
6 during operation, similar to the suppressor assembly 230 disclosed
7 above. However, as will be appreciated from the following
8 disclosure, the diffusion chamber 112' of the embodiment of Figure
9 5 serves to suppress sound waves generated during operation without
10 the need for a separate suppression chamber, as in previously
11 disclosed embodiments.

12 Before addressing the modified diffusion chamber 112' of the
13 embodiment of Figure 5, it is noted that, in many respects, the
14 fluid dispersion assembly 10 of Figure 5 is similar to the
15 previously disclosed embodiments herein. To begin, the fluid
16 dispersion assembly 10 of Figure 5 comprises a diffusion unit 100
17 having oppositely disposed ends 110, 113, and a diffusion chamber
18 112' disposed therebetween. Unlike previously disclosed
19 embodiments, however, the fluid dispersion assembly 10 of Figure 5
20 includes a service access port 160 having a removable service
21 access plug 162 disposed directly through one end 113 of the
22 diffusion unit 100, rather than through a separate cap disposed at
23 one end of the unit 100.

24 The fluid dispersion assembly 10 of Figure 5 further comprises
25 a container interconnect 140 cooperatively structured to

1 interconnect the diffusion unit 100 to a fluid container (FC) in a
2 substantially sealed relationship and, as before, a sealing washer
3 170 is provided to maintain a substantially sealed relationship.

4 A cartridge port 150 is disposed through one side of the
5 diffusion unit 100, in the illustrative embodiment of Figure 5, and
6 a diffusion assembly 200 is operatively positioned therethrough and
7 into fluid communication with diffusion chamber 112', as in
8 previously disclosed embodiments. The diffusion cartridge 200
9 includes an air inlet 210 disposed in communication with an
10 atomizer assembly 220. Further, and as in previously disclosed
11 embodiments, when compressed air is supplied to the diffusion
12 assembly 200, and more in particular, atomizer assembly 220,
13 through air inlet 210, a corresponding amount of fluid is drawn
14 into a mixing chamber 226 from the fluid container (FC) through a
15 fluid delivery tube 300, as a result of the venturi effect of
16 compressed air flowing past the opening of a fluid inlet 227 into
17 the mixing chamber 226. As a result, a fluid dispersion is formed
18 and discharged from the atomizer assembly 220 through atomizer
19 exhaust channel 228, and directly into diffusion chamber 112'.

20 As noted above, and as may be seen with reference to Figure 5,
21 the diffusion chamber 112' of the present embodiment comprises a
22 modified configuration. Specifically, the modified diffusion
23 chamber 112' comprises an upside down L-shaped configuration,
24 wherein a first axial portion 114 of the diffusion chamber 112' is
25 disposed in a substantially axial orientation adjacent and relative

1 to the discharge of the atomizer exhaust channel 228. A second
2 transverse portion 115 of the diffusion chamber 112' is disposed in
3 a substantially downwardly directed orientation, as shown in Figure
4 5, substantially transverse or perpendicular to the direction of
5 flow from atomizer exhaust channel 228.

6 The second or transverse portion 115 of the modified diffusion
7 chamber 112', in at least one embodiment, comprises a fluid return
8 lip 116 disposed at a lower end thereof in a surrounding relation
9 to incoming fluid delivery tube 300. The fluid return lip 116, in
10 at least one embodiment, extends downwardly and outwardly from the
11 walls of the second portion 115 of the diffusion chamber 112', such
12 that any liquid which coalesces in the diffusion chamber 112' along
13 the walls thereof, will be directed into drip tube 120, disposed in
14 an abutting relation along the underside of the fluid return lip
15 116, and back into fluid container (FC).

16 More importantly, the fluid dispersion discharged from the
17 atomizer assembly 220 through atomizer exhaust channel 228 into
18 diffusion chamber 112' is interrupted and redirected by virtue of
19 axial portion 114 and transverse portion 115 therein. The
20 interruption and redirection of flow in the modified diffusion
21 chamber 112' during operation of the fluid dispersion assembly 10
22 in accordance with the present embodiment, serves to suppress or
23 dampen sound waves generated therein, in a similar manner as the
24 suppression chamber 232 of previously disclosed embodiments.
25 Further, the restricted discharge from the transverse portion 115

1 of the modified diffusion chamber 112' may serve to further
2 suppress or dampen sound waves, thus reducing the noise generated
3 during operation to an even greater extent.

4 After being discharged from the diffusion chamber 112', the
5 fluid dispersion enters the freeboard above the liquid in the fluid
6 container (FC), the freeboard serving as a quasi-diffusion chamber
7 prior to final discharge of the fluid dispersion from the diffusion
8 unit 100. A discharge chamber 117 is disposed in fluid
9 communication with the freeboard of the fluid container (FC), such
10 that the fluid dispersion can pass therethrough, into a discharge
11 head 118 and out through discharge channel 119 into the airspace
12 surrounding the fluid dispersion assembly 10, as shown in the
13 illustrative embodiment of Figure 5.

14 Turning next to the illustrative embodiment of Figure 6, the
15 present invention is directed to yet another embodiment of a
16 diffusion unit 100 of a fluid dispersion assembly 10 which is also
17 powered by a compressed air source (not shown). In at least one
18 embodiment, the fluid dispersion assembly 10 is further structured
19 to operatively engage a fluid container, and to combine an amount
20 of an operative fluid with compressed air to generate a fluid
21 dispersion.

22 As before, a "fluid dispersion" in accordance with the present
23 invention shall mean a mixture of an operative fluid in air
24 comprising a plurality of substantially uniform droplets of the
25 operative fluid dispersed throughout the air. Further, and once

1 again, as used in the present specification, "substantially uniform
2 droplets" shall mean droplets having substantially the same
3 diameter. In at least one embodiment, the plurality of
4 "substantially uniform droplets" each have a diameter in the range
5 of about one micron (1 μm), in another embodiment, the diameter of
6 the "substantially uniform droplets" is in the range of about three
7 microns (3 μm), and, in one further embodiment, the plurality of
8 "substantially uniform droplets" each have a diameter in the range
9 of about five microns (5 μm). In another embodiment, the plurality
10 of "substantially uniform droplets" comprise a diameter in a range
11 of about 2 to 3 microns, and in yet one further embodiment, the
12 plurality of "substantially uniform droplets" comprise a diameter
13 in a range of about 2.3 to 3 microns.

14 In at least one embodiment, a diffusion unit 100 comprises
15 oppositely disposed ends, as at 110 and 113. Further, a diffusion
16 unit 100 at least partially defines a diffusion chamber 112'', and
17 in at least one embodiment, the diffusion chamber 112'' is
18 substantially enclosed within diffusion unit 100. As before, the
19 diffusion unit 100 may be constructed of any rigid material or
20 materials which are chemically inert, or at least chemically
21 resistant to the intended operative fluid(s) which include, but
22 once again are not limited to, fragrant oils, essential oils,
23 essential oil extracts, odor neutralizers, disinfectants, e.g.,
24 triethylene glycol, air sanitizers, etc.

25 Further, the material of construction selected for the

1 diffusion unit 100 must be capable of withstanding compressed air
2 at operative pressures, which may range anywhere from about 5 to 50
3 psig, in most embodiments of the present fluid dispersion assembly
4 10. In one lower pressure embodiment, the operating pressure of the
5 present fluid dispersion assembly 10 is in the range of about 5 to
6 10 psig, and in one further embodiment, the operating pressure is
7 in a range of about 5 to 7 psig. Conversely, a higher pressure
8 embodiment of the present fluid dispersion assembly 10 operates at
9 pressures in the range of about 20 to 25 psig, and in the range of
10 about 23 to 24 psig in yet one further embodiment. As such, the
11 material or materials of construction of a diffusion unit 100 in
12 accordance with the present invention may include metals,
13 engineered plastic materials, e.g., polyvinyl chloride, high-
14 density polyethylene, etc., and/or composite materials, just to
15 name a few.

16 In one embodiment, a cap 130 is cooperatively configured and
17 disposed in a sealing engagement with one of the oppositely
18 disposed ends 110, 113 of the diffusion unit 100. The cap 130
19 includes a discharge port 132 therethrough in communication with
20 the diffusion chamber 112'', and provides a point of release of a
21 fluid dispersion from the diffusion chamber 112'' into the airspace
22 surrounding the fluid dispersion assembly 10. In at least one
23 embodiment, the cap 130 is removably attached in a sealing
24 engagement to the diffusion unit 100.

25 The fluid dispersion assembly 10, in at least one embodiment,

1 includes a container interconnect 140 which is cooperatively
2 structured to interconnect the diffusion unit 100 to a fluid
3 container in a substantially sealed relationship. In one
4 embodiment, the container interconnect 140 is disposed at a
5 different one of the oppositely disposed ends 110, 113, opposite of
6 the cap 130 of the diffusion unit 100. A sealing washer 170 is
7 disposed between the diffusion unit 100 and the fluid container, in
8 at least one embodiment, so as to provide a substantially sealed
9 relationship between the diffusion unit 100 and the fluid container
10 (not shown). The sealing washer 170 may be constructed from any of
11 a variety of materials such as, but not limited to, rubber, nylon,
12 plastic, PVC, TEFLON, or a composite material, once again, provided
13 the material of construction is chemically inert or at least
14 chemically resistant to the operative fluid(s).

15 In one further embodiment of a fluid dispersion assembly 10 in
16 accordance with the present invention, a drip tube 120 is disposed
17 in an interconnecting relation between the diffusion unit 100 and
18 the fluid container. As shown in Figure 6, the drip tube 120 is
19 disposed through a sealing washer 170, and thus, the drip tube 120
20 serves to minimize contact between the sealing washer 170 and the
21 operative fluid, by essentially preventing the operative fluid from
22 making contact in and around the sealing washer 170 disposed
23 between the fluid container (not shown) and the container
24 interconnect 140. More in particular, the drip tube 120 channels
25 any operative fluid which may agglomerate and/or accumulate in the

1 diffusion chamber 112'' through the drip tube 120 directly back
2 into the fluid container (not shown) without contacting the sealing
3 washer 170, once again, as shown in Figure 6.

4 As before, the container interconnect 140 may be structured in
5 a variety of ways to allow interconnection to the fluid container.
6 As one example, the container interconnect 140 may be threaded,
7 internally or externally, such that the diffusion unit 100 is
8 interconnected to the fluid container by screwing the container
9 interconnect 140 into place onto corresponding threads on the neck
10 of the fluid container. In at least one other embodiment, the
11 container interconnect 140 comprises one portion of a quick-connect
12 type fitting and the fluid container comprises a complimentary
13 portion of such a quick-connect type fitting whereby once
14 operatively engaged, a substantially sealed relationship is created
15 between the diffusion unit 100 and the fluid container. In at least
16 some embodiments, the substantially sealed relationship is further
17 enhanced by a sealing washer 170, as disclosed above.

18 In at least one embodiment, a cartridge port 150 is provided
19 into the diffusion chamber 112'' to facilitate operative engagement
20 of a diffusion assembly 200 with the diffusion chamber 112''. The
21 diffusion assembly 200 may be removably engaged with the cartridge
22 port 150 to aid in removal and replacement and/or cleaning of the
23 diffusion assembly 200 and/or components thereof. As shown in the
24 illustrative embodiment of Figure 6, the cartridge port 150 is
25 disposed directly through the diffusion unit 100 and into the

1 diffusion chamber 112'', and is positioned between the oppositely
2 disposed ends 110, 113. In accordance with the illustrative
3 embodiment of Figure 6, the cartridge port 150 is disposed on the
4 diffusion unit 100 such that the diffusion assembly 200 is disposed
5 in a substantially perpendicular orientation relative to the
6 diffusion unit 100 when operatively engaging the cartridge port
7 150. As further illustrated in the embodiment of Figure 6, while
8 operatively disposed in the diffusion chamber 112'', the diffusion
9 assembly 200 is disposed between the upper chamber 115'' and the
10 lower chamber 114'' of the diffusion chamber 112''. In at least one
11 other embodiment, the cartridge port 150 is disposed through the
12 cap 130. In yet another embodiment, the diffusion assembly 200
13 comprises an integral component of the cap 130 itself.

14 As illustrated in Figure 6, the diffusion assembly 200
15 comprises an air inlet 210 and an atomizer assembly 220. The
16 atomizer assembly 220 comprises an atomizer air inlet channel 222,
17 a mixing chamber 226, and an atomizer exhaust aperture 228''. The
18 atomizer air inlet channel 222 is interconnected to the compressed
19 air source via the air inlet 210. Moreover, the atomizer air inlet
20 channel 222 includes an inlet aperture 223 and an outlet aperture
21 223'', as may be seen in Figure 6. As may also be seen in the
22 illustrative embodiment of Figure 6, the inlet aperture 223 and
23 outlet aperture 223'' are substantially equal in diameter, and is
24 the channel 223' disposed therebetween.

25 Further, the mixing chamber 226 comprises a fluid inlet 227

1 disposed in fluid communication with an operative fluid in the
2 fluid container via a fluid delivery tube 300. The fluid delivery
3 tube 300 is disposed in a fluid communicating relation between the
4 atomizer assembly 220 and the fluid container to facilitate
5 delivery of an amount of the operative fluid into the atomizer
6 assembly 220. In at least one embodiment, the fluid delivery tube
7 300 connects to the atomizer assembly 220 via the fluid inlet 227
8 into the mixing chamber 226.

9 As shown in Figure 6, the fluid inlet 227 is substantially
10 perpendicular to a compressed air flowpath through the atomizer
11 assembly 200. More in particular, and with reference to Figure 6,
12 the compressed air flowpath extends horizontally through the air
13 inlet 210, atomizer air inlet channel 222, inlet aperture 223,
14 channel 223', and outlet aperture 223'', into mixing chamber 226,
15 and out through the atomizer exhaust aperture 228''.

16 As such, when compressed air is supplied to the diffusion
17 assembly 200, a corresponding amount of operative fluid is drawn
18 into the mixing chamber 226 through the fluid delivery tube 300 as
19 a result of the venturi effect of the compressed air flowing over
20 the opening of the fluid inlet 227 into the mixing chamber 226.
21 More in particular, at each different compressed air flowrate,
22 i.e., each "predetermined amount" of compressed air which is
23 dictated and fixed by a compressed air operating pressure supplied
24 to diffusion assembly 200, a different corresponding and
25 substantially constant amount, i.e., a "preselected amount" of an

1 operative fluid corresponding to each different predetermined
2 amount of compressed air, will be drawn into the mixing chamber
3 226. More importantly, the "predetermined amount" of compressed air
4 and the "preselected amount" of the operable fluid are initially
5 mixed together in the mixing chamber 226 to form a fluid
6 dispersion. The diffusion chamber 112'' is further structured to
7 facilitate the formation of a plurality of substantially uniform
8 droplets, as defined hereinabove, in the fluid dispersion prior to
9 discharge from the diffusion chamber 112'' through discharge port
10 132.

11 Figure 6 is illustrative of an alternative embodiment of a
12 diffusion unit 100 having a modified diffusion chamber 112''. More
13 in particular, the modified diffusion chamber 112'' is configured
14 to suppress and/or dampen sound waves generated during operation,
15 similar to the suppressor assembly 230 disclosed above. However, as
16 will be appreciated from the following, the modified diffusion
17 chamber 112'' of the embodiment of Figure 6 serves to suppress
18 sound waves generated during operation without the need for a
19 separate suppression chamber, as in previously disclosed
20 embodiments.

21 As noted above, and as may be seen with reference to Figure 6,
22 the diffusion chamber 112'' of the present embodiment comprises a
23 modified configuration. Specifically, the modified diffusion
24 chamber 112'' comprises a lower chamber 114'' which is disposed
25 below and adjacent to the discharge of a fluid dispersion through

1 the atomizer exhaust aperture 228''. An upper chamber 115'' of the
2 diffusion chamber 112'' is disposed above the diffusion assembly
3 200, as shown in Figure 6, substantially opposite to the direction
4 of flow of a fluid dispersion from atomizer exhaust aperture 228''.

5 More importantly, the fluid dispersion discharged from the
6 atomizer assembly 220 through atomizer exhaust aperture 228'' into
7 diffusion chamber 112'' is interrupted and redirected by virtue of
8 lower chamber 114'' and upper chamber 115'' therein. The
9 interruption and redirection of flow in the modified diffusion
10 chamber 112'' during operation of the fluid dispersion assembly 10
11 in accordance with the present embodiment, serves to suppress or
12 dampen sound waves generated therein, much like the suppression
13 chamber 232 of previously disclosed embodiments. Further, the
14 restricted discharge from the upper chamber 115'' of the modified
15 diffusion chamber 112'' serves to further suppress or dampen sound
16 waves, thus reducing the noise generated during operation to an
17 even greater extent.

18 After being discharged from the mixing chamber 226 through the
19 atomizer exhaust aperture 228'', the fluid dispersion is at least
20 partially deflected into the freeboard above the liquid in the
21 fluid container, the freeboard serving as a quasi-diffusion chamber
22 prior to final discharge of the fluid dispersion from the diffusion
23 unit 100 through discharge port 132 and into the airspace
24 surrounding the fluid dispersion assembly 10. A portion of the
25 fluid dispersion is also deflected against the bottom surface of

1 the lower chamber 114'' of the modified diffusion chamber 112'' and
2 upwardly into the upper chamber 115'' of the modified diffusion
3 chamber 112'' before being discharged through discharge port 132
4 into the airspace surrounding the fluid dispersion assembly 10.

5 It is further envisioned that at least one embodiment of the
6 fluid dispersion assembly 10 of the present invention is operated
7 via a programmable timer to control a fragrance intensity and
8 character in an airspace by metering the fragrance delivered in an
9 enclosed environment. The fluid dispersion assembly 10 delivers a
10 specific amount of a fragrance, i.e., the delivery rate, based upon
11 such factors as the specific physical configuration of the atomizer
12 assembly 220 and the fluid container (FC) / fluid delivery tube
13 300, the pressure and volume of the compressed air supplied into
14 air inlet 210, as well as the physical properties of the fragrance
15 itself, such as, viscosity, surface tension, vapor pressure, etc.,
16 wherein the delivery rate is measured in grams per minute of a
17 fragrance dispersed. The perceived fragrance intensity in a
18 specific airspace is measured from a sensory point of view using a
19 labeled magnitude scale. The data is directly correlated to the
20 amount of fragrance delivered and may be measured in either grams
21 per liter or grams per cubic meter. Since the delivery rate is
22 fixed, fragrance intensity is controlled by cycling the fluid
23 dispersion assembly 10 through an on/off programming cycle every
24 minute to deliver the intensity and character levels that are
25 desired by a user. The optimization process is a function of dosing

1 time per minute and a user's desired fragrance experience.

