

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P184385WO	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/EP2018/078927	International filing date (day/month/year) 22.10.2018	Priority date (day/month/year) 23.10.2017	
International Patent Classification (IPC) or national classification and IPC INV. B01D47/06			
Applicant Universidad De Alcalá De Henares			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>7</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ (sent to the applicant and to the International Bureau) a total of <u>13</u> sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions). ☐ sheets containing rectifications, where the decision was made by this Authority not to take them into account because they were not authorized by or notified to this Authority at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2). ☐ superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)). b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in the form of an Annex C/ST.25 text file, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3ter of Annex C of the Administrative Instructions).			
4. This report contains indications relating to the following items: ☒ Box No. I Basis of the report ☐ Box No. II Priority ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability ☐ Box No. IV Lack of unity of invention ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement ☐ Box No. VI Certain documents cited ☐ Box No. VII Certain defects in the international application ☐ Box No. VIII Certain observations on the international application			
Date of submission of the demand 23.08.2019		Date of completion of this report 05.02.2020	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465		Authorized officer García Alonso, Nuria Telephone No. +49 89 2399-2097	



Box No. I Basis of the report

1. With regard to the **language**, this report is based on
- ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a) and (b))
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1-15 as originally filed

Claims, Numbers

1-18 filed on

23-08-2019

Drawings, Sheets

1/8-8/8 as originally filed

- ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)):
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
5. ☐ This report has been established:
- ☐ taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).
 - ☐ without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91(Rules 66.4bis and 70.2(e)).

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2018/078927

6. ☒ With regard to top-up searches (Rules 66.1 *ter* and 70.2(f)):
- ☒ A top-up search was carried out by this Authority on 18.09.2019 (all discovered documents are listed in the Supplemental Box Relating to Top-up Search).
 - ☐ Additional relevant documents have been discovered during the top-up search.
 - ☐ No top-up search was carried out by this Authority because it would serve no useful purpose.
7. ☐ Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

* If item 4 applies, some or all of those sheets may be marked "superseded".

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	<u>1-13, 16-18</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>14, 15</u>
Industrial applicability (IA)	Yes: Claims	<u>1-18</u>
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Item V

1 AMENDMENTS

- 1.1 Claim 1 has been amended for clarifying the structural relationship of the first inlet means with the pressurized tank.
- 1.2 Additionally, claim 1 includes the features of page 4, lines 17-21, relative to the effect derived from the stability of relative pressure of the components.
- 1.3 Claim 9 corresponds to claim 10 as originally filed and the features of page 7, lines 23-25 and 30-31.
- 1.4 Claim 4 has been deleted and claims 5-19 renumbered.

2 CLARITY

- 2.1 The new introduced feature of claim 1 does not fulfil the requirements of Art. 6 PCT because the matter for which protection is sought is not clearly defined.
- 2.2 From claim 1 it is not clearly derivable which features are responsible for providing a better control of the relative pressure of the various components compared to the prior art. The sole difference is the effect defined as forming a jet cone which remains stable during operation and that interacts with the surrounding air in a certain way. Therefore, it is concluded that the claim attempts to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

3 NON-UNITY / PATENTABILITY

- 3.1 The novelty objection is maintained because D1 and D2 comprise all the technical features of claim 1. At present, there is no argument for supporting that an equivalent arrangement to the one defined by the preamble of new claim 1 should deliver different effects. As a consequence, D1 and D2 disclose intrinsically the effects referred to in amended claim 1.
- 3.2 For the same reason, the non-unity objection is maintained.
- 3.3 The applicant is thus requested to provide a distinguishing feature over D1 and D2 that enables a better control of the relative pressure of the various components in order to achieve the stated effect, namely, the formation of a cone that remains stable during operation.