2 Since many modifications, variations and changes in detail can
3 be made to the described preferred embodiment of the invention, it
4 is intended that all matters in the foregoing description and shown
5 in the accompanying drawings be interpreted as illustrative and not
6 in a limiting sense. Thus, the scope of the invention should be
7 determined by the appended claims and their legal equivalents.

8 Now that the invention has been described,

1 What is claimed is:

2 1. A fluid dispersion assembly operatively engages a container of
3 an operative fluid and a compressed air source and generates and
4 discharges a fluid dispersion into a surrounding airspace, said
5 fluid dispersion assembly comprising:

6 a diffusion unit at least partially defining an enclosed
7 diffusion chamber, wherein said diffusion chamber comprises an
8 upper chamber and a lower chamber,

9 a discharge port disposed in fluid communication between said
10 diffusion chamber and the surrounding airspace,

11 a diffusion assembly disposed in an operative engagement with
12 said diffusion unit, wherein said diffusion assembly comprises an
13 atomizer assembly,

14 said atomizer assembly comprising an atomizer air inlet
15 channel, a fluid inlet, a mixing chamber, and an atomizer exhaust
16 aperture, and

17 said atomizer air inlet channel interconnected to the
18 compressed air source and said fluid inlet disposed in fluid
19 communication with the operative fluid in the container, wherein
20 the compressed air and the operative fluid are mixed together in
21 said mixing chamber to form the fluid dispersion.

22 2. The fluid dispersion assembly as recited in claim 1 wherein
23 said diffusion assembly is disposed between said upper chamber and
24 said lower chamber.

25 3. The fluid dispersion assembly as recited in claim 1 further

1 comprising a cap cooperatively configured and disposed in a sealing
2 engagement with said diffusion unit.

3 4. The fluid dispersion assembly as recited in claim 1 wherein
4 said atomizer exhaust aperture is disposed in a communicating
5 relation between said mixing chamber and said lower chamber to
6 facilitate transfer of the fluid dispersion therebetween.

7 5. The fluid dispersion assembly as recited in claim 1 wherein
8 said diffusion chamber facilitates formation of the fluid
9 dispersion prior to discharge of the fluid dispersion from said
10 diffusion chamber through said discharge port and into the
11 surrounding airspace.

12 6. A fluid dispersion assembly is operatively interconnected to a
13 container of an operative fluid and a compressed air source to
14 generate and discharge a fluid dispersion into a surrounding
15 airspace, said fluid dispersion assembly comprising:

16 a diffusion unit at least partially defining a diffusion
17 chamber, wherein said diffusion chamber comprises an upper chamber
18 and a lower chamber,

19 a discharge port disposed in fluid communication between said
20 diffusion chamber and the surrounding airspace, and

21 a diffusion assembly disposed in an operative engagement with
22 said diffusion unit, wherein said diffusion assembly comprises an
23 atomizer assembly.

24 7. The fluid dispersion assembly as recited in claim 6 wherein
25 said diffusion assembly is disposed between said upper chamber and

1 said lower chamber.

2 8. The fluid dispersion assembly as recited in claim 6 wherein
3 said atomizer assembly comprising an atomizer air inlet channel, a
4 fluid inlet, a mixing chamber, and an atomizer exhaust aperture.

5 9. The fluid dispersion assembly as recited in claim 8 wherein
6 said atomizer air inlet channel is interconnected to the compressed
7 air source and said fluid inlet disposed in fluid communication
8 with the operative fluid in the container, wherein the compressed
9 air and the operative fluid are mixed together in said mixing
10 chamber to form the fluid dispersion.

11 10. The fluid dispersion assembly as recited in claim 9 wherein
12 said diffusion chamber facilitates formation of the fluid
13 dispersion prior to discharge of the fluid dispersion from said
14 diffusion chamber through said discharge port and into the
15 surrounding airspace.

16 11. The fluid dispersion assembly as recited in claim 6 further
17 comprising a container interconnect operatively interconnecting
18 said diffusion unit to the container, wherein said container
19 interconnect comprises a sealing washer disposed between said
20 diffusion unit and the container.

21 12. The fluid dispersion assembly as recited in claim 11 further
22 comprising a drip tube, said drip tube disposed in an
23 interconnecting relation between said diffusion chamber and the
24 container through said sealing washer, wherein said drip tube
25 minimizes contact between said sealing washer and the operative

1 fluid.

2 13. A fluid dispersion assembly interconnects to a container of an
3 operative fluid and a compressed air source and generates and
4 discharges a fluid dispersion into a surrounding airspace, said
5 fluid dispersion assembly comprising:

6 a diffusion unit having an enclosed diffusion chamber, said
7 diffusion chamber comprising oppositely disposed portions therein,
8 said diffusion chamber comprises an upper chamber and a lower
9 chamber,

10 a diffusion assembly disposed in an operative engagement with
11 said diffusion unit between said upper chamber and said lower
12 chamber,

13 said diffusion assembly comprises an atomizer assembly having
14 an atomizer exhaust aperture,

15 said lower chamber disposed below and adjacent said atomizer
16 exhaust aperture, and

17 said diffusion chamber structured to facilitate formation of
18 the fluid dispersion prior to discharge of the fluid dispersion
19 from said diffusion chamber, wherein the fluid dispersion
20 discharged from said atomizer exhaust aperture into said diffusion
21 chamber is interrupted and redirected in said lower chamber,
22 thereby dampening sound waves generated during operation of said
23 fluid dispersion assembly.

24 14. The fluid dispersion assembly as recited in claim 13 wherein
25 said atomizer assembly further comprises an atomizer air inlet

1 channel, a fluid inlet, and a mixing chamber.

2 15. The fluid dispersion assembly as recited in claim 14 wherein
3 said atomizer air inlet channel is interconnected to the compressed
4 air source and said fluid inlet is disposed in fluid communication
5 with the preselected fluid in the container, wherein the compressed
6 air and the preselected fluid are mixed together in said mixing
7 chamber to form the fluid dispersion.

8 16. The fluid dispersion assembly as recited in claim 13 further
9 comprising a drip tube.

10 17. The a fluid dispersion assembly as recited in claim 16 wherein
11 said drip tube is disposed to direct coalesced fluid from the
12 diffusion chamber back into the container of operative fluid.

13

1 ABSTRACT OF THE DISCLOSURE

2 A fluid dispersion assembly comprises a diffusion unit
3 disposed in fluid communication with a fluid container, the
4 assembly being powered by a compressed air source. The diffusion
5 unit at least partially defines a diffusion chamber, and includes a
6 diffusion assembly containing an atomizer assembly which, in
7 combination with the diffusion chamber, generates a fluid
8 dispersion from a mixture of compressed air and an operative fluid,
9 for example, fragrant oils, essential oils, odor neutralizers,
10 disinfectants such as triethylene glycol, air sanitizers, etc.

1 FLUID DISPERSION ASSEMBLY

2
3 BACKGROUND OF THE INVENTION

4 Field of the Invention

5 This invention relates generally to the field of dispersion of
6 various fluids including, but not limited to, fragrant oils,
7 essential oils, odor neutralizers, disinfectants, e.g., triethylene
8 glycol, air sanitizers, and the like, into a generally enclosed
9 airspace.

10
11 DESCRIPTION OF THE RELATED ART

12 There are various devices that can be used to deliver fragrant
13 oils, essential oils, as well as other fluids into the air. Spray
14 cans are commonly used, however, such devices require a user to
15 repeatedly and manually spray when and where necessary. Plug-in
16 devices that heat oils for dispersion into the air are also
17 commonly used, but they require constant heating of the oil via an
18 electrical outlet, which consumes energy and poses a potential fire
19 hazard.

20 Fluid diffusion devices utilizing forced and/or compressed air
21 for delivery of fragrant oils, essential oils, or other liquids are
22 desirable alternatives to spray cans and plug-in devices since they
23 do not require heating or constant user interaction, however, they
24 have drawbacks as well. One drawback of many known fluid diffusion
25 devices utilizing forced air is that they tend to make an

1 undesirable and often, depending on the location, such as an office
2 of other place of business, a disruptive amount of noise when in
3 operation. In particular, the release of a fluid dispersed in the
4 forced and/or compressed air from such a device is often
5 unacceptably noisy.

6 As such, there is a need for a fluid dispersion assembly that
7 is designed to significantly reduce the amount of noise generated
8 during operation. A further need exists for such a fluid dispersion
9 assembly to not only operate more quietly, but to operate quietly
10 while generating a fluid dispersion in air having a uniform
11 particle size distribution, such that dosing of an airspace with a
12 particular liquid, whether it be oil, sanitizer, disinfectant,
13 etc., can be predicted within acceptable limits.

14 15 SUMMARY OF THE INVENTION

16 The present invention addresses the need for a forced air
17 diffusion and dispersion assembly for fluids such as fragrant oils,
18 essential oils, odor neutralizers, disinfectants, air sanitizers,
19 etc., that significantly reduces the amount of noise generated
20 during operation. In at least one embodiment, the present invention
21 is directed to a fluid dispersion assembly which operatively
22 engages a fluid container, and is powered by a compressed air
23 source. The fluid dispersion assembly includes a diffusion unit
24 having oppositely disposed ends, which at least partially defines a
25 diffusion chamber. The diffusion chamber is structured so as to

1 facilitate formation of a fluid dispersion comprising a plurality
2 of substantially uniform droplets prior to discharge from the
3 diffusion chamber.

4 In at least one embodiment, a cap is cooperatively configured
5 in sealing engagement with one of the oppositely disposed ends of
6 the diffusion unit. Furthermore, the cap may be removably attached
7 to the diffusion unit. The cap includes a discharge port disposed
8 in communication with the diffusion chamber such that the fluid
9 dispersion can exit the diffusion chamber and into an airspace
10 surrounding the fluid dispersion assembly, while the assembly is in
11 use. In some embodiments, the cap may include a service access port
12 disposed therethrough. The service access port may also include a
13 service access plug removably disposed therein, wherein removal of
14 the service access plug allows for removal, repair, and/or cleaning
15 of the internal components of the fluid dispersion assembly.

16 The present fluid dispersion assembly, in at least one
17 embodiment, further includes a container interconnect affixed to a
18 different one of the oppositely disposed ends of the diffusion unit
19 which is cooperatively structured to interconnect the diffusion
20 unit to the fluid container in a substantially sealed relationship.
21 In at least one embodiment, a sealing washer is provided to
22 facilitate formation of the substantially sealed relationship, and
23 a drip tube is disposed in an interconnecting relation between the
24 diffusion chamber and the fluid container, in at least one further
25 embodiment, to protect the sealing washer from contact with the

1 operative fluid(s).

2 In one embodiment, a diffusion assembly is disposed in an
3 operative engagement with the diffusion unit via a cartridge port.
4 The diffusion assembly is removably engaged with the cartridge
5 port, in at least one embodiment. In some embodiments, the
6 cartridge port is disposed directly through the diffusion unit
7 between the oppositely disposed ends. The cartridge port may be
8 oriented on the diffusion unit such that the diffusion assembly is
9 at a substantially perpendicular orientation to the diffusion unit
10 upon engagement therewith. In at least one other embodiment, a
11 cartridge port is disposed through the cap. The diffusion assembly
12 comprises an atomizer assembly, which in one embodiment comprises
13 an inlet channel, a mixing chamber, and an atomizer exhaust
14 channel, wherein the inlet channel is interconnected to the
15 compressed air source and the mixing chamber comprises a fluid
16 inlet disposed in fluid communication with the fluid in the fluid
17 container. Compressed air and fluid are initially mixed together in
18 the mixing chamber to form a fluid dispersion.

19 These and other objects, features and advantages of the
20 present invention will become clearer when the drawings as well as
21 the detailed description are taken into consideration.

22 23 BRIEF DESCRIPTION OF THE DRAWINGS

24 For a fuller understanding of the nature of the present
25 invention, reference should be had to the following detailed

1 description taken in connection with the accompanying drawings in
2 which:

3 Figure 1 is a cross-sectional elevation illustrative of one
4 embodiment of a fluid dispersion assembly as disclosed in the
5 present specification.

6 Figure 2 is a cross-sectional elevation illustrative of
7 another embodiment of a fluid dispersion assembly as disclosed in
8 the present specification.

9 Figure 3 is a cross-sectional view illustrative of yet another
10 embodiment of a fluid dispersion assembly as disclosed in the
11 present specification.

12 Figure 4 is a plan view illustrative of an embodiment of a
13 fluid dispersion assembly as disclosed in the present invention.

14 Figure 5 is a cross-sectional elevation illustrative of one
15 further embodiment of a fluid dispersion assembly in accordance
16 with the present specification.

17 Figure 6 is a cross-sectional elevation illustrative of yet
18 another further embodiment of a fluid dispersion assembly in
19 accordance with the present specification.

20 Like reference numerals refer to like parts throughout the
21 several views of the drawings.

22 23 DETAILED DESCRIPTION

24 As illustrated in the accompanying figures, and with initial
25 reference to Figures 1 and 2, the present invention is directed to

1 a fluid dispersion assembly, generally indicated as 10, powered by
2 a compressed air source. In at least one embodiment, the fluid
3 dispersion assembly 10 is further structured to operatively engage
4 a fluid container (FC). The fluid dispersion assembly 10 is
5 structured to combine an amount of an operative fluid with
6 compressed air to generate a fluid dispersion.

7 More in particular, a "fluid dispersion" in accordance with
8 the present specification shall mean a mixture of an operative
9 fluid in air comprising a plurality of substantially uniform
10 droplets of the operative fluid dispersed throughout the air.
11 Further, and once again, as used in the present specification,
12 "substantially uniform droplets" shall mean droplets having
13 substantially the same diameter. In at least one embodiment, the
14 plurality of "substantially uniform droplets" each have a diameter
15 in the range of about one micron (1 μm), in another embodiment, the
16 diameter of the droplets is in the range of about three microns (3
17 μm), and, in one further embodiment, droplet diameter is in the
18 range of about five microns (5 μm).

19 The fluid dispersion assembly 10 includes a diffusion unit 100
20 having oppositely disposed ends, as at 110 and 113, in at least one
21 embodiment. The diffusion unit 100 at least partially defines a
22 diffusion chamber 112, and in at least one embodiment, the
23 diffusion chamber 112 is substantially enclosed within diffusion
24 unit 100. The diffusion unit 100 may be constructed of any rigid
25 material or materials which are chemically inert, or at least

1 chemically resistant to the intended operative fluid(s) which
2 include, but once again are not limited to, fragrant oils,
3 essential oils, essential oil extracts, odor neutralizers,
4 disinfectants, e.g., triethylene glycol, air sanitizers, etc.
5 Further, the material of construction selected for the diffusion
6 unit 100 must be capable of withstanding compressed air at
7 operative pressures, which may range anywhere from about 5 to 50
8 psig, in most embodiments of the present fluid dispersion assembly
9 10. In one lower pressure embodiment, the operating pressure of the
10 present fluid dispersion assembly 10 is in the range of about 5 to
11 10 psig, and in one further embodiment, the operating pressure is
12 in a range of between about 5 to 7 psig. Conversely, a higher
13 pressure embodiment of the present fluid dispersion assembly 10
14 operates at pressures in the range of about 20 to 25 psig, and in
15 the range of between about 23 to 24 psig in yet one further
16 embodiment. As such, the material or materials of construction of a
17 diffusion unit 100 in accordance with the present invention may
18 include metals, engineered plastic materials, e.g., polyvinyl
19 chloride, high-density polyethylene, etc., and/or composite
20 materials, just to name a few.

21 In one embodiment, a cap 130 is cooperatively configured and
22 disposed in a sealing engagement with one of the oppositely
23 disposed ends 110, 113 of the diffusion unit 100. The cap 130
24 includes a discharge port 132 therethrough in communication with
25 the diffusion chamber 112, and provides a point of release of the

1 fluid dispersion from the diffusion chamber 112 into the airspace
2 surrounding the fluid dispersion assembly 10. In at least one
3 embodiment, the cap 130 is removably attached in a sealing
4 engagement to the diffusion unit 100. Figure 4 is a plan view of
5 the embodiment of the fluid dispersion assembly 10 as shown in
6 Figures 1 and 2, and shows the cap 130 having a discharge port 132
7 disposed therethrough. As shown in the embodiment of Figure 3, the
8 cap 130 may include a service access port 160 disposed
9 therethrough. The service access port 160 includes a service access
10 plug 162 removably disposed therein, wherein removal of the service
11 access plug 162 allows access for removal and cleaning or repair of
12 a diffusion assembly 200, as disclosed in greater detail below.

13 The fluid dispersion assembly 10, in at least one embodiment,
14 includes a container interconnect 140 which is cooperatively
15 structured to interconnect the diffusion unit 100 to the fluid
16 container (FC) in a substantially sealed relationship. In one
17 embodiment, the container interconnect 140 is disposed at a
18 different one of the oppositely disposed ends 110, 113, opposite of
19 cap 130 of the diffusion unit 100. A sealing washer 170 is disposed
20 between the diffusion unit 100 and the fluid container (FC), in at
21 least one embodiment, so as to provide a substantially sealed
22 relationship between the diffusion unit 100 and the fluid container
23 (FC). The sealing washer 170 may be constructed from any of a
24 variety of materials such as, but not limited to, rubber, nylon,
25 plastic, PVC, TEFLON, or a composite material, once again, provided

1 the material of construction is chemically inert or at least
2 chemically resistant to the operative fluid(s).

3 In one further embodiment of a fluid dispersion assembly 10 in
4 accordance with the present invention, a drip tube 120 is disposed
5 in an interconnecting relation between the diffusion unit 100 and
6 the fluid container (FC). As shown in Figures 1 and 2, the drip
7 tube 120 is disposed through a sealing washer 170, and thus, the
8 drip tube 120 serves to minimize contact between the sealing washer
9 170 and the operative fluid, by essentially preventing the
10 operative fluid from making contact in and around the sealing
11 washer 170 disposed between the fluid container (FC) and the
12 container interconnect 140. More in particular, the drip tube 120
13 channels any operative fluid which may agglomerate and/or
14 accumulate in the diffusion chamber 112 through the drip tube 120
15 directly back into the fluid container (FC) without contacting the
16 sealing washer 170, once again, as shown in Figures 1 and 2.

17 The container interconnect 140 may be structured in a variety
18 of ways to allow interconnection to the fluid container (FC). As
19 one example, the container interconnect 140 may be threaded,
20 internally or externally, such that the diffusion unit 100 is
21 interconnected to the fluid container (FC) by screwing the
22 container interconnect 140 into place onto corresponding threads on
23 the neck of the fluid container (FC). In at least one other
24 embodiment, the container interconnect 140 comprises one portion of
25 a quick-connect type fitting and the fluid container (FC) comprises

1 a complimentary portion of such a quick-connect type fitting
2 whereby once operatively engaged, a substantially sealed
3 relationship is created between the diffusion unit 100 and the
4 fluid container (FC). In at least some embodiments, the
5 substantially sealed relationship is further enhanced by a sealing
6 washer 170, as disclosed above.

7 In at least one embodiment, a cartridge port 150 is provided
8 into the diffusion chamber 112 to facilitate operative engagement
9 of a diffusion assembly 200 with the diffusion chamber 112. The
10 diffusion assembly 200 may be removably engaged with the cartridge
11 port 150 to aid in removal and replacement and/or cleaning of the
12 diffusion assembly 200 and/or components thereof. In some
13 embodiments, the cartridge port 150 is disposed directly through
14 the diffusion unit 100 and into the diffusion chamber 112, and is
15 positioned between the oppositely disposed ends 110, 113. In at
16 least one embodiment, the cartridge port 150 is disposed on the
17 diffusion unit 100 such that the diffusion assembly 200 is disposed
18 in a substantially perpendicular orientation relative to the
19 diffusion unit 100 when operatively engaging the cartridge port
20 150, such as is shown in the illustrative embodiment of Figure 1.
21 The diffusion assembly 200 is also shown disposed substantially
22 perpendicular to the diffusion unit 100 in the plan view of Figure
23 4. In at least one other embodiment, the cartridge port 150 is
24 disposed through the cap 130. In yet another embodiment, the
25 diffusion assembly 200 comprises an integral component of the cap

130 itself, such as in the embodiment of Figure 3.

As illustrated in Figures 1 and 3, the diffusion assembly 200 comprises an air inlet 210 and an atomizer assembly 220. The atomizer assembly 220 comprises an atomizer air inlet channel 222, a mixing chamber 226, and an atomizer exhaust channel 228. The atomizer air inlet channel 222 is interconnected to the compressed air source via the air inlet 210. Moreover, the atomizer air inlet channel 222 may also include an inlet aperture 223, a first portion 224 and a second portion 225. The first portion 224 and the second portion 225 are collectively structured to facilitate delivery of compressed air into the mixing chamber 226. The first portion 224 of the atomizer air inlet channel 222 may comprise a larger diameter than the second portion 225, such as is shown in the illustrative embodiment of Figure 1. Of course, it is within the scope and intent of the present invention for the atomizer air inlet channel 222 to comprise a constant diameter along its entire length, i.e., a diameter of a first portion 224 is substantially equal to a diameter of a second portion 225.

Further, the mixing chamber 226 comprises a fluid inlet 227 disposed in fluid communication with an operative fluid in the fluid container (FC) via a fluid delivery tube 300. The fluid delivery tube 300 is disposed in a fluid communicating relation between the atomizer assembly 220 and the fluid container (FC) to facilitate delivery of an amount of the operative fluid into the atomizer assembly 220. In at least one embodiment, the fluid

1 delivery tube 300 connects to the atomizer assembly 220 via the
2 fluid inlet 227 into the mixing chamber 226.

3 As shown in Figures 1 and 2, the fluid inlet 227 is
4 substantially perpendicular to a compressed air flowpath through
5 the atomizer assembly 200. More in particular, and with reference
6 to Figure 1, the compressed air flowpath extends horizontally
7 through the air inlet 210, atomizer air inlet channel 222, mixing
8 chamber 226, and out through the atomizer exhaust 228.

9 As such, when compressed air is supplied to the diffusion
10 assembly 200, a corresponding amount of operative fluid is drawn
11 into the mixing chamber 226 through the fluid delivery tube 300 as
12 a result of the venturi effect of the compressed air flowing past
13 the opening of the fluid inlet 227 into the mixing chamber 226.
14 More in particular, at each different compressed air flowrate,
15 i.e., each "predetermined amount" of compressed air which is
16 dictated and fixed by a compressed air operating pressure supplied
17 to diffusion assembly 200, a different corresponding and
18 substantially constant amount, i.e., a "preselected amount" of an
19 operative fluid corresponding to each different predetermined
20 amount of compressed air, will be drawn into the mixing chamber
21 226. More importantly, the "predetermined amount" of compressed air
22 and the "preselected amount" of the operable fluid are initially
23 mixed together in the mixing chamber 226 to form a fluid
24 dispersion. The diffusion chamber 112 is further structured to
25 facilitate the formation of a plurality of substantially uniform

1 droplets, as defined herein, in the fluid dispersion prior to
2 discharge from the diffusion chamber 112 through discharge port
3 132.

4 As illustrated in Figures 1 and 2, the fluid dispersion
5 assembly 10 also includes a suppressor assembly 230 disposed in
6 communication with the diffusion assembly 200. The suppressor
7 assembly 230 comprises a suppression chamber 232, disposed in a
8 communicating relation with the atomizer exhaust channel 228 of the
9 atomizer assembly 220. More in particular, the suppression chamber
10 232 receives the fluid dispersion from the mixing chamber 226. The
11 suppressor assembly 230 helps to suppress the noise generated
12 during operation of the fluid dispersion assembly 10 as it disrupts
13 the path of flow of the fluid dispersion out of the atomizer
14 assembly 200 and into diffusion chamber 112, and therefore,
15 disrupts and dampens the sound waves associated therewith. Further,
16 the walls of the suppressor assembly 230 itself serve to absorb and
17 dampen the sound waves generated by the flow of the fluid
18 dispersion out of the mixing chamber 236 through atomizer exhaust
19 channel 238.

20 The suppressor assembly 230 may also include a suppressor
21 discharge port 234 to facilitate transfer of the fluid dispersion
22 from the suppressor chamber 232 into the diffusion chamber 112. In
23 at least one embodiment, such as is shown in Figure 1, the
24 suppressor discharge port 234 is located through a low point in the
25 suppressor chamber 232. Of course, as shown in the alternative

1 embodiment of Figure 2, the suppressor discharge port 234 is
2 located through the sides of the suppressor chamber 232.

3 Figure 5 is illustrative of an alternative embodiment of a
4 fluid dispersion assembly 10, wherein a modified diffusion chamber
5 112' is configured to suppress and/or dampen sound waves generated
6 during operation, similar to the suppressor assembly 230 disclosed
7 above. However, as will be appreciated from the following
8 disclosure, the diffusion chamber 112' of the embodiment of Figure
9 5 serves to suppress sound waves generated during operation without
10 the need for a separate suppression chamber, as in previously
11 disclosed embodiments.

12 Before addressing the modified diffusion chamber 112' of the
13 embodiment of Figure 5, it is noted that, in many respects, the
14 fluid dispersion assembly 10 of Figure 5 is similar to the
15 previously disclosed embodiments herein. To begin, the fluid
16 dispersion assembly 10 of Figure 5 comprises a diffusion unit 100
17 having oppositely disposed ends 110, 113, and a diffusion chamber
18 112' disposed therebetween. Unlike previously disclosed
19 embodiments, however, the fluid dispersion assembly 10 of Figure 5
20 includes a service access port 160 having a removable service
21 access plug 162 disposed directly through one end 113 of the
22 diffusion unit 100, rather than through a separate cap disposed at
23 one end of the unit 100.

24 The fluid dispersion assembly 10 of Figure 5 further comprises
25 a container interconnect 140 cooperatively structured to

1 interconnect the diffusion unit 100 to a fluid container (FC) in a
2 substantially sealed relationship and, as before, a sealing washer
3 170 is provided to maintain a substantially sealed relationship.

4 A cartridge port 150 is disposed through one side of the
5 diffusion unit 100, in the illustrative embodiment of Figure 5, and
6 a diffusion assembly 200 is operatively positioned therethrough and
7 into fluid communication with diffusion chamber 112', as in
8 previously disclosed embodiments. The diffusion cartridge 200
9 includes an air inlet 210 disposed in communication with an
10 atomizer assembly 220. Further, and as in previously disclosed
11 embodiments, when compressed air is supplied to the diffusion
12 assembly 200, and more in particular, atomizer assembly 220,
13 through air inlet 210, a corresponding amount of fluid is drawn
14 into a mixing chamber 226 from the fluid container (FC) through a
15 fluid delivery tube 300, as a result of the venturi effect of
16 compressed air flowing past the opening of a fluid inlet 227 into
17 the mixing chamber 226. As a result, a fluid dispersion is formed
18 and discharged from the atomizer assembly 220 through atomizer
19 exhaust channel 228, and directly into diffusion chamber 112'.

20 As noted above, and as may be seen with reference to Figure 5,
21 the diffusion chamber 112' of the present embodiment comprises a
22 modified configuration. Specifically, the modified diffusion
23 chamber 112' comprises an upside down L-shaped configuration,
24 wherein a first axial portion 114 of the diffusion chamber 112' is
25 disposed in a substantially axial orientation adjacent and relative

1 to the discharge of the atomizer exhaust channel 228. A second
2 transverse portion 115 of the diffusion chamber 112' is disposed in
3 a substantially downwardly directed orientation, as shown in Figure
4 5, substantially transverse or perpendicular to the direction of
5 flow from atomizer exhaust channel 228.

6 The second or transverse portion 115 of the modified diffusion
7 chamber 112', in at least one embodiment, comprises a fluid return
8 lip 116 disposed at a lower end thereof in a surrounding relation
9 to incoming fluid delivery tube 300. The fluid return lip 116, in
10 at least one embodiment, extends downwardly and outwardly from the
11 walls of the second portion 115 of the diffusion chamber 112', such
12 that any liquid which coalesces in the diffusion chamber 112' along
13 the walls thereof, will be directed into drip tube 120, disposed in
14 an abutting relation along the underside of the fluid return lip
15 116, and back into fluid container (FC).

16 More importantly, the fluid dispersion discharged from the
17 atomizer assembly 220 through atomizer exhaust channel 228 into
18 diffusion chamber 112' is interrupted and redirected by virtue of
19 axial portion 114 and transverse portion 115 therein. The
20 interruption and redirection of flow in the modified diffusion
21 chamber 112' during operation of the fluid dispersion assembly 10
22 in accordance with the present embodiment, serves to suppress or
23 dampen sound waves generated therein, in a similar manner as the
24 suppression chamber 232 of previously disclosed embodiments.
25 Further, the restricted discharge from the transverse portion 115

1 of the modified diffusion chamber 112' may serve to further
2 suppress or dampen sound waves, thus reducing the noise generated
3 during operation to an even greater extent.

4 After being discharged from the diffusion chamber 112', the
5 fluid dispersion enters the freeboard above the liquid in the fluid
6 container (FC), the freeboard serving as a quasi-diffusion chamber
7 prior to final discharge of the fluid dispersion from the diffusion
8 unit 100. A discharge chamber 117 is disposed in fluid
9 communication with the freeboard of the fluid container (FC), such
10 that the fluid dispersion can pass therethrough, into a discharge
11 head 118 and out through discharge channel 119 into the airspace
12 surrounding the fluid dispersion assembly 10, as shown in the
13 illustrative embodiment of Figure 5.

14 Turning next to the illustrative embodiment of Figure 6, the
15 present invention is directed to yet another embodiment of a
16 diffusion unit 100 of a fluid dispersion assembly 10 which is also
17 powered by a compressed air source (not shown). In at least one
18 embodiment, the fluid dispersion assembly 10 is further structured
19 to operatively engage a fluid container, and to combine an amount
20 of an operative fluid with compressed air to generate a fluid
21 dispersion.

22 As before, a "fluid dispersion" in accordance with the present
23 invention shall mean a mixture of an operative fluid in air
24 comprising a plurality of substantially uniform droplets of the
25 operative fluid dispersed throughout the air. Further, and once

again, as used in the present specification, "substantially uniform droplets" shall mean droplets having substantially the same diameter. In at least one embodiment, the plurality of "substantially uniform droplets" each have a diameter in the range of about one micron (1 μm), in another embodiment, the diameter of the "substantially uniform droplets" is in the range of about three microns (3 μm), and, in one further embodiment, the plurality of "substantially uniform droplets" each have a diameter in the range of about five microns (5 μm). In another embodiment, the plurality of "substantially uniform droplets" comprise a diameter in a range of about 2 to 3 microns, and in yet one further embodiment, the plurality of "substantially uniform droplets" comprise a diameter in a range of about 2.3 to 3 microns.

In at least one embodiment, a diffusion unit 100 comprises oppositely disposed ends, as at 110 and 113. Further, a diffusion unit 100 at least partially defines a diffusion chamber 112'', and in at least one embodiment, the diffusion chamber 112'' is substantially enclosed within diffusion unit 100. As before, the diffusion unit 100 may be constructed of any rigid material or materials which are chemically inert, or at least chemically resistant to the intended operative fluid(s) which include, but once again are not limited to, fragrant oils, essential oils, essential oil extracts, odor neutralizers, disinfectants, e.g., triethylene glycol, air sanitizers, etc.

Further, the material of construction selected for the

1 diffusion unit 100 must be capable of withstanding compressed air
2 at operative pressures, which may range anywhere from about 5 to 50
3 psig, in most embodiments of the present fluid dispersion assembly
4 10. In one lower pressure embodiment, the operating pressure of the
5 present fluid dispersion assembly 10 is in the range of about 5 to
6 10 psig, and in one further embodiment, the operating pressure is
7 in a range of about 5 to 7 psig. Conversely, a higher pressure
8 embodiment of the present fluid dispersion assembly 10 operates at
9 pressures in the range of about 20 to 25 psig, and in the range of
10 about 23 to 24 psig in yet one further embodiment. As such, the
11 material or materials of construction of a diffusion unit 100 in
12 accordance with the present invention may include metals,
13 engineered plastic materials, e.g., polyvinyl chloride, high-
14 density polyethylene, etc., and/or composite materials, just to
15 name a few.

16 In one embodiment, a cap 130 is cooperatively configured and
17 disposed in a sealing engagement with one of the oppositely
18 disposed ends 110, 113 of the diffusion unit 100. The cap 130
19 includes a discharge port 132 therethrough in communication with
20 the diffusion chamber 112'', and provides a point of release of a
21 fluid dispersion from the diffusion chamber 112'' into the airspace
22 surrounding the fluid dispersion assembly 10. In at least one
23 embodiment, the cap 130 is removably attached in a sealing
24 engagement to the diffusion unit 100.

25 The fluid dispersion assembly 10, in at least one embodiment,

1 includes a container interconnect 140 which is cooperatively
 2 structured to interconnect the diffusion unit 100 to a fluid
 3 container in a substantially sealed relationship. In one
 4 embodiment, the container interconnect 140 is disposed at a
 5 different one of the oppositely disposed ends 110, 113, opposite of
 6 the cap 130 of the diffusion unit 100. A sealing washer 170 is
 7 disposed between the diffusion unit 100 and the fluid container, in
 8 at least one embodiment, so as to provide a substantially sealed
 9 relationship between the diffusion unit 100 and the fluid container
 10 (not shown). The sealing washer 170 may be constructed from any of
 11 a variety of materials such as, but not limited to, rubber, nylon,
 12 plastic, PVC, TEFLON, or a composite material, once again, provided
 13 the material of construction is chemically inert or at least
 14 chemically resistant to the operative fluid(s).

15 In one further embodiment of a fluid dispersion assembly 10 in
 16 accordance with the present invention, a drip tube 120 is disposed
 17 in an interconnecting relation between the diffusion unit 100 and
 18 the fluid container. As shown in Figure 6, the drip tube 120 is
 19 disposed through a sealing washer 170, and thus, the drip tube 120
 20 serves to minimize contact between the sealing washer 170 and the
 21 operative fluid, by essentially preventing the operative fluid from
 22 making contact in and around the sealing washer 170 disposed
 23 between the fluid container (not shown) and the container
 24 interconnect 140. More in particular, the drip tube 120 channels
 25 any operative fluid which may agglomerate and/or accumulate in the

1 diffusion chamber 112'' through the drip tube 120 directly back
2 into the fluid container (not shown) without contacting the sealing
3 washer 170, once again, as shown in Figure 6.

4 As before, the container interconnect 140 may be structured in
5 a variety of ways to allow interconnection to the fluid container.
6 As one example, the container interconnect 140 may be threaded,
7 internally or externally, such that the diffusion unit 100 is
8 interconnected to the fluid container by screwing the container
9 interconnect 140 into place onto corresponding threads on the neck
10 of the fluid container. In at least one other embodiment, the
11 container interconnect 140 comprises one portion of a quick-connect
12 type fitting and the fluid container comprises a complimentary
13 portion of such a quick-connect type fitting whereby once
14 operatively engaged, a substantially sealed relationship is created
15 between the diffusion unit 100 and the fluid container. In at least
16 some embodiments, the substantially sealed relationship is further
17 enhanced by a sealing washer 170, as disclosed above.

18 In at least one embodiment, a cartridge port 150 is provided
19 into the diffusion chamber 112'' to facilitate operative engagement
20 of a diffusion assembly 200 with the diffusion chamber 112''. The
21 diffusion assembly 200 may be removably engaged with the cartridge
22 port 150 to aid in removal and replacement and/or cleaning of the
23 diffusion assembly 200 and/or components thereof. As shown in the
24 illustrative embodiment of Figure 6, the cartridge port 150 is
25 disposed directly through the diffusion unit 100 and into the

1 diffusion chamber 112'', and is positioned between the oppositely
2 disposed ends 110, 113. In accordance with the illustrative
3 embodiment of Figure 6, the cartridge port 150 is disposed on the
4 diffusion unit 100 such that the diffusion assembly 200 is disposed
5 in a substantially perpendicular orientation relative to the
6 diffusion unit 100 when operatively engaging the cartridge port
7 150. As further illustrated in the embodiment of Figure 6, while
8 operatively disposed in the diffusion chamber 112'', the diffusion
9 assembly 200 is disposed between the upper chamber 115'' and the
10 lower chamber 114'' of the diffusion chamber 112''. In at least one
11 other embodiment, the cartridge port 150 is disposed through the
12 cap 130. In yet another embodiment, the diffusion assembly 200
13 comprises an integral component of the cap 130 itself.