Item V

Reference is made to the following documents:

D1 US 2012/241016 A1 (KOKOT JR RALPH [US] ET AL) 27 September 2012
(2012-09-27)

D2 US 3 916 032 A (CONNER KENNETH F) 28 October 1975 (1975-10-28)

D3 US 3 547 409 A (JACUZZI FRANK) 15 December 1970 (1970-12-15)

4 NOVELTY (Art 33(2)PCT)

4.1 The document D1 discloses a washing and decontaminating system [0017] comprising nebulizing means [76] for a mixture of at least one first gas and at least one first liquid, and pressurizing means [26] of said first gas, wherein said pressurizing means [26] are in fluid communication with gas accumulation means [40] and said accumulation means [40] are in fluid communication with a first pressure-regulating valve [58] and with a second pressure-regulating valve [64], the first pressure-regulating valve [58] being in fluid communication with a first pressurized tank [12] through first inlet means [28] of said first gas, the first pressurized tank [12] being configured to contain the first liquid [14], and comprising first outlet means [18] of said first liquid to the nebulizing means [76] through a first valve [20], at a first pressure that is greater than atmospheric pressure, and wherein the second pressure-regulating valve [64] is in fluid communication with said nebulizing means [76], and is configured to pressurize the gas at a second pressure that is greater than atmospheric pressure.

Furthermore, the D1 also discloses the following features

- the first inlet means [28] of the first gas are located in the first pressurized tank [12] at a height that is higher than the first outlet means [18];
- the first pressurized tank [12] comprises means for feeding said first liquid [13];
- it comprises a second valve located between the first pressure-regulating valve [36] and the first pressurized tank [12];
- it comprises a third valve [68] located between the second pressure-regulating valve [64] and the nebulizing means [76];
- it comprises first remote actuating means [39] in series with the first pressure-regulating valve [58]; and non-return means [68], [92] in series with the first and second pressure-regulating valves [58], [64].

The subject-matter of claims 1-11 and 17-18 is not new in view of D1.

- 4.2 The document D2 discloses a system suitable for spraying a cleaning liquid (fig. 1) comprising nebulizing means [27] for a mixture of at least one first gas and at least one first liquid, and pressurizing means [10] of said first gas, wherein said pressurizing means [10] are in fluid communication with a first pressure-regulating valve [14] and with a second pressure-regulating valve [34], the first pressure-regulating valve [14] being in fluid communication with a first pressurized tank [15] through first inlet means [13] of said first gas, located at a height that is higher than the first outlet means, the first pressurized tank [15] being configured to contain the first liquid, and comprising first outlet means [21] of said first liquid to the nebulizing means [27] through a first valve [22, 23], at a first pressure that is greater than atmospheric pressure, and wherein the second pressure-regulating valve [34] is in fluid communication with said nebulizing means [27], and is configured to pressurize the gas at a second pressure that is greater than atmospheric pressure. The system further comprises second remote actuation means [32] in series with the second pressure-regulating valve [34].

The subject-matter of claims 1, 2, 4, 9, 8, 9 and 17 is not new in view of D2.

- 4.3 The document D3 discloses a washing and decontaminating system (claim 3) comprising nebulizing means (reference [27] in fig.2) for a mixture of at least one first gas and at least one first liquid, and pressurizing means (claim 7, [87]) of said first gas, wherein said pressurizing means [87] are in fluid communication with a first pressure-regulating valve arranged at the outlet of compressor [87] (no reference number provided). Compressor [87] is in fluid communication with a second pressure-regulating valve [97] and with a third pressure-regulating valve [95]; the first pressure-regulating valve [97] is in fluid communication with a first pressurized tank [37] through first inlet means of said first gas, the first pressurized tank [37] being configured to contain a first liquid [71], and comprising first outlet means [51] of said first liquid to the nebulizing means [27] through a first valve [49], at a first pressure that is greater than atmospheric pressure; the first pressure-regulating valve being further in fluid communication with said nebulizing means [27] and configured to pressurize the gas at a second pressure that is greater than atmospheric pressure and connected in series with in series with the second and the third pressure-regulating valves [95] and [97], wherein the third pressure-regulating valve [95] is in fluid communication with a second pressurized tank [35] through second inlet means of said first gas, the second pressurized tank [35] being configured to contain a second liquid [39], and comprising second outlet means [51] of said second liquid towards the nebulizing means [27], through a fourth valve [49], at

a third pressure that is higher than atmospheric pressure; and wherein the system comprises first and second means [31] for measuring the flow rate in series with the first pressure-regulating valve and the second pressure-regulating valve.