14 As illustrated in Figure 6, the diffusion assembly 200
15 comprises an air inlet 210 and an atomizer assembly 220. The
16 atomizer assembly 220 comprises an atomizer air inlet channel 222,
17 a mixing chamber 226, and an atomizer exhaust aperture 228''. The
18 atomizer air inlet channel 222 is interconnected to the compressed
19 air source via the air inlet 210. Moreover, the atomizer air inlet
20 channel 222 includes an inlet aperture 223 and an outlet aperture
21 223'', as may be seen in Figure 6. As may also be seen in the
22 illustrative embodiment of Figure 6, the inlet aperture 223 and
23 outlet aperture 223'' are substantially equal in diameter, and is
24 the channel 223' disposed therebetween.

25 Further, the mixing chamber 226 comprises a fluid inlet 227

1 disposed in fluid communication with an operative fluid in the
 2 fluid container via a fluid delivery tube 300. The fluid delivery
 3 tube 300 is disposed in a fluid communicating relation between the
 4 atomizer assembly 220 and the fluid container to facilitate
 5 delivery of an amount of the operative fluid into the atomizer
 6 assembly 220. In at least one embodiment, the fluid delivery tube
 7 300 connects to the atomizer assembly 220 via the fluid inlet 227
 8 into the mixing chamber 226.

9 As shown in Figure 6, the fluid inlet 227 is substantially
 10 perpendicular to a compressed air flowpath through the atomizer
 11 assembly 200. More in particular, and with reference to Figure 6,
 12 the compressed air flowpath extends horizontally through the air
 13 inlet 210, atomizer air inlet channel 222, inlet aperture 223,
 14 channel 223', and outlet aperture 223'', into mixing chamber 226,
 15 and out through the atomizer exhaust aperture 228''.

16 As such, when compressed air is supplied to the diffusion
 17 assembly 200, a corresponding amount of operative fluid is drawn
 18 into the mixing chamber 226 through the fluid delivery tube 300 as
 19 a result of the venturi effect of the compressed air flowing over
 20 the opening of the fluid inlet 227 into the mixing chamber 226.
 21 More in particular, at each different compressed air flowrate,
 22 i.e., each "predetermined amount" of compressed air which is
 23 dictated and fixed by a compressed air operating pressure supplied
 24 to diffusion assembly 200, a different corresponding and
 25 substantially constant amount, i.e., a "preselected amount" of an

operative fluid corresponding to each different predetermined amount of compressed air, will be drawn into the mixing chamber 226. More importantly, the "predetermined amount" of compressed air and the "preselected amount" of the operable fluid are initially mixed together in the mixing chamber 226 to form a fluid dispersion. The diffusion chamber 112'' is further structured to facilitate the formation of a plurality of substantially uniform droplets, as defined hereinabove, in the fluid dispersion prior to discharge from the diffusion chamber 112'' through discharge port 132.

Figure 6 is illustrative of an alternative embodiment of a diffusion unit 100 having a modified diffusion chamber 112''. More in particular, the modified diffusion chamber 112'' is configured to suppress and/or dampen sound waves generated during operation, similar to the suppressor assembly 230 disclosed above. However, as will be appreciated from the following, the modified diffusion chamber 112'' of the embodiment of Figure 6 serves to suppress sound waves generated during operation without the need for a separate suppression chamber, as in previously disclosed embodiments.

As noted above, and as may be seen with reference to Figure 6, the diffusion chamber 112'' of the present embodiment comprises a modified configuration. Specifically, the modified diffusion chamber 112'' comprises a lower chamber 114'' which is disposed below and adjacent to the discharge of a fluid dispersion through

1 the atomizer exhaust aperture 228''. An upper chamber 115'' of the
2 diffusion chamber 112'' is disposed above the diffusion assembly
3 200, as shown in Figure 6, substantially opposite to the direction
4 of flow of a fluid dispersion from atomizer exhaust aperture 228''.

5 More importantly, the fluid dispersion discharged from the
6 atomizer assembly 220 through atomizer exhaust aperture 228'' into
7 diffusion chamber 112'' is interrupted and redirected by virtue of
8 lower chamber 114'' and upper chamber 115'' therein. The
9 interruption and redirection of flow in the modified diffusion
10 chamber 112'' during operation of the fluid dispersion assembly 10
11 in accordance with the present embodiment, serves to suppress or
12 dampen sound waves generated therein, much like the suppression
13 chamber 232 of previously disclosed embodiments. Further, the
14 restricted discharge from the upper chamber 115'' of the modified
15 diffusion chamber 112'' serves to further suppress or dampen sound
16 waves, thus reducing the noise generated during operation to an
17 even greater extent.

18 After being discharged from the mixing chamber 226 through the
19 atomizer exhaust aperture 228'', the fluid dispersion is at least
20 partially deflected into the freeboard above the liquid in the
21 fluid container, the freeboard serving as a quasi-diffusion chamber
22 prior to final discharge of the fluid dispersion from the diffusion
23 unit 100 through discharge port 132 and into the airspace
24 surrounding the fluid dispersion assembly 10. A portion of the
25 fluid dispersion is also deflected against the bottom surface of

1 the lower chamber 114'' of the modified diffusion chamber 112'' and
2 upwardly into the upper chamber 115'' of the modified diffusion
3 chamber 112'' before being discharged through discharge port 132
4 into the airspace surrounding the fluid dispersion assembly 10.

5 It is further envisioned that at least one embodiment of the
6 fluid dispersion assembly 10 of the present invention is operated
7 via a programmable timer to control a fragrance intensity and
8 character in an airspace by metering the fragrance delivered in an
9 enclosed environment. The fluid dispersion assembly 10 delivers a
10 specific amount of a fragrance, i.e., the delivery rate, based upon
11 such factors as the specific physical configuration of the atomizer
12 assembly 220 and the fluid container (FC) / fluid delivery tube
13 300, the pressure and volume of the compressed air supplied into
14 air inlet 210, as well as the physical properties of the fragrance
15 itself, such as, viscosity, surface tension, vapor pressure, etc.,
16 wherein the delivery rate is measured in grams per minute of a
17 fragrance dispersed. The perceived fragrance intensity in a
18 specific airspace is measured from a sensory point of view using a
19 labeled magnitude scale. The data is directly correlated to the
20 amount of fragrance delivered and may be measured in either grams
21 per liter or grams per cubic meter. Since the delivery rate is
22 fixed, fragrance intensity is controlled by cycling the fluid
23 dispersion assembly 10 through an on/off programming cycle every
24 minute to deliver the intensity and character levels that are
25 desired by a user. The optimization process is a function of dosing

1 time per minute and a user's desired fragrance experience.

2 Since many modifications, variations and changes in detail can
3 be made to the described preferred embodiment of the invention, it
4 is intended that all matters in the foregoing description and shown
5 in the accompanying drawings be interpreted as illustrative and not
6 in a limiting sense. Thus, the scope of the invention should be
7 determined by the appended claims and their legal equivalents.

8 Now that the invention has been described,

1 What is claimed is:

2 1. A fluid dispersion assembly operatively engages a container of
3 an operative fluid and a compressed air source and generates and
4 discharges a fluid dispersion into a surrounding airspace, said
5 fluid dispersion assembly comprising:

6 a diffusion unit at least partially defining an enclosed
7 diffusion chamber, wherein said diffusion chamber comprises an
8 upper chamber and a lower chamber,

9 a discharge port disposed in fluid communication between said
10 diffusion chamber and the surrounding airspace,

11 a diffusion assembly disposed in an operative engagement with
12 said diffusion unit, wherein said diffusion assembly comprises an
13 atomizer assembly,

14 said atomizer assembly comprising an atomizer air inlet
15 channel, a fluid inlet, a mixing chamber, and an atomizer exhaust
16 aperture, and

17 said atomizer air inlet channel interconnected to the
18 compressed air source and said fluid inlet disposed in fluid
19 communication with the operative fluid in the container, wherein
20 the compressed air and the operative fluid are mixed together in
21 said mixing chamber to form the fluid dispersion.

22 2. The fluid dispersion assembly as recited in claim 1 wherein
23 said diffusion assembly is disposed between said upper chamber and
24 said lower chamber.

25 3. The fluid dispersion assembly as recited in claim 1 further

1 comprising a cap cooperatively configured and disposed in a sealing
2 engagement with said diffusion unit.

3 4. The fluid dispersion assembly as recited in claim 1 wherein
4 said atomizer exhaust aperture is disposed in a communicating
5 relation between said mixing chamber and said lower chamber to
6 facilitate transfer of the fluid dispersion therebetween.

7 5. The fluid dispersion assembly as recited in claim 1 wherein
8 said diffusion chamber facilitates formation of the fluid
9 dispersion prior to discharge of the fluid dispersion from said
10 diffusion chamber through said discharge port and into the
11 surrounding airspace.

12 6. A fluid dispersion assembly is operatively interconnected to a
13 container of an operative fluid and a compressed air source to
14 generate and discharge a fluid dispersion into a surrounding
15 airspace, said fluid dispersion assembly comprising:

16 a diffusion unit at least partially defining a diffusion
17 chamber, wherein said diffusion chamber comprises an upper chamber
18 and a lower chamber,

19 a discharge port disposed in fluid communication between said
20 diffusion chamber and the surrounding airspace, and

21 a diffusion assembly disposed in an operative engagement with
22 said diffusion unit, wherein said diffusion assembly comprises an
23 atomizer assembly.

24 7. The fluid dispersion assembly as recited in claim 6 wherein
25 said diffusion assembly is disposed between said upper chamber and

1 said lower chamber.

2 8. The fluid dispersion assembly as recited in claim 6 wherein
3 said atomizer assembly comprising an atomizer air inlet channel, a
4 fluid inlet, a mixing chamber, and an atomizer exhaust aperture.

5 9. The fluid dispersion assembly as recited in claim 8 wherein
6 said atomizer air inlet channel is interconnected to the compressed
7 air source and said fluid inlet disposed in fluid communication
8 with the operative fluid in the container, wherein the compressed
9 air and the operative fluid are mixed together in said mixing
10 chamber to form the fluid dispersion.

11 10. The fluid dispersion assembly as recited in claim 9 wherein
12 said diffusion chamber facilitates formation of the fluid
13 dispersion prior to discharge of the fluid dispersion from said
14 diffusion chamber through said discharge port and into the
15 surrounding airspace.

16 11. The fluid dispersion assembly as recited in claim 6 further
17 comprising a container interconnect operatively interconnecting
18 said diffusion unit to the container, wherein said container
19 interconnect comprises a sealing washer disposed between said
20 diffusion unit and the container.

21 12. The fluid dispersion assembly as recited in claim 11 further
22 comprising a drip tube, said drip tube disposed in an
23 interconnecting relation between said diffusion chamber and the
24 container through said sealing washer, wherein said drip tube
25 minimizes contact between said sealing washer and the operative

1 fluid.

2 13. A fluid dispersion assembly interconnects to a container of an
3 operative fluid and a compressed air source and generates and
4 discharges a fluid dispersion into a surrounding airspace, said
5 fluid dispersion assembly comprising:

6 a diffusion unit having an enclosed diffusion chamber, said
7 diffusion chamber comprising oppositely disposed portions therein,
8 said diffusion chamber comprises an upper chamber and a lower
9 chamber,

10 a diffusion assembly disposed in an operative engagement with
11 said diffusion unit between said upper chamber and said lower
12 chamber,

13 said diffusion assembly comprises an atomizer assembly having
14 an atomizer exhaust aperture,

15 said lower chamber disposed below and adjacent said atomizer
16 exhaust aperture, and

17 said diffusion chamber structured to facilitate formation of
18 the fluid dispersion prior to discharge of the fluid dispersion
19 from said diffusion chamber, wherein the fluid dispersion
20 discharged from said atomizer exhaust aperture into said diffusion
21 chamber is interrupted and redirected in said lower chamber,
22 thereby dampening sound waves generated during operation of said
23 fluid dispersion assembly.

24 14. The fluid dispersion assembly as recited in claim 13 wherein
25 said atomizer assembly further comprises an atomizer air inlet

1 channel, a fluid inlet, and a mixing chamber.

2 15. The fluid dispersion assembly as recited in claim 14 wherein
3 said atomizer air inlet channel is interconnected to the compressed
4 air source and said fluid inlet is disposed in fluid communication
5 with the preselected fluid in the container, wherein the compressed
6 air and the preselected fluid are mixed together in said mixing
7 chamber to form the fluid dispersion.

8 16. The fluid dispersion assembly as recited in claim 13 further
9 comprising a drip tube.

10 17. The a fluid dispersion assembly as recited in claim 16 wherein
11 said drip tube is disposed to direct coalesced fluid from the
12 diffusion chamber back into the container of operative fluid.

13

1 ABSTRACT OF THE DISCLOSURE

2 A fluid dispersion assembly comprises a diffusion unit
3 disposed in fluid communication with a fluid container, the
4 assembly being powered by a compressed air source. The diffusion
5 unit at least partially defines a diffusion chamber, and includes a
6 diffusion assembly containing an atomizer assembly which, in
7 combination with the diffusion chamber, generates a fluid
8 dispersion from a mixture of compressed air and an operative fluid,
9 for example, fragrant oils, essential oils, odor neutralizers,
10 disinfectants such as triethylene glycol, air sanitizers, etc.

Electronic Acknowledgement Receipt

EFS ID:	27999458
Application Number:	15353951
International Application Number:	
Confirmation Number:	5613
Title of Invention:	FLUID DISPERSION ASSEMBLY
First Named Inventor/Applicant Name:	Marc Levy
Customer Number:	4219
Filer:	John Fulton/Monica Rodriguez
Filer Authorized By:	John Fulton
Attorney Docket Number:	1.106B.16
Receipt Date:	06-JAN-2017
Filing Date:	17-NOV-2016
Time Stamp:	17:53:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	2017_01_06_EFS_CERT_Missin g_Parts_Filed_1106B.pdf	75841 5dccb149840cdae765bff539cae828879e 20d2	no	1

Warnings:

Information:					
2	Applicant Response to Pre-Exam Formalities Notice	2017_01_06_Response_To_Missing_Parts_1106B.pdf	49650	no	1
			ab7de3d1ee5d3365d1f523e317ff3c71998cb3e7		
Warnings:					
Information:					
3		2017_01_06_Substitute_Specification_clean_Filed_1106Bcw.pdf	121432	yes	33
			c102ee607c754c699e75a84fcdf1a18d84bb4902		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	27	
	Claims		28	32	
	Abstract		33	33	
Warnings:					
Information:					
4		2017_01_06_Substitute_Specification_with_markings_Filed_1106B.pdf	121921	yes	33
			2130770972bf2727e261b34b0e14286c08d0b0aa		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	27	
	Claims		28	32	
	Abstract		33	33	
Warnings:					
Information:					
Total Files Size (in bytes):			368844		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Air Essentials Inc.

Inventors: Marc Levy, Craig Huck, and Steven Semoff

Serial No.: 15/353,951

Filing Date: November 17, 2016

For: FLUID DISPERSION ASSEMBLY

Confirmation No. 5613
Customer No. 04219
Group Art Unit 1715

2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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I HEREBY CERTIFY that this correspondence is being transmitted via the U.S. Patent and Trademark Office (USPTO) electronic filing system (EFS-Web) to the USPTO this 6 day of January, 2017.

Respectfully Submitted,

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(305) 858-8000

By: /John Fulton, Jr./
John Fulton, Jr.
Reg. No. 46,716
Email: patents@malloylaw.com

Date: January 6, 2017

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number
15/353,951

APPLICATION AS FILED - PART I

(Column 1)		(Column 2)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(j))	17	minus 20 = *	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
			TOTAL	730		TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.



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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/353,951	11/17/2016	Marc Levy	1.106B.16

CONFIRMATION NO. 5613

FORMALITIES LETTER



OC000000087441773

4219
MALLOY & MALLOY
2800 S.W. THIRD AVENUE
HISTORIC CORAL WAY
MIAMI, FL 33129

Date Mailed: 11/25/2016

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The substitute specification must be submitted with markings and be accompanied by a clean version (without markings) as set forth in 37 CFR 1.125(c) and a statement that the substitute specification contains no new matter (see 37 CFR 1.125(b)). The specification, claims, and/or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
 - The application contains drawings, but the specification does not contain a brief description of the several views of the drawings as required by 37 CFR 1.74 and 37 CFR 1.77(b)(9).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

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Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice".
<https://portal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/tnguyen/



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
15/353,951	11/17/2016	1715	730	1.106B.16	17	3

CONFIRMATION NO. 5613

FILING RECEIPT



0000000087441772

4219
MALLOY & MALLOY
2800 S.W. THIRD AVENUE
HISTORIC CORAL WAY
MIAMI, FL 33129

Date Mailed: 11/25/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Marc Levy, Palmetto Bay, FL;
Craig Huck, Waterford, PA;
Steven Semoff, New City, NY;

Applicant(s)

Air Essentials Inc., Miami, FL

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CIP of 14/844,650 09/03/2015
which is a CON of 13/838,364 03/15/2013 PAT 9126215
which claims benefit of 61/694,500 08/29/2012

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 11/23/2016

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/353,951**

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

**** SMALL ENTITY ****

Title

FLUID DISPERSION ASSEMBLY

Preliminary Class

427

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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NON-PROVISIONAL UTILITY PATENT APPLICATION TRANSMITTAL LETTER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Docket No. **1.106B.16**
Customer No. **04219**

Transmitted herewith for filing are papers related to the patent application of:

Applicant: Air Essentials Inc.
Inventor(s): Marc Levy, Craig Huck, and Steven Semoff
For: FLUID DISPERSION ASSEMBLY

Enclosed are:

<u>XX</u>	<u>33</u>	pages of specification, including Abstract and claims.
<u>X</u>	<u>6</u>	sheet(s) of drawings.
<u>X</u>		A Declaration and Power of Attorney.
<u>X</u>		Application Data Sheet 37 CFR 1.76.
<u>X</u>		Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i).
<u> </u>		An assignment of the invention to: _____.
<u> </u>		Certified copy(s) of the following application(s) the priority of which is hereby claimed under 35 USC §119: _____.

The filing fee has been calculated as shown below:

			Small Entity Rate	Fees	Large Entity Rate	Fees
Basic Online Filing, Search, and Examination Fees:				\$730		\$1,600
Total Claims:	<u>17</u>	- 20=	<u>0</u>	x 40 =	x 80 =	
Independent Claims:	<u>3</u>	- 3=	<u>0</u>	x 210 =	x 420 =	
Total Sheets (if >100):	<u> </u>	-100=	<u>/50</u>	x 200 =	x 400 =	
Multiple Dependent Claims:	<u> </u>			x 390 =	x 780 =	
Non-English Specification	<u> </u>			+ 70 =	+ 140 =	
Total Fees:				\$		\$ 0

[] Please charge Deposit Account No. _____ in the amount of \$_____.

[X] Payment by credit card to cover the filing fee of **\$730**.

[] A duplicate copy of this sheet is enclosed.

[] The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. _____. A duplicate copy of this sheet is enclosed.

[] Any additional filing fees required under 37 CFR 1.16.

[] Any patent application processing fees under 37 CFR 1.17.

[] The Commissioner is hereby authorized to charge payment of the following fees during the pendency of this application or credit any overpayment to Deposit Account No. _____. A duplicate copy of this sheet is enclosed.

A duplicate copy of this sheet is enclosed.

[] Any filing fees under 37 CFR 1.16 for presentation of extra claims.

[] Any patent application processing fees under 37 CFR 1.17.

[] The issue fee set in 37 CFR 1.18 at or before mailing of the Notice of Allowance pursuant to 37 CFR 1.311(b).

November 17, 2016
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FLUID DISPERSION ASSEMBLY

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates generally to the field of dispersion of various fluids including, but not limited to, fragrant oils, essential oils, odor neutralizers, disinfectants, e.g., triethylene glycol, air sanitizers, and the like, into a generally enclosed airspace.

DESCRIPTION OF THE RELATED ART

There are various devices that can be used to deliver fragrant oils, essential oils, as well as other fluids into the air. Spray cans are commonly used, however, such devices require a user to repeatedly and manually spray when and where necessary. Plug-in devices that heat oils for dispersion into the air are also commonly used, but they require constant heating of the oil via an electrical outlet, which consumes energy and poses a potential fire hazard.

Fluid diffusion devices utilizing forced and/or compressed air for delivery of fragrant oils, essential oils, or other liquids are desirable alternatives to spray cans and plug-in devices since they do not require heating or constant user interaction, however, they have drawbacks as well. One drawback of many known fluid diffusion devices utilizing forced air is that they tend to make an

1 undesirable and often, depending on the location, such as an office
2 of other place of business, a disruptive amount of noise when in
3 operation. In particular, the release of a fluid dispersed in the
4 forced and/or compressed air from such a device is often
5 unacceptably noisy.

6 As such, there is a need for a fluid dispersion assembly that
7 is designed to significantly reduce the amount of noise generated
8 during operation. A further need exists for such a fluid dispersion
9 assembly to not only operate more quietly, but to operate quietly
10 while generating a fluid dispersion in air having a uniform
11 particle size distribution, such that dosing of an airspace with a
12 particular liquid, whether it be oil, sanitizer, disinfectant,
13 etc., can be predicted within acceptable limits.

14 15 SUMMARY OF THE INVENTION

16 The present invention addresses the need for a forced air
17 diffusion and dispersion assembly for fluids such as fragrant oils,
18 essential oils, odor neutralizers, disinfectants, air sanitizers,
19 etc., that significantly reduces the amount of noise generated
20 during operation. In at least one embodiment, the present invention
21 is directed to a fluid dispersion assembly which operatively
22 engages a fluid container, and is powered by a compressed air
23 source. The fluid dispersion assembly includes a diffusion unit
24 having oppositely disposed ends, which at least partially defines a
25 diffusion chamber. The diffusion chamber is structured so as to

1 facilitate formation of a fluid dispersion comprising a plurality
2 of substantially uniform droplets prior to discharge from the
3 diffusion chamber.

4 In at least one embodiment, a cap is cooperatively configured
5 in sealing engagement with one of the oppositely disposed ends of
6 the diffusion unit. Furthermore, the cap may be removably attached
7 to the diffusion unit. The cap includes a discharge port disposed
8 in communication with the diffusion chamber such that the fluid
9 dispersion can exit the diffusion chamber and into an airspace
10 surrounding the fluid dispersion assembly, while the assembly is in
11 use. In some embodiments, the cap may include a service access port
12 disposed therethrough. The service access port may also include a
13 service access plug removably disposed therein, wherein removal of
14 the service access plug allows for removal, repair, and/or cleaning
15 of the internal components of the fluid dispersion assembly.

16 The present fluid dispersion assembly, in at least one
17 embodiment, further includes a container interconnect affixed to a
18 different one of the oppositely disposed ends of the diffusion unit
19 which is cooperatively structured to interconnect the diffusion
20 unit to the fluid container in a substantially sealed relationship.
21 In at least one embodiment, a sealing washer is provided to
22 facilitate formation of the substantially sealed relationship, and
23 a drip tube is disposed in an interconnecting relation between the
24 diffusion chamber and the fluid container, in at least one further
25 embodiment, to protect the sealing washer from contact with the

operative fluid(s).

In one embodiment, a diffusion assembly is disposed in an operative engagement with the diffusion unit via a cartridge port. The diffusion assembly is removably engaged with the cartridge port, in at least one embodiment. In some embodiments, the cartridge port is disposed directly through the diffusion unit between the oppositely disposed ends. The cartridge port may be oriented on the diffusion unit such that the diffusion assembly is at a substantially perpendicular orientation to the diffusion unit upon engagement therewith. In at least one other embodiment, a cartridge port is disposed through the cap. The diffusion assembly comprises an atomizer assembly, which in one embodiment comprises an inlet channel, a mixing chamber, and an atomizer exhaust channel, wherein the inlet channel is interconnected to the compressed air source and the mixing chamber comprises a fluid inlet disposed in fluid communication with the fluid in the fluid container. Compressed air and fluid are initially mixed together in the mixing chamber to form a fluid dispersion.

These and other objects, features and advantages of the present invention will become clearer when the drawings as well as the detailed description are taken into consideration.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature of the present invention, reference should be had to the following detailed

1 description taken in connection with the accompanying drawings in
2 which:

3 Figure 1 is a cross-sectional elevation illustrative of one
4 embodiment of a fluid dispersion assembly as disclosed in the
5 present specification.

6 Figure 2 is a cross-sectional elevation illustrative of
7 another embodiment of a fluid dispersion assembly as disclosed in
8 the present specification.

9 Figure 3 is a cross-sectional view illustrative of yet another
10 embodiment of a fluid dispersion assembly as disclosed in the
11 present specification.

12 Figure 4 is a plan view illustrative of an embodiment of a
13 fluid dispersion assembly as disclosed in the present invention.

14 Figure 5 is a cross-sectional elevation illustrative of one
15 further embodiment of a fluid dispersion assembly in accordance
16 with the present specification.

17 Like reference numerals refer to like parts throughout the
18 several views of the drawings.

19
20 DETAILED DESCRIPTION

21 As illustrated in the accompanying figures, and with initial
22 reference to Figures 1 and 2, the present invention is directed to
23 a fluid dispersion assembly, generally indicated as 10, powered by
24 a compressed air source. In at least one embodiment, the fluid
25 dispersion assembly 10 is further structured to operatively engage

1 a fluid container (FC). The fluid dispersion assembly 10 is
2 structured to combine an amount of an operative fluid with
3 compressed air to generate a fluid dispersion.

4 More in particular, a "fluid dispersion" in accordance with
5 the present specification shall mean a mixture of an operative
6 fluid in air comprising a plurality of substantially uniform
7 droplets of the operative fluid dispersed throughout the air.
8 Further, and once again, as used in the present specification,
9 "substantially uniform droplets" shall mean droplets having
10 substantially the same diameter. In at least one embodiment, the
11 plurality of "substantially uniform droplets" each have a diameter
12 in the range of about one micron (1 μm), in another embodiment, the
13 diameter of the droplets is in the range of about three microns (3
14 μm), and, in one further embodiment, droplet diameter is in the
15 range of about five microns (5 μm).

16 The fluid dispersion assembly 10 includes a diffusion unit 100
17 having oppositely disposed ends, as at 110 and 113, in at least one
18 embodiment. The diffusion unit 100 at least partially defines a
19 diffusion chamber 112, and in at least one embodiment, the
20 diffusion chamber 112 is substantially enclosed within diffusion
21 unit 100. The diffusion unit 100 may be constructed of any rigid
22 material or materials which are chemically inert, or at least
23 chemically resistant to the intended operative fluid(s) which
24 include, but once again are not limited to, fragrant oils,
25 essential oils, essential oil extracts, odor neutralizers,

1 disinfectants, e.g., triethylene glycol, air sanitizers, etc.
2 Further, the material of construction selected for the diffusion
3 unit 100 must be capable of withstanding compressed air at
4 operative pressures, which may range anywhere from about 5 to 50
5 psig, in most embodiments of the present fluid dispersion assembly
6 10. In one lower pressure embodiment, the operating pressure of the
7 present fluid dispersion assembly 10 is in the range of about 5 to
8 10 psig, and in one further embodiment, the operating pressure is
9 in a range of between about 5 to 7 psig. Conversely, a higher
10 pressure embodiment of the present fluid dispersion assembly 10
11 operates at pressures in the range of about 20 to 25 psig, and in
12 the range of between about 23 to 24 psig in yet one further
13 embodiment. As such, the material or materials of construction of a
14 diffusion unit 100 in accordance with the present invention may
15 include metals, engineered plastic materials, e.g., polyvinyl
16 chloride, high-density polyethylene, etc., and/or composite
17 materials, just to name a few.

18 In one embodiment, a cap 130 is cooperatively configured and
19 disposed in a sealing engagement with one of the oppositely
20 disposed ends 110, 113 of the diffusion unit 100. The cap 130
21 includes a discharge port 132 therethrough in communication with
22 the diffusion chamber 112, and provides a point of release of the
23 fluid dispersion from the diffusion chamber 112 into the airspace
24 surrounding the fluid dispersion assembly 10. In at least one
25 embodiment, the cap 130 is removably attached in a sealing

1 engagement to the diffusion unit 100. Figure 4 is a plan view of
2 the embodiment of the fluid dispersion assembly 10 as shown in
3 Figures 1 and 2, and shows the cap 130 having a discharge port 132
4 disposed therethrough. As shown in the embodiment of Figure 3, the
5 cap 130 may include a service access port 160 disposed
6 therethrough. The service access port 160 includes a service access
7 plug 162 removably disposed therein, wherein removal of the service
8 access plug 162 allows access for removal and cleaning or repair of
9 a diffusion assembly 200, as disclosed in greater detail below.

10 The fluid dispersion assembly 10, in at least one embodiment,
11 includes a container interconnect 140 which is cooperatively
12 structured to interconnect the diffusion unit 100 to the fluid
13 container (FC) in a substantially sealed relationship. In one
14 embodiment, the container interconnect 140 is disposed at a
15 different one of the oppositely disposed ends 110, 113, opposite of
16 cap 130 of the diffusion unit 100. A sealing washer 170 is disposed
17 between the diffusion unit 100 and the fluid container (FC), in at
18 least one embodiment, so as to provide a substantially sealed
19 relationship between the diffusion unit 100 and the fluid container
20 (FC). The sealing washer 170 may be constructed from any of a
21 variety of materials such as, but not limited to, rubber, nylon,
22 plastic, PVC, TEFLON, or a composite material, once again, provided
23 the material of construction is chemically inert or at least
24 chemically resistant to the operative fluid(s).

25 In one further embodiment of a fluid dispersion assembly 10 in

1 accordance with the present invention, a drip tube 120 is disposed
2 in an interconnecting relation between the diffusion unit 100 and
3 the fluid container (FC). As shown in Figures 1 and 2, the drip
4 tube 120 is disposed through a sealing washer 170, and thus, the
5 drip tube 120 serves to minimize contact between the sealing washer
6 170 and the operative fluid, by essentially preventing the
7 operative fluid from making contact in and around the sealing
8 washer 170 disposed between the fluid container (FC) and the
9 container interconnect 140. More in particular, the drip tube 120
10 channels any operative fluid which may agglomerate and/or
11 accumulate in the diffusion chamber 112 through the drip tube 120
12 directly back into the fluid container (FC) without contacting the
13 sealing washer 170, once again, as shown in Figures 1 and 2.

14 The container interconnect 140 may be structured in a variety
15 of ways to allow interconnection to the fluid container (FC). As
16 one example, the container interconnect 140 may be threaded,
17 internally or externally, such that the diffusion unit 100 is
18 interconnected to the fluid container (FC) by screwing the
19 container interconnect 140 into place onto corresponding threads on
20 the neck of the fluid container (FC). In at least one other
21 embodiment, the container interconnect 140 comprises one portion of
22 a quick-connect type fitting and the fluid container (FC) comprises
23 a complimentary portion of such a quick-connect type fitting
24 whereby once operatively engaged, a substantially sealed
25 relationship is created between the diffusion unit 100 and the

1 fluid container (FC). In at least some embodiments, the
2 substantially sealed relationship is further enhanced by a sealing
3 washer 170, as disclosed above.

4 In at least one embodiment, a cartridge port 150 is provided
5 into the diffusion chamber 112 to facilitate operative engagement
6 of a diffusion assembly 200 with the diffusion chamber 112. The
7 diffusion assembly 200 may be removably engaged with the cartridge
8 port 150 to aid in removal and replacement and/or cleaning of the
9 diffusion assembly 200 and/or components thereof. In some
10 embodiments, the cartridge port 150 is disposed directly through
11 the diffusion unit 100 and into the diffusion chamber 112, and is
12 positioned between the oppositely disposed ends 110, 113. In at
13 least one embodiment, the cartridge port 150 is disposed on the
14 diffusion unit 100 such that the diffusion assembly 200 is disposed
15 in a substantially perpendicular orientation relative to the
16 diffusion unit 100 when operatively engaging the cartridge port
17 150, such as is shown in the illustrative embodiment of Figure 1.
18 The diffusion assembly 200 is also shown disposed substantially
19 perpendicular to the diffusion unit 100 in the plan view of Figure
20 4. In at least one other embodiment, the cartridge port 150 is
21 disposed through the cap 130. In yet another embodiment, the
22 diffusion assembly 200 comprises an integral component of the cap
23 130 itself, such as in the embodiment of Figure 3.

24 As illustrated in Figures 1 and 3, the diffusion assembly 200
25 comprises an air inlet 210 and an atomizer assembly 220. The

1 atomizer assembly 220 comprises an atomizer air inlet channel 222,
2 a mixing chamber 226, and an atomizer exhaust channel 228. The
3 atomizer air inlet channel 222 is interconnected to the compressed
4 air source via the air inlet 210. Moreover, the atomizer air inlet
5 channel 222 may also include an inlet aperture 223, a first portion
6 224 and a second portion 225. The first portion 224 and the second
7 portion 225 are collectively structured to facilitate delivery of
8 compressed air into the mixing chamber 226. The first portion 224
9 of the atomizer air inlet channel 222 may comprise a larger
10 diameter than the second portion 225, such as is shown in the
11 illustrative embodiment of Figure 1. Of course, it is within the
12 scope and intent of the present invention for the atomizer air
13 inlet channel 222 to comprise a constant diameter along its entire
14 length, i.e., a diameter of a first portion 224 is substantially
15 equal to a diameter of a second portion 225.

16 Further, the mixing chamber 226 comprises a fluid inlet 227
17 disposed in fluid communication with an operative fluid in the
18 fluid container (FC) via a fluid delivery tube 300. The fluid
19 delivery tube 300 is disposed in a fluid communicating relation
20 between the atomizer assembly 220 and the fluid container (FC) to
21 facilitate delivery of an amount of the operative fluid into the
22 atomizer assembly 220. In at least one embodiment, the fluid
23 delivery tube 300 connects to the atomizer assembly 220 via the
24 fluid inlet 227 into the mixing chamber 226.

25 As shown in Figures 1 and 2, the fluid inlet 227 is

1 substantially perpendicular to a compressed air flowpath through
2 the atomizer assembly 200. More in particular, and with reference
3 to Figure 1, the compressed air flowpath extends horizontally
4 through the air inlet 210, atomizer air inlet channel 222, mixing
5 chamber 226, and out through the atomizer exhaust 228.

6 As such, when compressed air is supplied to the diffusion
7 assembly 200, a corresponding amount of operative fluid is drawn
8 into the mixing chamber 226 through the fluid delivery tube 300 as
9 a result of the venturi effect of the compressed air flowing past
10 the opening of the fluid inlet 227 into the mixing chamber 226.
11 More in particular, at each different compressed air flowrate,
12 i.e., each "predetermined amount" of compressed air which is
13 dictated and fixed by a compressed air operating pressure supplied
14 to diffusion assembly 200, a different corresponding and
15 substantially constant amount, i.e., a "preselected amount" of an
16 operative fluid corresponding to each different predetermined
17 amount of compressed air, will be drawn into the mixing chamber
18 226. More importantly, the "predetermined amount" of compressed air
19 and the "preselected amount" of the operable fluid are initially
20 mixed together in the mixing chamber 226 to form a fluid
21 dispersion. The diffusion chamber 112 is further structured to
22 facilitate the formation of a plurality of substantially uniform
23 droplets, as defined herein, in the fluid dispersion prior to
24 discharge from the diffusion chamber 112 through discharge port
25 132.

1 As illustrated in Figures 1 and 2, the fluid dispersion
2 assembly 10 also includes a suppressor assembly 230 disposed in
3 communication with the diffusion assembly 200. The suppressor
4 assembly 230 comprises a suppression chamber 232, disposed in a
5 communicating relation with the atomizer exhaust channel 228 of the
6 atomizer assembly 220. More in particular, the suppression chamber
7 232 receives the fluid dispersion from the mixing chamber 226. The
8 suppressor assembly 230 helps to suppress the noise generated
9 during operation of the fluid dispersion assembly 10 as it disrupts
10 the path of flow of the fluid dispersion out of the atomizer
11 assembly 200 and into diffusion chamber 112, and therefore,
12 disrupts and dampens the sound waves associated therewith. Further,
13 the walls of the suppressor assembly 230 itself serve to absorb and
14 dampen the sound waves generated by the flow of the fluid
15 dispersion out of the mixing chamber 236 through atomizer exhaust
16 channel 238.

17 The suppressor assembly 230 may also include a suppressor
18 discharge port 234 to facilitate transfer of the fluid dispersion
19 from the suppressor chamber 232 into the diffusion chamber 112. In
20 at least one embodiment, such as is shown in Figure 1, the
21 suppressor discharge port 234 is located through a low point in the
22 suppressor chamber 232. Of course, as shown in the alternative
23 embodiment of Figure 2, the suppressor discharge port 234 is
24 located through the sides of the suppressor chamber 232.

25 Figure 5 is illustrative of an alternative embodiment of a

1 fluid dispersion assembly 10, wherein a modified diffusion chamber
2 112' is configured to suppress and/or dampen sound waves generated
3 during operation, similar to the suppressor assembly 230 disclosed
4 above. However, as will be appreciated from the following
5 disclosure, the diffusion chamber 112' of the embodiment of Figure
6 5 serves to suppress sound waves generated during operation without
7 the need for a separate suppression chamber, as in previously
8 disclosed embodiments.