The subject-matter of claims 1, 12, 13 and 16 is not new in view of D3.

5 INVENTIVE STEP (Art. 33(3) PCT)

- 5.1 The additional features of unclear claim 15 and claim 16 are merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed. Thus, the subject-matter of claims 14 and 15 is not inventive.

EUROPEAN PATENT OFFICE
Bob-van-Bentheim-Platz 1
D-80469 München
(Alemania)

On-line submission

Madrid, 22 August 2019

Re.: Reply to International Search Report and written opinion pursuant to PCT Rule 44.1

Application No.: PCT/EP2018/078927

O/ref.: P184385WO

Applicant: UNIVERSIDAD DE ALCALA

Title: CLEANING SYSTEM BY MEANS OF ARTIFICIAL MIST

Dear Sirs:

With reference to the Communication pursuant to PCT Rule 44.1 dated 3 June 2019 for the above noted application, we herewith submit the following.

Amendments

We herewith amend the application, and enclose:

- A. Claims amendment explanation sheets 1 to 4 with the text of the claims as originally filed, but with highlighted amendments: added text is underlined and deleted text is crossed through; within asterisks ("~~***~~ - ~~***~~") we have provided indications regarding support for the amendments
- B. Replacement sheets 1 to 4 with the amended claims.

The amendments do not add subject matter in the sense of Art. 123(2) EPC.

CLAIMS

Amended claim 1:

Attached is a set of claims with amended claim 1 with the features of the cleaning cone. The amended claim 1 is included below:

"1. A washing and decontaminating system comprising nebulizing means (8) of at least a first liquid within at least a first gas to form a mist, and pressurizing means (1) of said first gas, wherein said pressurizing means (1) are in fluid communication with a first pressure-regulating valve (3) and with a second pressure-regulating valve (4), the first pressure-regulating valve (3) being in fluid communication with a first pressurized tank (5) through first inlet means (31) of said first gas into the tank (5), the first pressurized tank (5) being configured to contain the first liquid, and comprising first outlet means (30) of said first liquid to the nebulizing means (8) through a first valve (6), at a first pressure that is greater than atmospheric pressure, and wherein the second pressure-regulating valve (4) is in fluid communication with said nebulizing means (8), and is configured to pressurize the gas at a second pressure that is greater than atmospheric pressure, characterized in that, the pressurizing means (1), the first pressure-regulating valve (3), the second pressure-regulating valve (4), the first pressurized tank (5) and the first valve (6) are configured to keep the relative pressure of the various components of the mixture stable and wherein propelling mist under pressure through the nebulizing means (8) produces a beneficial effect that multiplies the effectiveness of the micrometric droplets in their function of cleaning through collision and entrapment of polluting particles by forming a cone that interacts with the surrounding air, suctioning it through the effect of speed while at the same time producing a high velocity gradient at the edges of the cone and thus facilitating the collision of mist droplets with the particles that are cleaned from the air, wherein both effects of the jet edge increase the effective cross-section of the liquid droplets in their collision action, as well as the collision rate, making the cleaning action of the jet edge even greater than that of mist deposition due to gravity."

The amended claim 1 is supported on original claim 1 and on page 5, line 23 to page 6, line 5:

"Without serving as a limitation to the invention, the authors believe that propelling mist under pressure through a nozzle produces a beneficial effect that multiplies the effectiveness of the micrometric droplets in their function of cleaning through collision and entrapment of polluting particles by forming a cone that interacts with the surrounding air, suctioning it through the effect of speed (also called the Venturi effect) while at the same time producing a high velocity gradient at the edges and thus facilitating the collision of mist droplets with the particles that are cleaned from the air. The authors believe that the jet also generates turbulences and fluid dynamic instabilities such as Kelvin-Helmholtz instability. Both effects of the jet edge increase the effective cross-section of the liquid

droplets in their collision action, as well as the collision rate, making the cleaning action of the jet edge even greater than that of mist deposition due to gravity. Thus, the importance of keeping the relative pressure of the various components of the mixture stable has been surprising, especially when compared to a system that uses pumps to feed some of the components of the mixture. Therefore, the system of the invention also reduces the number of mechanic or propulsion elements to one or a plurality of gas compressors, without the need for pumps."