9 Before addressing the modified diffusion chamber 112' of the
10 embodiment of Figure 5, it is noted that, in many respects, the
11 fluid dispersion assembly 10 of Figure 5 is similar to the
12 previously disclosed embodiments herein. To begin, the fluid
13 dispersion assembly 10 of Figure 5 comprises a diffusion unit 100
14 having oppositely disposed ends 110, 113, and a diffusion chamber
15 112' disposed therebetween. Unlike previously disclosed
16 embodiments, however, the fluid dispersion assembly 10 of Figure 5
17 includes a service access port 160 having a removable service
18 access plug 162 disposed directly through one end 113 of the
19 diffusion unit 100, rather than through a separate cap disposed at
20 one end of the unit 100.

21 The fluid dispersion assembly 10 of Figure 5 further comprises
22 a container interconnect 140 cooperatively structured to
23 interconnect the diffusion unit 100 to a fluid container (FC) in a
24 substantially sealed relationship and, as before, a sealing washer
25 170 is provided to maintain a substantially sealed relationship.

1 A cartridge port 150 is disposed through one side of the
2 diffusion unit 100, in the illustrative embodiment of Figure 5, and
3 a diffusion assembly 200 is operatively positioned therethrough and
4 into fluid communication with diffusion chamber 112', as in
5 previously disclosed embodiments. The diffusion cartridge 200
6 includes an air inlet 210 disposed in communication with an
7 atomizer assembly 220. Further, and as in previously disclosed
8 embodiments, when compressed air is supplied to the diffusion
9 assembly 200, and more in particular, atomizer assembly 220,
10 through air inlet 210, a corresponding amount of fluid is drawn
11 into a mixing chamber 226 from the fluid container (FC) through a
12 fluid delivery tube 300, as a result of the venturi effect of
13 compressed air flowing past the opening of a fluid inlet 227 into
14 the mixing chamber 226. As a result, a fluid dispersion is formed
15 and discharged from the atomizer assembly 220 through atomizer
16 exhaust channel 228, and directly into diffusion chamber 112'.

17 As noted above, and as may be seen with reference to Figure 5,
18 the diffusion chamber 112' of the present embodiment comprises a
19 modified configuration. Specifically, the modified diffusion
20 chamber 112' comprises an upside down L-shaped configuration,
21 wherein a first axial portion 114 of the diffusion chamber 112' is
22 disposed in a substantially axial orientation adjacent and relative
23 to the discharge of the atomizer exhaust channel 228. A second
24 transverse portion 115 of the diffusion chamber 112' is disposed in
25 a substantially downwardly directed orientation, as shown in Figure

1 5, substantially transverse or perpendicular to the direction of
2 flow from atomizer exhaust channel 228.

3 The second or transverse portion 115 of the modified diffusion
4 chamber 112', in at least one embodiment, comprises a fluid return
5 lip 116 disposed at a lower end thereof in a surrounding relation
6 to incoming fluid delivery tube 300. The fluid return lip 116, in
7 at least one embodiment, extends downwardly and outwardly from the
8 walls of the second portion 115 of the diffusion chamber 112', such
9 that any liquid which coalesces in the diffusion chamber 112' along
10 the walls thereof, will be directed into drip tube 120, disposed in
11 an abutting relation along the underside of the fluid return lip
12 116, and back into fluid container (FC).

13 More importantly, the fluid dispersion discharged from the
14 atomizer assembly 220 through atomizer exhaust channel 228 into
15 diffusion chamber 112' is interrupted and redirected by virtue of
16 axial portion 114 and transverse portion 115 therein. The
17 interruption and redirection of flow in the modified diffusion
18 chamber 112' during operation of the fluid dispersion assembly 10
19 in accordance with the present embodiment, serves to suppress or
20 dampen sound waves generated therein, in a similar manner as the
21 suppression chamber 232 of previously disclosed embodiments.
22 Further, the restricted discharge from the transverse portion 115
23 of the modified diffusion chamber 112' may serve to further
24 suppress or dampen sound waves, thus reducing the noise generated
25 during operation to an even greater extent.

1 After being discharged from the diffusion chamber 112', the
2 fluid dispersion enters the freeboard above the liquid in the fluid
3 container (FC), the freeboard serving as a quasi-diffusion chamber
4 prior to final discharge of the fluid dispersion from the diffusion
5 unit 100. A discharge chamber 117 is disposed in fluid
6 communication with the freeboard of the fluid container (FC), such
7 that the fluid dispersion can pass therethrough, into a discharge
8 head 118 and out through discharge channel 119 into the airspace
9 surrounding the fluid dispersion assembly 10, as shown in the
10 illustrative embodiment of Figure 5.

11 Turning next to the illustrative embodiment of Figure 6, the
12 present invention is directed to yet another embodiment of a
13 diffusion unit 100 of a fluid dispersion assembly 10 which is also
14 powered by a compressed air source (not shown). In at least one
15 embodiment, the fluid dispersion assembly 10 is further structured
16 to operatively engage a fluid container, and to combine an amount
17 of an operative fluid with compressed air to generate a fluid
18 dispersion.

19 As before, a "fluid dispersion" in accordance with the present
20 invention shall mean a mixture of an operative fluid in air
21 comprising a plurality of substantially uniform droplets of the
22 operative fluid dispersed throughout the air. Further, and once
23 again, as used in the present specification, "substantially uniform
24 droplets" shall mean droplets having substantially the same
25 diameter. In at least one embodiment, the plurality of

1 "substantially uniform droplets" each have a diameter in the range
2 of about one micron (1 μm), in another embodiment, the diameter of
3 the "substantially uniform droplets" is in the range of about three
4 microns (3 μm), and, in one further embodiment, the plurality of
5 "substantially uniform droplets" each have a diameter in the range
6 of about five microns (5 μm). In another embodiment, the plurality
7 of "substantially uniform droplets" comprise a diameter in a range
8 of about 2 to 3 microns, and in yet one further embodiment, the
9 plurality of "substantially uniform droplets" comprise a diameter
10 in a range of about 2.3 to 3 microns.

11 In at least one embodiment, a diffusion unit 100 comprises
12 oppositely disposed ends, as at 110 and 113. Further, a diffusion
13 unit 100 at least partially defines a diffusion chamber 112'', and
14 in at least one embodiment, the diffusion chamber 112'' is
15 substantially enclosed within diffusion unit 100. As before, the
16 diffusion unit 100 may be constructed of any rigid material or
17 materials which are chemically inert, or at least chemically
18 resistant to the intended operative fluid(s) which include, but
19 once again are not limited to, fragrant oils, essential oils,
20 essential oil extracts, odor neutralizers, disinfectants, e.g.,
21 triethylene glycol, air sanitizers, etc.

22 Further, the material of construction selected for the
23 diffusion unit 100 must be capable of withstanding compressed air
24 at operative pressures, which may range anywhere from about 5 to 50
25 psig, in most embodiments of the present fluid dispersion assembly

1 10. In one lower pressure embodiment, the operating pressure of the
2 present fluid dispersion assembly 10 is in the range of about 5 to
3 10 psig, and in one further embodiment, the operating pressure is
4 in a range of about 5 to 7 psig. Conversely, a higher pressure
5 embodiment of the present fluid dispersion assembly 10 operates at
6 pressures in the range of about 20 to 25 psig, and in the range of
7 about 23 to 24 psig in yet one further embodiment. As such, the
8 material or materials of construction of a diffusion unit 100 in
9 accordance with the present invention may include metals,
10 engineered plastic materials, e.g., polyvinyl chloride, high-
11 density polyethylene, etc., and/or composite materials, just to
12 name a few.

13 In one embodiment, a cap 130 is cooperatively configured and
14 disposed in a sealing engagement with one of the oppositely
15 disposed ends 110, 113 of the diffusion unit 100. The cap 130
16 includes a discharge port 132 therethrough in communication with
17 the diffusion chamber 112'', and provides a point of release of a
18 fluid dispersion from the diffusion chamber 112'' into the airspace
19 surrounding the fluid dispersion assembly 10. In at least one
20 embodiment, the cap 130 is removably attached in a sealing
21 engagement to the diffusion unit 100.

22 The fluid dispersion assembly 10, in at least one embodiment,
23 includes a container interconnect 140 which is cooperatively
24 structured to interconnect the diffusion unit 100 to a fluid
25 container in a substantially sealed relationship. In one

1 embodiment, the container interconnect 140 is disposed at a
2 different one of the oppositely disposed ends 110, 113, opposite of
3 the cap 130 of the diffusion unit 100. A sealing washer 170 is
4 disposed between the diffusion unit 100 and the fluid container, in
5 at least one embodiment, so as to provide a substantially sealed
6 relationship between the diffusion unit 100 and the fluid container
7 (not shown). The sealing washer 170 may be constructed from any of
8 a variety of materials such as, but not limited to, rubber, nylon,
9 plastic, PVC, TEFLON, or a composite material, once again, provided
10 the material of construction is chemically inert or at least
11 chemically resistant to the operative fluid(s).

12 In one further embodiment of a fluid dispersion assembly 10 in
13 accordance with the present invention, a drip tube 120 is disposed
14 in an interconnecting relation between the diffusion unit 100 and
15 the fluid container. As shown in Figure 6, the drip tube 120 is
16 disposed through a sealing washer 170, and thus, the drip tube 120
17 serves to minimize contact between the sealing washer 170 and the
18 operative fluid, by essentially preventing the operative fluid from
19 making contact in and around the sealing washer 170 disposed
20 between the fluid container (not shown) and the container
21 interconnect 140. More in particular, the drip tube 120 channels
22 any operative fluid which may agglomerate and/or accumulate in the
23 diffusion chamber 112'' through the drip tube 120 directly back
24 into the fluid container (not shown) without contacting the sealing
25 washer 170, once again, as shown in Figure 6.

1 As before, the container interconnect 140 may be structured in
2 a variety of ways to allow interconnection to the fluid container.
3 As one example, the container interconnect 140 may be threaded,
4 internally or externally, such that the diffusion unit 100 is
5 interconnected to the fluid container by screwing the container
6 interconnect 140 into place onto corresponding threads on the neck
7 of the fluid container. In at least one other embodiment, the
8 container interconnect 140 comprises one portion of a quick-connect
9 type fitting and the fluid container comprises a complimentary
10 portion of such a quick-connect type fitting whereby once
11 operatively engaged, a substantially sealed relationship is created
12 between the diffusion unit 100 and the fluid container. In at least
13 some embodiments, the substantially sealed relationship is further
14 enhanced by a sealing washer 170, as disclosed above.

15 In at least one embodiment, a cartridge port 150 is provided
16 into the diffusion chamber 112'' to facilitate operative engagement
17 of a diffusion assembly 200 with the diffusion chamber 112''. The
18 diffusion assembly 200 may be removably engaged with the cartridge
19 port 150 to aid in removal and replacement and/or cleaning of the
20 diffusion assembly 200 and/or components thereof. As shown in the
21 illustrative embodiment of Figure 6, the cartridge port 150 is
22 disposed directly through the diffusion unit 100 and into the
23 diffusion chamber 112'', and is positioned between the oppositely
24 disposed ends 110, 113. In accordance with the illustrative
25 embodiment of Figure 6, the cartridge port 150 is disposed on the

1 diffusion unit 100 such that the diffusion assembly 200 is disposed
2 in a substantially perpendicular orientation relative to the
3 diffusion unit 100 when operatively engaging the cartridge port
4 150. As further illustrated in the embodiment of Figure 6, while
5 operatively disposed in the diffusion chamber 112'', the diffusion
6 assembly 200 is disposed between the upper chamber 115'' and the
7 lower chamber 114'' of the diffusion chamber 112''. In at least one
8 other embodiment, the cartridge port 150 is disposed through the
9 cap 130. In yet another embodiment, the diffusion assembly 200
10 comprises an integral component of the cap 130 itself.

11 As illustrated in Figure 6, the diffusion assembly 200
12 comprises an air inlet 210 and an atomizer assembly 220. The
13 atomizer assembly 220 comprises an atomizer air inlet channel 222,
14 a mixing chamber 226, and an atomizer exhaust aperture 228''. The
15 atomizer air inlet channel 222 is interconnected to the compressed
16 air source via the air inlet 210. Moreover, the atomizer air inlet
17 channel 222 includes an inlet aperture 223 and an outlet aperture
18 223'', as may be seen in Figure 6. As may also be seen in the
19 illustrative embodiment of Figure 6, the inlet aperture 223 and
20 outlet aperture 223'' are substantially equal in diameter, and is
21 the channel 223' disposed therebetween.

22 Further, the mixing chamber 226 comprises a fluid inlet 227
23 disposed in fluid communication with an operative fluid in the
24 fluid container via a fluid delivery tube 300. The fluid delivery
25 tube 300 is disposed in a fluid communicating relation between the

1 atomizer assembly 220 and the fluid container to facilitate
2 delivery of an amount of the operative fluid into the atomizer
3 assembly 220. In at least one embodiment, the fluid delivery tube
4 300 connects to the atomizer assembly 220 via the fluid inlet 227
5 into the mixing chamber 226.

6 As shown in Figure 6, the fluid inlet 227 is substantially
7 perpendicular to a compressed air flowpath through the atomizer
8 assembly 200. More in particular, and with reference to Figure 6,
9 the compressed air flowpath extends horizontally through the air
10 inlet 210, atomizer air inlet channel 222, inlet aperture 223,
11 channel 223', and outlet aperture 223'', into mixing chamber 226,
12 and out through the atomizer exhaust aperture 228''.

13 As such, when compressed air is supplied to the diffusion
14 assembly 200, a corresponding amount of operative fluid is drawn
15 into the mixing chamber 226 through the fluid delivery tube 300 as
16 a result of the venturi effect of the compressed air flowing over
17 the opening of the fluid inlet 227 into the mixing chamber 226.
18 More in particular, at each different compressed air flowrate,
19 i.e., each "predetermined amount" of compressed air which is
20 dictated and fixed by a compressed air operating pressure supplied
21 to diffusion assembly 200, a different corresponding and
22 substantially constant amount, i.e., a "preselected amount" of an
23 operative fluid corresponding to each different predetermined
24 amount of compressed air, will be drawn into the mixing chamber
25 226. More importantly, the "predetermined amount" of compressed air

1 and the "preselected amount" of the operable fluid are initially
2 mixed together in the mixing chamber 226 to form a fluid
3 dispersion. The diffusion chamber 112'' is further structured to
4 facilitate the formation of a plurality of substantially uniform
5 droplets, as defined hereinabove, in the fluid dispersion prior to
6 discharge from the diffusion chamber 112'' through discharge port
7 132.

8 Figure 6 is illustrative of an alternative embodiment of a
9 diffusion unit 100 having a modified diffusion chamber 112''. More
10 in particular, the modified diffusion chamber 112'' is configured
11 to suppress and/or dampen sound waves generated during operation,
12 similar to the suppressor assembly 230 disclosed above. However, as
13 will be appreciated from the following, the modified diffusion
14 chamber 112'' of the embodiment of Figure 6 serves to suppress
15 sound waves generated during operation without the need for a
16 separate suppression chamber, as in previously disclosed
17 embodiments.

18 As noted above, and as may be seen with reference to Figure 6,
19 the diffusion chamber 112'' of the present embodiment comprises a
20 modified configuration. Specifically, the modified diffusion
21 chamber 112'' comprises a lower chamber 114'' which is disposed
22 below and adjacent to the discharge of a fluid dispersion through
23 the atomizer exhaust aperture 228''. An upper chamber 115'' of the
24 diffusion chamber 112'' is disposed above the diffusion assembly
25 200, as shown in Figure 6, substantially opposite to the direction

1 of flow of a fluid dispersion from atomizer exhaust aperture 228''.

2 More importantly, the fluid dispersion discharged from the
3 atomizer assembly 220 through atomizer exhaust aperture 228'' into
4 diffusion chamber 112'' is interrupted and redirected by virtue of
5 lower chamber 114'' and upper chamber 115'' therein. The
6 interruption and redirection of flow in the modified diffusion
7 chamber 112'' during operation of the fluid dispersion assembly 10
8 in accordance with the present embodiment, serves to suppress or
9 dampen sound waves generated therein, much like the suppression
10 chamber 232 of previously disclosed embodiments. Further, the
11 restricted discharge from the upper chamber 115'' of the modified
12 diffusion chamber 112'' serves to further suppress or dampen sound
13 waves, thus reducing the noise generated during operation to an
14 even greater extent.

15 After being discharged from the mixing chamber 226 through the
16 atomizer exhaust aperture 228'', the fluid dispersion is at least
17 partially deflected into the freeboard above the liquid in the
18 fluid container, the freeboard serving as a quasi-diffusion chamber
19 prior to final discharge of the fluid dispersion from the diffusion
20 unit 100 through discharge port 132 and into the airspace
21 surrounding the fluid dispersion assembly 10. A portion of the
22 fluid dispersion is also deflected against the bottom surface of
23 the lower chamber 114'' of the modified diffusion chamber 112'' and
24 upwardly into the upper chamber 115'' of the modified diffusion
25 chamber 112'' before being discharged through discharge port 132

1 into the airspace surrounding the fluid dispersion assembly 10.

2 It is further envisioned that at least one embodiment of the
3 fluid dispersion assembly 10 of the present invention is operated
4 via a programmable timer to control a fragrance intensity and
5 character in an airspace by metering the fragrance delivered in an
6 enclosed environment. The fluid dispersion assembly 10 delivers a
7 specific amount of a fragrance, i.e., the delivery rate, based upon
8 such factors as the specific physical configuration of the atomizer
9 assembly 220 and the fluid container (FC) / fluid delivery tube
10 300, the pressure and volume of the compressed air supplied into
11 air inlet 210, as well as the physical properties of the fragrance
12 itself, such as, viscosity, surface tension, vapor pressure, etc.,
13 wherein the delivery rate is measured in grams per minute of a
14 fragrance dispersed. The perceived fragrance intensity in a
15 specific airspace is measured from a sensory point of view using a
16 labeled magnitude scale. The data is directly correlated to the
17 amount of fragrance delivered and may be measured in either grams
18 per liter or grams per cubic meter. Since the delivery rate is
19 fixed, fragrance intensity is controlled by cycling the fluid
20 dispersion assembly 10 through an on/off programming cycle every
21 minute to deliver the intensity and character levels that are
22 desired by a user. The optimization process is a function of dosing
23 time per minute and a user's desired fragrance experience.