Dependent claims

Former claim 4 that coincided with former claim 9 has been deleted and claims and dependencies have been renumbered.

(1) NON-UNITY

The written opinion includes an analysis of the unity of invention mentioning that there are two inventions:

Group I: Claims 1-12 and 17-18.

Group II: Claims 13-16.

The written opinion includes that the subject matter of claim 1 is already disclosed in document D1 (figure 3) and in document D2 (figure 1).

The written opinion points out that there is no special technical features between claim groups I and II and that the objective of each of the mentioned claim groups I and II is different.

According to amended claim 1, it is submitted that the subject-matter of amended claim 1 is new in view of D1 and D2 (see arguments regarding novelty under point **(3)** below) and that the alleged two group of claims share special technical features (at least those defined in claim 1, since amended claim 12 (former claim 13) depends on claim 1); consequently, there is unity of invention.

Regarding the objective problem, it is submitted that the alleged two group of claims also solve the same problem, the one discussed in the arguments regarding inventive step under point **(4)** below.

Accordingly, regarding the problem solved by the invention there is also unity of invention.

(2) CLARITY (ART. 8 PCT)

(2.1) Claim 1 has been amended to make the structural relationship between the first inlet means, the first pressurized tank and the first pressure regulating valve clear. Thus, amended claim 1 defines that *"the first pressure-regulating valve (3) being in fluid communication with a first pressurized tank (5) through first inlet means (31) of said first gas into the tank (5)"* according to the suggestion in the written opinion.

(2.2) Former claims 1, 14 (amended claims 1 and 13) refer to apparatus claims and former claim 19 (amended claim 18) refer to a method claim.

(2.3) Former claim 10 (amended claim 9) has been amended to make the structural relationship between the first feeding valve and the first evacuation valve. Their position is specified as required in the written opinion. Amended claim 9 defines:

"9. The system according to claim 8, characterized in that said first feeding means comprise a first feed valve (9) and a first evacuation valve (12), wherein the first feed valve (9) is connected to the lower part of the first pressurized tank (5) and the first evacuation valve (12) is connected to the upper part of the first pressurized tank (5)."

Regarding the feature:

"wherein the first feed valve (9) is connected to the lower part of the first pressurized tank (5)"

It is supported in page 8, lines 23-25:

"With reference to Figure 6, it is preferable that the feeding means comprise a first feed valve (9) and a first evacuation valve (12). Preferably, said first feed valve (9) is connected to the lower part of the first pressurized tank."

Regarding the feature:

"the first evacuation valve (12) is connected to the upper part of the first pressurized tank (5)"

It is supported in page 8, lines 30-31:

"the evacuation valve (12), preferably connected to the upper part of the first pressurized tank (5)"

(2.4) Former claim 15 (amended claim 14) has been amended to avoid a contradictory wording. Amended claim 14 defines:

"14. The system according to any one of claims 12 or 13, characterized in that it comprises a fifth valve (24) that enables the flow of the first gas towards the nebulizing means (8) to be selectively interrupted."

Amended claim 14 is supported in

- page 10, lines 4-6:

"In this configuration, the system may comprise a fifth valve (24) that enables the flow of the first gas towards the nebulizing means (8) to be selectively interrupted."

- page 11, lines 18-20:

"In this configuration, the system may comprise a fifth valve (24) that enables the flow of the first gas towards the nebulizing means (8) to be selectively interrupted."

(3) NOVELTY (ART. 33(2)PCT)

(3.1) The written opinion includes that the subject matter of former claims 1-12 and 18-19 is not new in view of D1.

(3.2) The written opinion also includes that the subject matter of former claims 1, 2, 4, 8, 9, 10 and 18 is not new in view of D2.

(3.3) Amended claim 1 defines in the characterizing portion:

"characterized in that, the pressurizing means (1), the first pressure-regulating valve (3), the second pressure-regulating valve (4), the first pressurized tank (5) and the first valve (6) are configured to keep the relative pressure of the various components of the mixture stable and wherein propelling mist under pressure through the nebulizing means (8) produces a

beneficial effect that multiplies the effectiveness of the micrometric droplets in their function of cleaning through collision and entrapment of polluting particles by forming a cone that interacts with the surrounding air, suctioning it through the effect of speed while at the same time producing a high velocity gradient at the edges of the cone and thus facilitating the collision of mist droplets with the particles that are cleaned from the air, wherein both effects of the jet edge increase the effective cross-section of the liquid droplets in their collision action, as well as the collision rate, making the cleaning action of the jet edge even greater than that of mist deposition due to gravity."

D1 and D2 fail to disclose at least the features defined in the characterizing portion of amended claim 1. Accordingly, amended claim 1 is new in view of D1 and D2.

(4) INVENTIVE STEP (ART. 33(3)PCT)

(4.1) The written opinion includes that the subject matter of former claim 17 is not inventive.

(4.2) The technical effect derived from the distinguishing features in amended claim 1 is described in page 5, line 23 to page 6, line 5:

*"propelling mist under pressure through a nozzle **produces a beneficial effect that multiplies the effectiveness of the micrometric droplets in their function of cleaning through collision and entrapment of polluting particles by forming a cone that interacts with the surrounding air, suctioning it through the effect of speed** (also called the Venturi effect) **while at the same time producing a high velocity gradient at the edges and thus facilitating the collision of mist droplets with the particles that are cleaned from the air.** The authors believe that **the jet also generates turbulences and fluid dynamic instabilities** such as Kelvin-Helmholtz instability. **Both effects of the jet edge increase the effective cross-section of the liquid droplets in their collision action, as well as the collision rate, making the cleaning action of the jet edge even greater than that of mist deposition due to gravity.** Thus, the importance of keeping the relative pressure of the various components of the mixture stable has been surprising, especially when compared to a system that uses pumps to feed some of the components of the mixture. Therefore, the system of the invention also reduces the number of mechanic or propulsion elements to one or a plurality of gas compressors, without the need for pumps."*

Thus, the problem to be solved may be formulated as how to provide a cleaning system by means of artificial mist (title of the present invention) that increases the effective cross-section of

the liquid droplets in their collision action, as well as the collision rate, making the cleaning action of the jet edge even greater than that of mist deposition due to gravity and that reduces the number of mechanic or propulsion elements to one or a plurality of gas compressors, without the need for pumps (as mentioned in page 5, line 23 to page 6, line 5).

D1 discloses:

"a pressurized fluid delivery system and method that can be used to interrogate objects, such as the interrogation and detonation of IEDs. The system and method entail pressurizing a liquid within a vessel with a compressed gas source so that the liquid within the vessel is at a pressure above atmospheric pressure. The pressurized liquid, the compressed gas, or a mixture thereof is then selectively delivered to an outlet, and then discharged from the outlet to physically interrogate the object." (Abstract)

[0002] The present invention generally relates to systems and methods that make use of pressurized gases and liquids. More particularly, the present invention relates to pressurized fluid delivery systems and methods that use pressurized fluid to physically interrogate objects, a particularly notable example of which are buried improvised explosive devices (IEDs).

Despite D1 mentions other possible uses, D1 is focused on IED interrogation.

D2 discloses a:

"Method and apparatus for transporting and applying a liquid developer to a test piece having dyed indications therein indicative of the presence of flaws, involving directing a stream of a readily volatilizable solvent for a liquid developer from a pressurized source into a container containing the liquid developer to thereby displace some of the liquid developer at a controlled flow rate from the container, injecting the displaced stream into the mixing chamber of a spray nozzle, and propelling the liquid developer and the readily volatilizable solvent through the spray nozzle by the use of an additional stream of the readily volatilizable solvent." (Abstract)

Thus, bearing in mind the disclosure of D1 and D2, a person skilled in the art, when looking for a solution to the problem solved by the present invention, would not have looked for such a solution in D1 or D2, nor would have they found any incentive in D1 or D2 to combine the two documents.