24 Since many modifications, variations and changes in detail can
25 be made to the described preferred embodiment of the invention, it

1 is intended that all matters in the foregoing description and shown
2 in the accompanying drawings be interpreted as illustrative and not
3 in a limiting sense. Thus, the scope of the invention should be
4 determined by the appended claims and their legal equivalents.

5 Now that the invention has been described,

1 What is claimed is:

2 1. A fluid dispersion assembly operatively engages a container of
3 an operative fluid and a compressed air source and generates and
4 discharges a fluid dispersion into a surrounding airspace, said
5 fluid dispersion assembly comprising:

6 a diffusion unit at least partially defining an enclosed
7 diffusion chamber, wherein said diffusion chamber comprises an
8 upper chamber and a lower chamber,

9 a discharge port disposed in fluid communication between said
10 diffusion chamber and the surrounding airspace,

11 a diffusion assembly disposed in an operative engagement with
12 said diffusion unit, wherein said diffusion assembly comprises an
13 atomizer assembly,

14 said atomizer assembly comprising an atomizer air inlet
15 channel, a fluid inlet, a mixing chamber, and an atomizer exhaust
16 aperture, and

17 said atomizer air inlet channel interconnected to the
18 compressed air source and said fluid inlet disposed in fluid
19 communication with the operative fluid in the container, wherein
20 the compressed air and the operative fluid are mixed together in
21 said mixing chamber to form the fluid dispersion.

22 2. The fluid dispersion assembly as recited in claim 1 wherein
23 said diffusion assembly is disposed between said upper chamber and
24 said lower chamber.

25 3. The fluid dispersion assembly as recited in claim 1 further

1 comprising a cap cooperatively configured and disposed in a sealing
2 engagement with said diffusion unit.

3 4. The fluid dispersion assembly as recited in claim 1 wherein
4 said atomizer exhaust aperture is disposed in a communicating
5 relation between said mixing chamber and said lower chamber to
6 facilitate transfer of the fluid dispersion therebetween.

7 5. The fluid dispersion assembly as recited in claim 1 wherein
8 said diffusion chamber facilitates formation of the fluid
9 dispersion prior to discharge of the fluid dispersion from said
10 diffusion chamber through said discharge port and into the
11 surrounding airspace.

12 6. A fluid dispersion assembly is operatively interconnected to a
13 container of an operative fluid and a compressed air source to
14 generate and discharge a fluid dispersion into a surrounding
15 airspace, said fluid dispersion assembly comprising:

16 a diffusion unit at least partially defining a diffusion
17 chamber, wherein said diffusion chamber comprises an upper chamber
18 and a lower chamber,

19 a discharge port disposed in fluid communication between said
20 diffusion chamber and the surrounding airspace, and

21 a diffusion assembly disposed in an operative engagement with
22 said diffusion unit, wherein said diffusion assembly comprises an
23 atomizer assembly.

24 7. The fluid dispersion assembly as recited in claim 6 wherein
25 said diffusion assembly is disposed between said upper chamber and

1 said lower chamber.

2 8. The fluid dispersion assembly as recited in claim 6 wherein
3 said atomizer assembly comprising an atomizer air inlet channel, a
4 fluid inlet, a mixing chamber, and an atomizer exhaust aperture.

5 9. The fluid dispersion assembly as recited in claim 8 wherein
6 said atomizer air inlet channel is interconnected to the compressed
7 air source and said fluid inlet disposed in fluid communication
8 with the operative fluid in the container, wherein the compressed
9 air and the operative fluid are mixed together in said mixing
10 chamber to form the fluid dispersion.

11 10. The fluid dispersion assembly as recited in claim 9 wherein
12 said diffusion chamber facilitates formation of the fluid
13 dispersion prior to discharge of the fluid dispersion from said
14 diffusion chamber through said discharge port and into the
15 surrounding airspace.

16 11. The fluid dispersion assembly as recited in claim 6 further
17 comprising a container interconnect operatively interconnecting
18 said diffusion unit to the container, wherein said container
19 interconnect comprises a sealing washer disposed between said
20 diffusion unit and the container.

21 12. The fluid dispersion assembly as recited in claim 11 further
22 comprising a drip tube, said drip tube disposed in an
23 interconnecting relation between said diffusion chamber and the
24 container through said sealing washer, wherein said drip tube
25 minimizes contact between said sealing washer and the operative

1 fluid.

2 13. A fluid dispersion assembly interconnects to a container of an
3 operative fluid and a compressed air source and generates and
4 discharges a fluid dispersion into a surrounding airspace, said
5 fluid dispersion assembly comprising:

6 a diffusion unit having an enclosed diffusion chamber, said
7 diffusion chamber comprising oppositely disposed portions therein,
8 said diffusion chamber comprises an upper chamber and a lower
9 chamber,

10 a diffusion assembly disposed in an operative engagement with
11 said diffusion unit between said upper chamber and said lower
12 chamber,

13 said diffusion assembly comprises an atomizer assembly having
14 an atomizer exhaust aperture,

15 said lower chamber disposed below and adjacent said atomizer
16 exhaust aperture, and

17 said diffusion chamber structured to facilitate formation of
18 the fluid dispersion prior to discharge of the fluid dispersion
19 from said diffusion chamber, wherein the fluid dispersion
20 discharged from said atomizer exhaust aperture into said diffusion
21 chamber is interrupted and redirected in said lower chamber,
22 thereby dampening sound waves generated during operation of said
23 fluid dispersion assembly.

24 14. The fluid dispersion assembly as recited in claim 13 wherein
25 said atomizer assembly further comprises an atomizer air inlet

1 channel, a fluid inlet, and a mixing chamber.

2 15. The fluid dispersion assembly as recited in claim 14 wherein
3 said atomizer air inlet channel is interconnected to the compressed
4 air source and said fluid inlet is disposed in fluid communication
5 with the preselected fluid in the container, wherein the compressed
6 air and the preselected fluid are mixed together in said mixing
7 chamber to form the fluid dispersion.

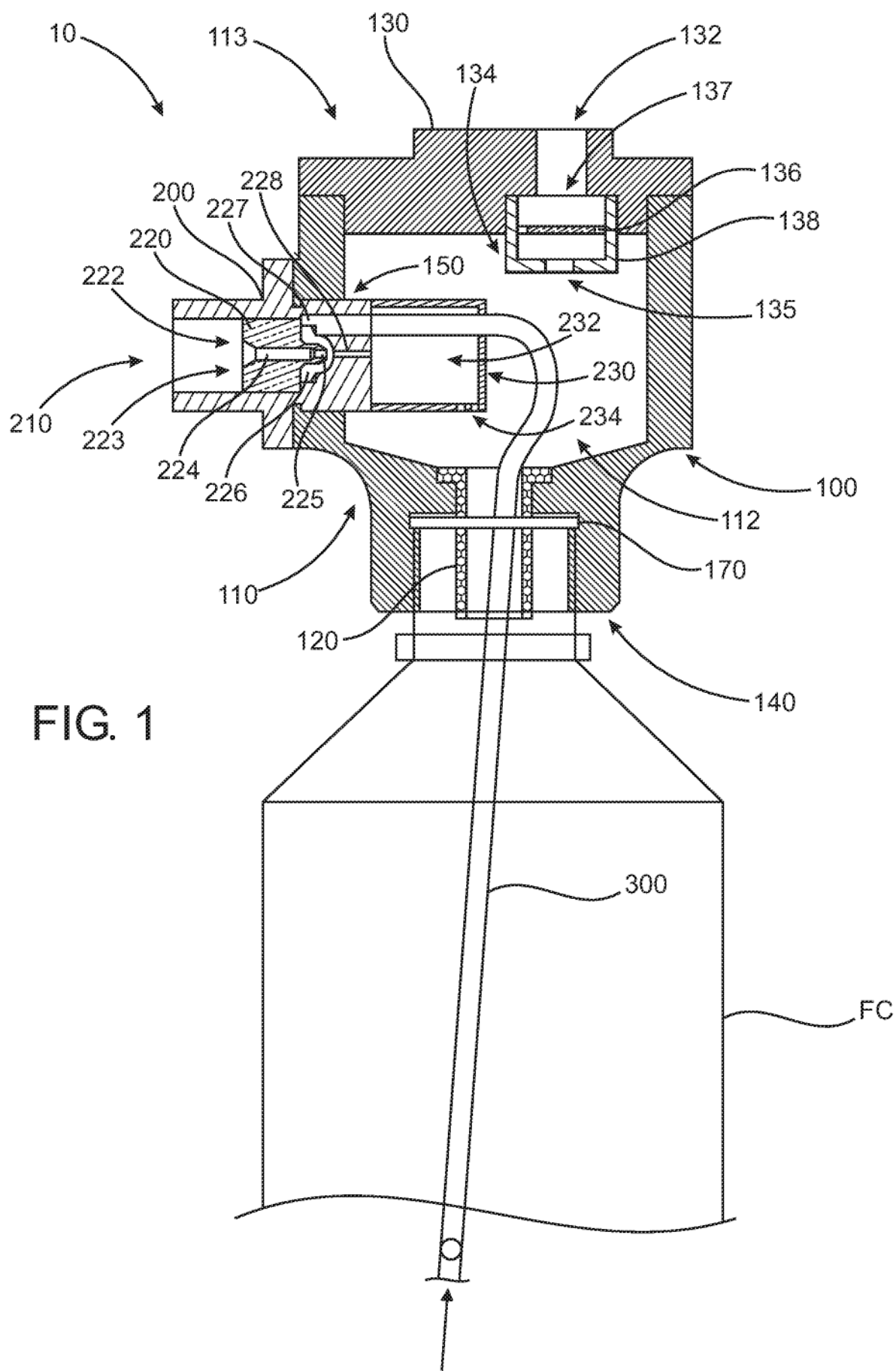
8 16. The fluid dispersion assembly as recited in claim 13 further
9 comprising a drip tube.

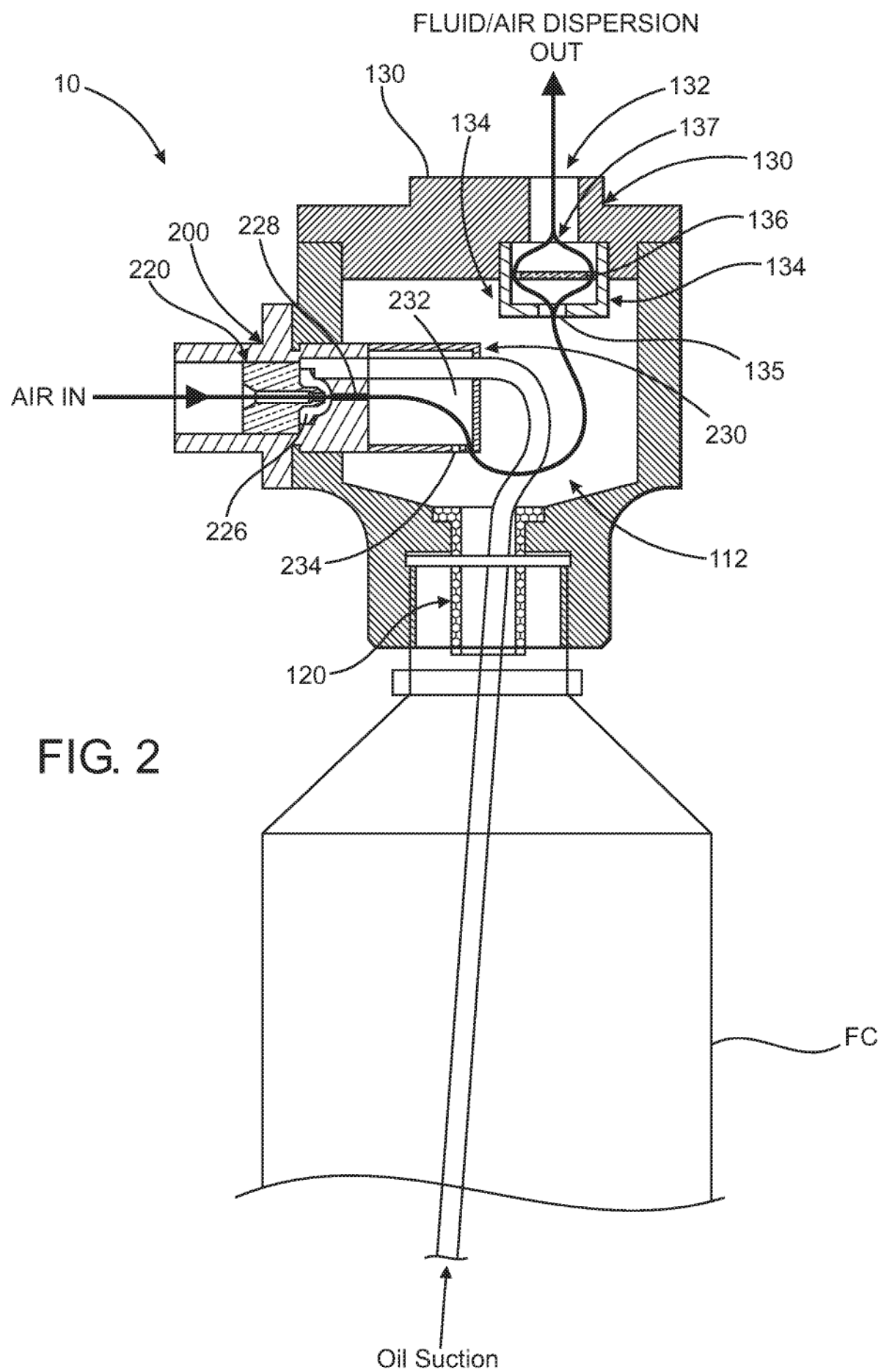
10 17. The a fluid dispersion assembly as recited in claim 16 wherein
11 said drip tube is disposed to direct coalesced fluid from the
12 diffusion chamber back into the container of operative fluid.

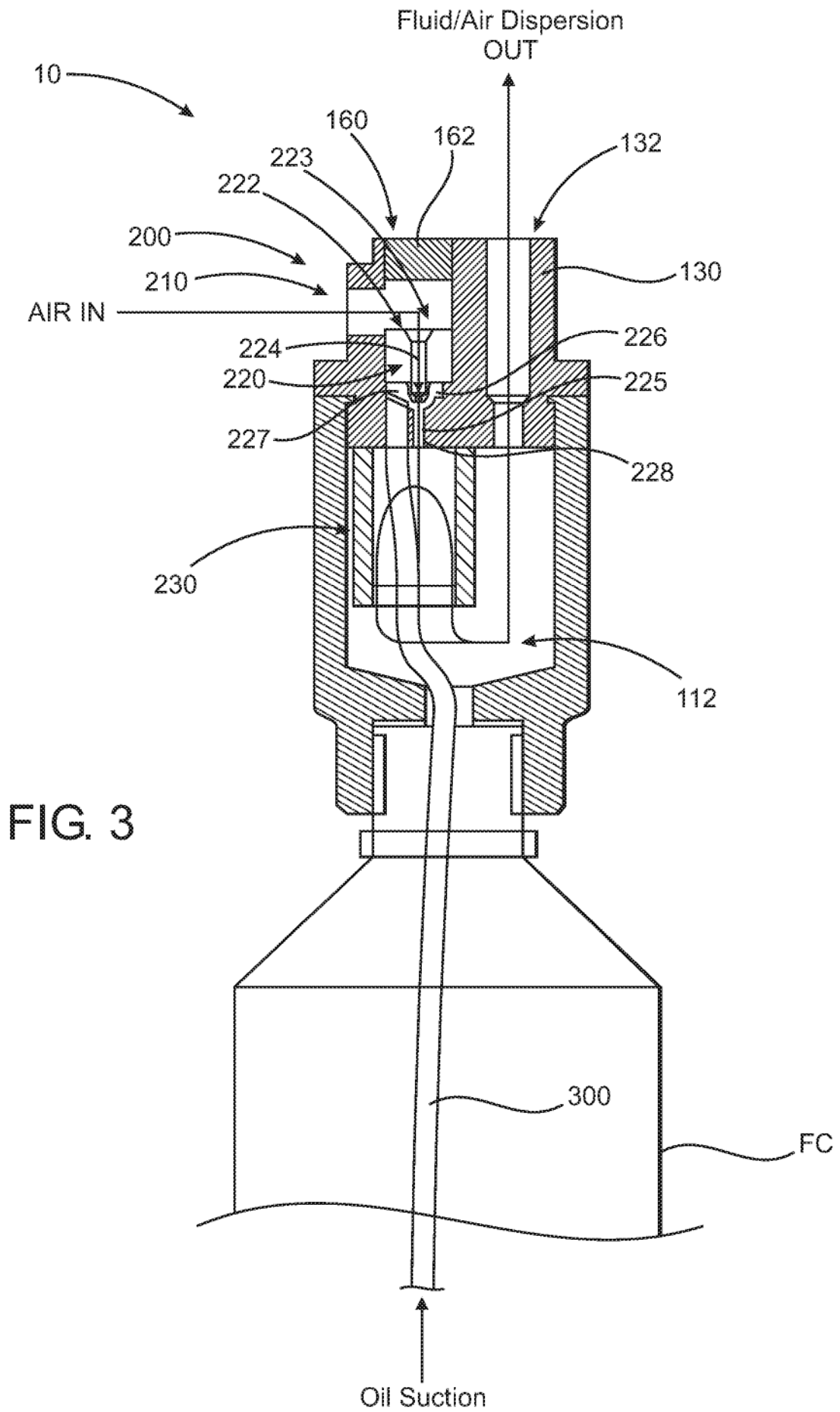
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1 ABSTRACT OF THE DISCLOSURE

2 A fluid dispersion assembly comprises a diffusion unit
3 disposed in fluid communication with a fluid container, the
4 assembly being powered by a compressed air source. The diffusion
5 unit at least partially defines a diffusion chamber, and includes a
6 diffusion assembly containing an atomizer assembly which, in
7 combination with the diffusion chamber, generates a fluid
8 dispersion from a mixture of compressed air and an operative fluid,
9 for example, fragrant oils, essential oils, odor neutralizers,
10 disinfectants such as triethylene glycol, air sanitizers, etc.