Even if the teachings of documents D1 and D2 were combined, the person skilled in the art would not have arrived at the invention as defined in amended claim 1

(5) NOVELTY (ART. 33(2)PCT)

(5.1) The written opinion includes that the subject matter of former claims 1, 13, 14 and 17 is not new in view of D3.

(5.2) As mentioned above, amended claim 1 defines in the characterizing portion:

"characterized in that, the pressurizing means (1), the first pressure-regulating valve (3), the second pressure-regulating valve (4), the first pressurized tank (5) and the first valve (6) are configured to keep the relative pressure of the various components of the mixture stable and wherein propelling mist under pressure through the nebulizing means (8) produces a beneficial effect that multiplies the effectiveness of the micrometric droplets in their function of cleaning through collision and entrapment of polluting particles by forming a cone that interacts with the surrounding air, suctioning it through the effect of speed while at the same time producing a high velocity gradient at the edges of the cone and thus facilitating the collision of mist droplets with the particles that are cleaned from the air, wherein both effects of the jet edge increase the effective cross-section of the liquid droplets in their collision action, as well as the collision rate, making the cleaning action of the jet edge even greater than that of mist deposition due to gravity."

D3 fails to disclose at least the features defined in the characterizing portion of amended claim 1. Accordingly, amended claim 1 is new in view of D3.

(6) INVENTIVE STEP (ART. 33(3)PCT)

(6.1) The written opinion indicates that the additional features of former claims 15 and 16 are mere possibilities that the person skilled in the art would choose depending on the circumstances, without exercise of inventive step, to solve the proposed problem, so that the subject matter of former claims 15 and 16 is not inventive.

Given that amended claims 14 and 15 (former claims 15 and 16) depend on claim 1, the mentioned claims are also new and inventive.

(7) Final Remarks

It is respectfully submitted that the applicant may wish to obtain protection for the entire subject-matter of the application as originally filed. Thus, it is pointed out that any subject-matter that may have been withdrawn (or that may be considered to have been withdrawn) from the application or otherwise abandoned, either implicitly or explicitly, by way of amendment or in any other way, can be reinstated to the application by way of corresponding amendments and/or clarifications, or can be made the subject of one or more divisional applications at any moment during pendency of the present application.

Respectfully submitted,

BALDER

Association of Representatives 639

Enclosed: Amended claims (working copy and clean copy)

CLAIMS

1. A washing and decontaminating system comprising nebulizing means (8) of at least a first liquid within at least a first gas to form a mist, and pressurizing means (1) of said first gas, wherein said pressurizing means (1) are in fluid communication with a first pressure-regulating valve (3) and with a second pressure-regulating valve (4),

the first pressure-regulating valve (3) being in fluid communication with a first pressurized tank (5) through first inlet means (31) of said first gas into the tank (5), the first pressurized tank (5) being configured to contain the first liquid, and comprising first outlet means (30) of said first liquid to the nebulizing means (8) through a first valve (6), at a first pressure that is greater than atmospheric pressure,

and wherein the second pressure-regulating valve (4) is in fluid communication with said nebulizing means (8), and is configured to pressurize the gas at a second pressure that is greater than atmospheric pressure,

characterized in that, the pressurizing means (1), the first pressure-regulating valve (3), the second pressure-regulating valve (4), the first pressurized tank (5) and the first valve (6) are configured to keep the relative pressure of the various components of the mixture stable and wherein propelling mist under pressure through the nebulizing means (8) produces a beneficial effect that multiplies the effectiveness of the micrometric droplets in their function of cleaning through collision and entrapment of polluting particles by forming a cone that interacts with the surrounding air, suctioning it through the effect of speed while at the same time producing a high velocity gradient at the edges of the cone and thus facilitating the collision of mist droplets with the particles that are cleaned from the air, wherein both effects of the jet edge increase the effective cross-section of the liquid droplets in their collision action, as well as the collision rate, making the cleaning action of the jet edge even greater than that of mist deposition due to gravity.

2. The system according to claim 1, characterized in that said first inlet means (31) of the first gas are located in the first pressurized tank (5) at a height that is higher than the first outlet means (30).

3. The system according to any one of the preceding claims, characterized in that it comprises gas accumulation means **(2)** located between the pressurizing means **(1)** of the first gas, and the first pressure-regulating valve **(3)** and the second pressure-regulating valve **(4)**.
4. The system according to any one of the preceding claims, characterized in that it comprises a second valve **(13)** located between the first pressure-regulating valve **(3)** and the first pressurized tank **(5)**.
5. The system according to any one of the preceding claims, characterized in that it comprises a third valve **(7)** located between the second pressure-regulating valve **(4)** and the nebulizing means **(8)**.
6. The system according to any one of the preceding claims, characterized in that it comprises first remote actuating means **(18)** in series with the first pressure-regulating valve **(3)**.
7. The system according to any one of the preceding claims, characterized in that it comprises second remote actuation means **(16)** in series with the second pressure-regulating valve **(4)**.
8. The system according to any one of the preceding claims, characterized in that the first pressurized tank **(5)** comprises first feeding means of said first liquid.
9. The system according to claim 8, characterized in that said first feeding means comprise a first feed valve **(9)** and a first evacuation valve **(12)**, wherein the first feed valve **(9)** is connected to the lower part of the first pressurized tank **(5)** and the first evacuation valve **(12)** is connected to the upper part of the first pressurized tank **(5)**.
10. The system according to any one of the preceding claims, characterized in that it comprises first non-return means **(14)** in series with the first pressure-regulating valve **(3)**.

11. The system according to any one of the preceding claims, characterized in that it comprises second non-return means **(15)** in series with the second pressure-regulating valve **(4)**.

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12. The system according to any one of the preceding claims, characterized in that it comprises a third pressure-regulating valve **(23)** connected in series with the second pressure-regulating valve **(4)**.

10 13. The system according to claim 12, characterized in that the third pressure-regulating valve **(23)** is in fluid communication with a second pressurized tank **(20)** through second inlet means **(33)** of said first gas, the second pressurized tank **(20)** being configured to contain a second liquid, and comprising second outlet means **(34)** of said second liquid towards the
15 nebulizing means **(8)**, through a fourth valve **(21)**, at a third pressure that is higher than atmospheric pressure.

14. The system according to any one of claims 12 or 13, characterized in that it comprises a fifth valve **(24)** that enables the flow of the first gas towards
20 the nebulizing means **(8)** to be selectively interrupted.

15. The system according to any one of claims 13 or 14, characterized in that the second pressurized tank **(20)** comprises second means for feeding the second liquid.

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16. The system according to any one of the preceding claims, characterized in that it comprises first means for measuring the flow rate **(19)**, in series with the first pressure-regulating valve **(3)**, and second means for measuring the flow rate **(17)**, in series with the second pressure-regulating valve **(4)**.

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17. The system according to any one of the preceding claims, characterized in that it has a pressure of between 8 bar and 20 bar.

18. A method for washing and decontaminating which comprises
35 pressurizing a first gas by means of pressurizing means **(1)**, which are in fluid

communication with a first pressure-regulating valve (3) and with a second pressure-regulating valve (4), such that

5 the first pressure-regulating valve (3) regulates the pressure of the first gas in a first pressurized tank (5) configured to contain a first liquid and comprising first outlet means (30) and first inlet means (31), such that said first liquid is in turn in fluid communication with nebulizing means (8) through a first valve (6), the first liquid being at a first pressure that is greater than atmospheric pressure,

10 and wherein the second pressure-regulating valve (4) regulates the pressure at which the first gas is fed to said nebulizing means (8), said first gas being at a second pressure that is greater than atmospheric pressure.