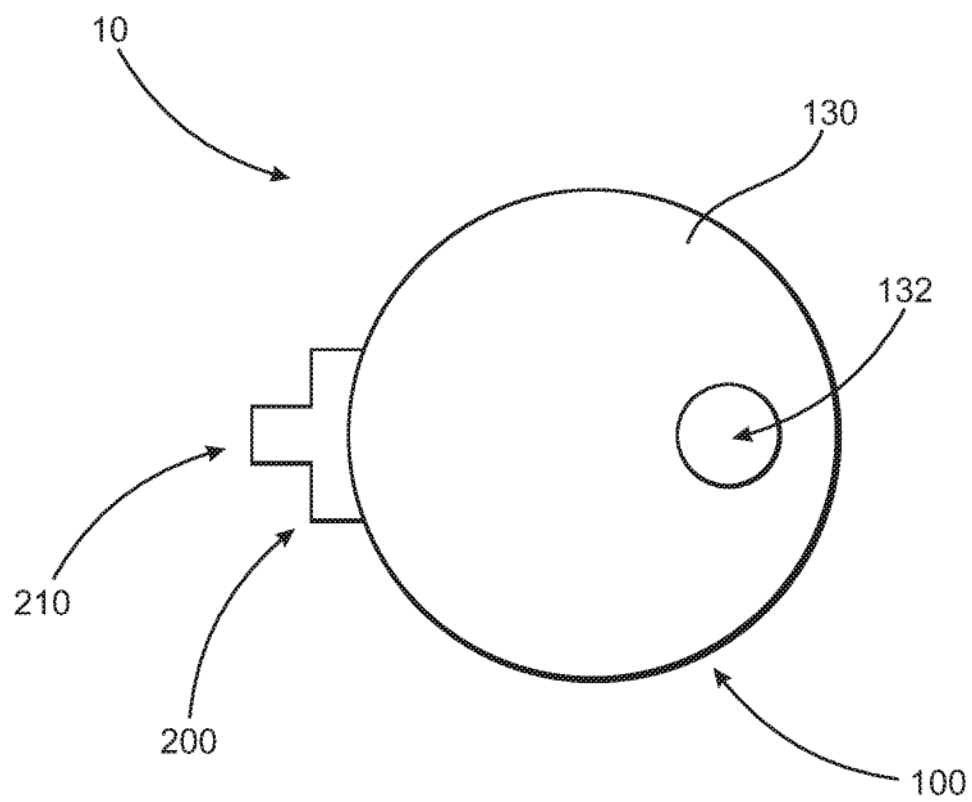


FIG. 4

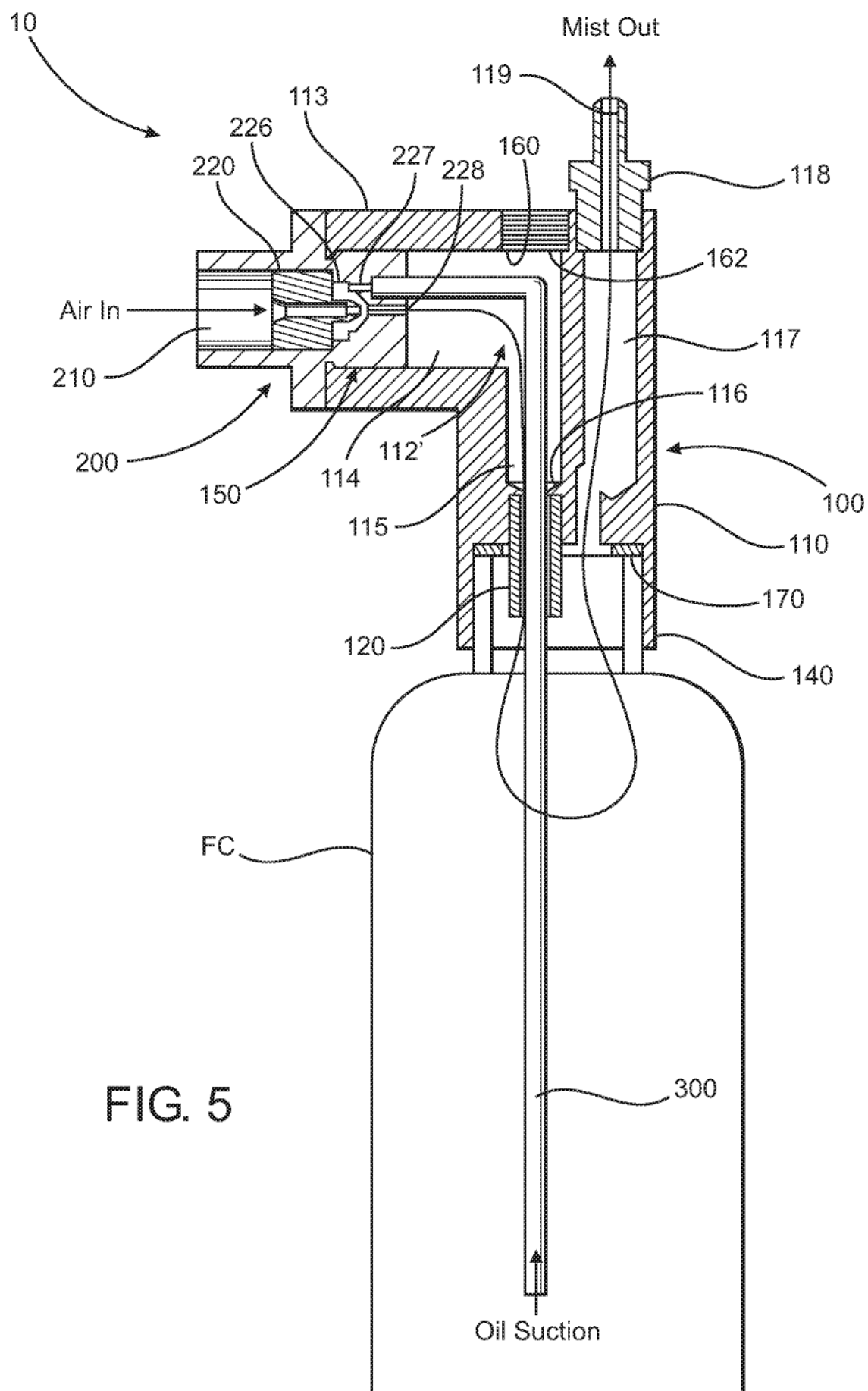
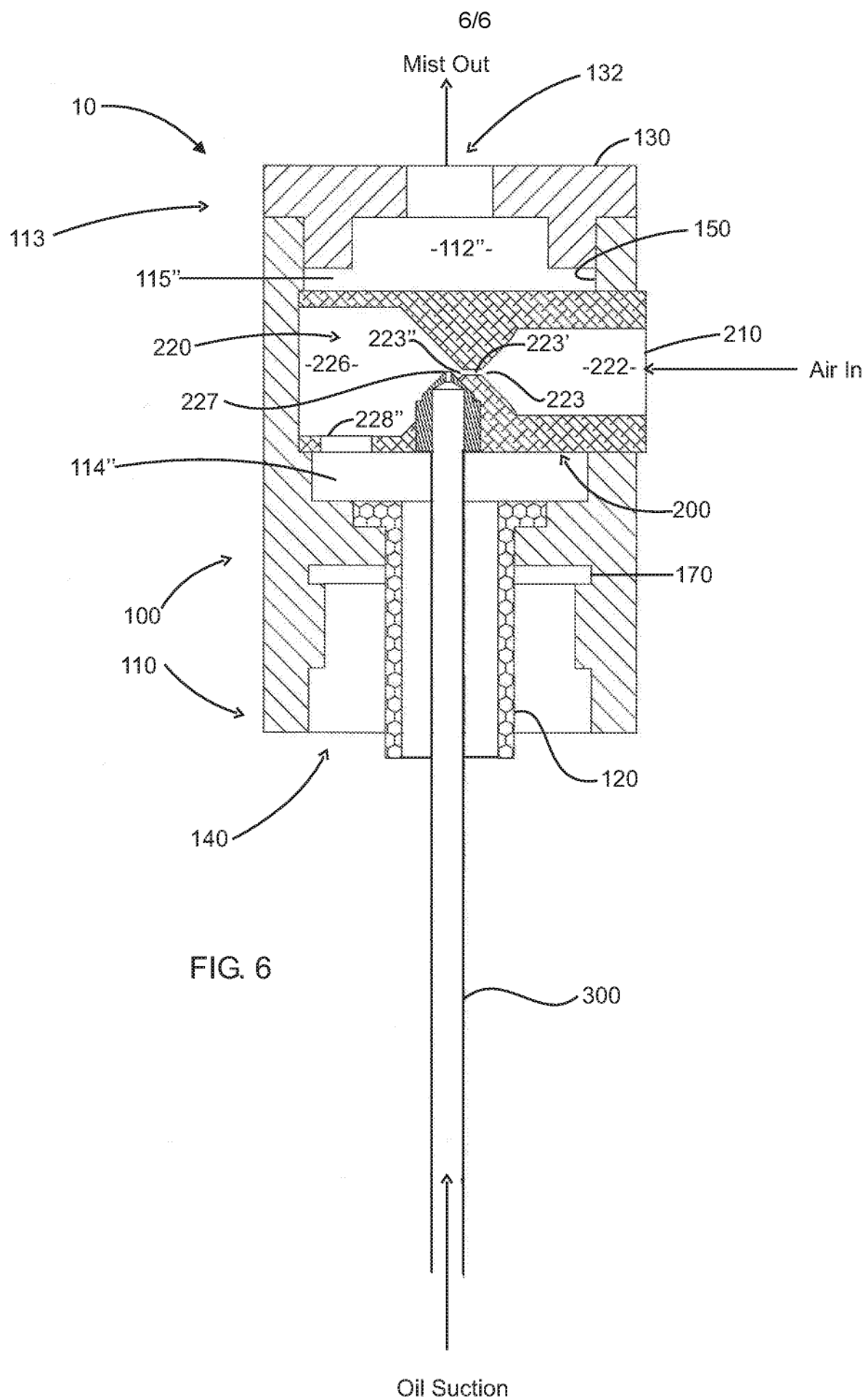


FIG. 5



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DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

TITLE OF INVENTION:

FLUID DISPERSION ASSEMBLY

the application for which

 X is attached hereto; or
 was filed on _____ and has been assigned
Application Serial No. _____;
and was amended on and _____
(if applicable)

As a below named inventor or joint inventor, I hereby declare that:

The above-identified application was made or was authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under section 1001 of title 18 by fine or imprisonment of not more than five (5) years, or both.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made of information and belief are believed to be true, and further, and that any willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby state that I have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment referred to above.

I hereby acknowledge the duty to disclose all information known to me to be material to the patentability of this invention in accordance with 37 CFR 1.56.

POWER OF ATTORNEY: As a below named inventor or joint inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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Direct all correspondence to the address associated with: Customer Number: 04219.

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1.106B.16

STEVEN SELLOFF
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	1.106B.16
		Application Number	
Title of Invention	FLUID DISPERSION ASSEMBLY		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor	1				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Marc		Levy			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
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Inventor	2				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Craig		Huck			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
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Postal Code	16441	Country	US			
Inventor	3				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Steven		Semoff			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						

Application Data Sheet 37 CFR 1.76		Attorney Docket Number		1.106B.16	
		Application Number			
Title of Invention	FLUID DISPERSION ASSEMBLY				
City	New City	State/Province	NY	Country of Residence	US
Mailing Address of Inventor:					
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Address 2					
City	New City	State/Province	NY		
Postal Code	10956	Country	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

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☐ An Address is being provided for the correspondence information of this application.			
Customer Number	04219		
Email Address	patents@malloylaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	FLUID DISPERSION ASSEMBLY		
Attorney Docket Number	1.106B.16	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	6	Suggested Figure for Publication (if any)	6

Filing By Reference :

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☒ Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	1.106B.16
		Application Number	
Title of Invention	FLUID DISPERSION ASSEMBLY		

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	04219		

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This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the application number blank.

Prior Application Status	Pending		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
	Continuation in part of	14844650	2015-09-03		
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14844650	Continuation of	13838364	2013-03-15	9126215	2015-09-08
Prior Application Status	Expired		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
13838364	Claims benefit of provisional	61694500	2012-08-29		
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.					Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)¹ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	1.106B.16
		Application Number	
Title of Invention	FLUID DISPERSION ASSEMBLY		

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Remove Access Code ^j (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☐ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	1.106B.16
		Application Number	
Title of Invention	FLUID DISPERSION ASSEMBLY		

Applicant	1	Remove
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.		
Clear		
Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
☒ Person to whom the inventor is obligated to assign.		☐ Person who shows sufficient proprietary interest
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:		
Name of the Deceased or Legally Incapacitated Inventor :		
If the Applicant is an Organization check here. ☒		
Organization Name	Air Essentials Inc.	
Mailing Address Information For Applicant:		
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Address 2		
City	Miami	State/Province FL
Country	US	Postal Code 33155
Phone Number		Fax Number
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Additional Applicant Data may be generated within this form by selecting the Add button. Add		

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	1.106B.16
		Application Number	
Title of Invention	FLUID DISPERSION ASSEMBLY		

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1				
Address 2				
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Country ⁱ		Postal Code		
Phone Number		Fax Number		
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Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	/John Fulton, Jr./		Date (YYYY-MM-DD)	2016-11-17
First Name	John	Last Name	Fulton, Jr.	Registration Number
			46716	

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
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**NONPUBLICATION REQUEST
UNDER
35 U.S.C. 122(b)(2)(B)(i)**

First Named Inventor

Title

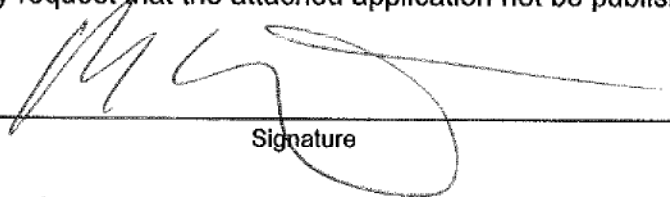
FLUID DISPERSION ASSEMBLY

Attorney Docket Number

1.106B.16

I hereby certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

I hereby request that the attached application not be published under 35 U.S.C. 122(b).


Signature

9/4/16
Date

Marc T Levy
Typed or printed name

Registration Number, if applicable

305-858-8000

Telephone Number

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application **upon filing**.

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant **must** notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. **Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).**

This collection of information is required by 37 CFR 1.213(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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**NONPUBLICATION REQUEST
UNDER
35 U.S.C. 122(b)(2)(B)(i)**

First Named Inventor

Title

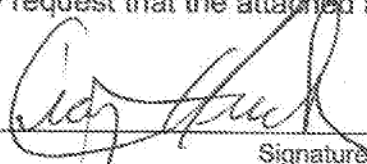
FLUID DISPERSION ASSEMBLY

Attorney Docket Number

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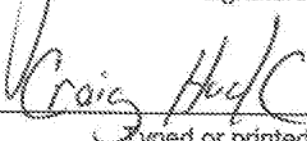
I hereby request that the attached application not be published under 35 U.S.C. 122(b).



Signature

9-28-16

Date



Typed or printed name

Registration Number, if applicable

305-858-8000

Telephone Number

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UNDER
35 U.S.C. 122(b)(2)(B)(i)**

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Attorney Docket Number

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Signature

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305-858-8000

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Electronic Patent Application Fee Transmittal

Application Number:

Filing Date:

Title of Invention:

FLUID DISPERSION ASSEMBLY

First Named Inventor/Applicant Name:

Marc Levy

Filer:

John Fulton/Monica Rodriguez

Attorney Docket Number:

1.106B.16

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	70	70
UTILITY SEARCH FEE	2111	1	300	300
UTILITY EXAMINATION FEE	2311	1	360	360

Pages:

Claims:

Miscellaneous-Filing:

Petition:

Patent-Appeals-and-Interference:

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				730

Electronic Acknowledgement Receipt

EFS ID:	27540418
Application Number:	15353951
International Application Number:	
Confirmation Number:	5613
Title of Invention:	FLUID DISPERSION ASSEMBLY
First Named Inventor/Applicant Name:	Marc Levy
Customer Number:	4219
Filer:	John Fulton/Monica Rodriguez
Filer Authorized By:	John Fulton
Attorney Docket Number:	1.106B.16
Receipt Date:	17-NOV-2016
Filing Date:	
Time Stamp:	12:06:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 730
RAM confirmation Number	111716INTEFSW12081100
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	2016_11_17_EFS_CERT_Transmittal_Filed_1106B.pdf	11858	no	1
			3821c9d949e1ebdb20703b7d01f9ebb88251ad02		
Warnings:					
Information:					
2	Transmittal of New Application	2016_11_17_Transmittal_EFS_Filed_1106B.pdf	17897	no	1
			6378bbded6535f5a22f34608ecb337abeee12f6f		
Warnings:					
Information:					
3		2016_11_17_Continuation_In_Part_Patent_Application_Filed_1106B.pdf	122176	yes	33
			6687ab9e1c88b40a450f8e8ab5156d5ccc6b29e3		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	27	
	Claims		28	32	
	Abstract		33	33	
Warnings:					
Information:					
4	Drawings-only black and white line drawings	2016_11_17_Drawings_Filed_1106B.pdf	662611	no	6
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Warnings:					
Information:					
5	Oath or Declaration filed	2016_11_17_Declaration_and_POA_Filed_1106B.pdf	693178	no	4
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6	Application Data Sheet	2016_11_17_ADS_Filed_1106B.pdf	1819442	no	7
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Warnings:					
Information:					
7	Nonpublication request from applicant	2016_11_17_Non_Pub_Req_ML_Filed_1106B.pdf	83732	no	1
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Warnings:					
Information:					
8	Nonpublication request from applicant	2016_11_17_Non_Pub_Req_CH_Filed_1106B.pdf	434298	no	1
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Warnings:					
Information:					
9	Nonpublication request from applicant	2016_11_17_Non_Pub_Req_SS_Filed_1106B.pdf	556640	no	1
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Information:					
10	Fee Worksheet (SB06)	fee-info.pdf	34953	no	2
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Air Essentials Inc.

Inventors: Marc Levy, Craig Huck, and Steven Semoff

Serial No.:

Filing Date:

For: FLUID DISPERSION ASSEMBLY

Customer No. 04219

2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF EFS-WEB TRANSMISSION

I HEREBY CERTIFY that this correspondence is being transmitted via the U.S. Patent and Trademark Office (USPTO) electronic filing system (EFS-Web) to the USPTO this 17 day of November, 2016.

Respectfully Submitted,

MALLOY & MALLOY, P.L.
Attorneys for Applicant
2800 S.W. Third Avenue
Historic Coral Way
Miami, Florida 33129
(305)858-8000

By: /John Fulton, Jr./
John Fulton, Jr.
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Email: patents@malloylaw.com

Date: November 17, 2016