REPUBLIC OF SOUTH AFRICA

REPUBLIEK VAN SUID AFRIKA

PATENTS ACT, 1978

CERTIFICATE

n accordance with section 44 (1) of the Patents Act, No. 57 of 1978, it is hereby certified that:

REPG ENERJI SISTEMLERI SANAYI VE TICARET ANONIM SIRKETI

Has been granted a patent in respect of an invention described and claimed in complete specification deposited at the Patent Office under the number

2023/03379

A copy of the complete specification is annexed, together with the relevant Form P2.

timony thereof, the seal of the Patent Office has been affixed at Pretoria with effect from the 25th day of October 2023

.....

Registrar of Patents

FORM P2

REPUBLIC OF SOUTH AFRICA **REGISTER OF PATENTS** PATENTS ACT, 1978

Official application No.	Lodging date: Provisional	Acceptance date
(21) (01) **2023/03379**	(22)	(47) 19 September 2023
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(71) Full name(s) of applicant(s)/Patentee(s):

REPG ENERJI SISTEMLERI SANAYI VE TICARET ANONIM SIRKETI

(71) Applicant substitued: Date registrered

(71) Assignee(s): Date registrered

(72) Full name(s) of inventor(s):

AYARTURK, Hasan

Priority claimed:	Country	Number	Date
	(33) TR	(31) 2020/14598	(32) 2020/09/15

(54) Title of invention

AIR-SOLUTION REGENERATION DEVICE

Address of applicant(s)/patentee(s):

Cali Mahallesi 10 (410) Sokak No.2, Nilufer/Bursa
TURKEY

(74) Address for service

BRIAN BACON INC
Cnr Roeland Street and Drury Lane, Cape Town, 8001
SOUTH AFRICA
Reference No. P6429ZA00

(61) Patent of addition No.	Date of any change
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(71) Applicant: **REPG ENERJI SISTEMLERI SANAYI VE TICARET ANONIM SIRKETI** [TR/TR]; Cali Mahallesi 10 (410) Sokak No:2, Nilufer/Bursa (TR).

(72) Inventor: **AYARTURK, Hasan**; Resitpasa Mahallesi Katar Caddesi Teknokent, Ari-4 Sitesi No:2/50/6, 34467 Sariyer/Istanbul (TR).

(74) Agent: **KAYA, Erdem**; Konak Mh. Kudret Sok. Elitpark Park Sit. Ofisler Apt. No:12/27, 16110 Nilufer/Bursa (TR).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(54) Title: AIR-SOLUTION REGENERATION DEVICE

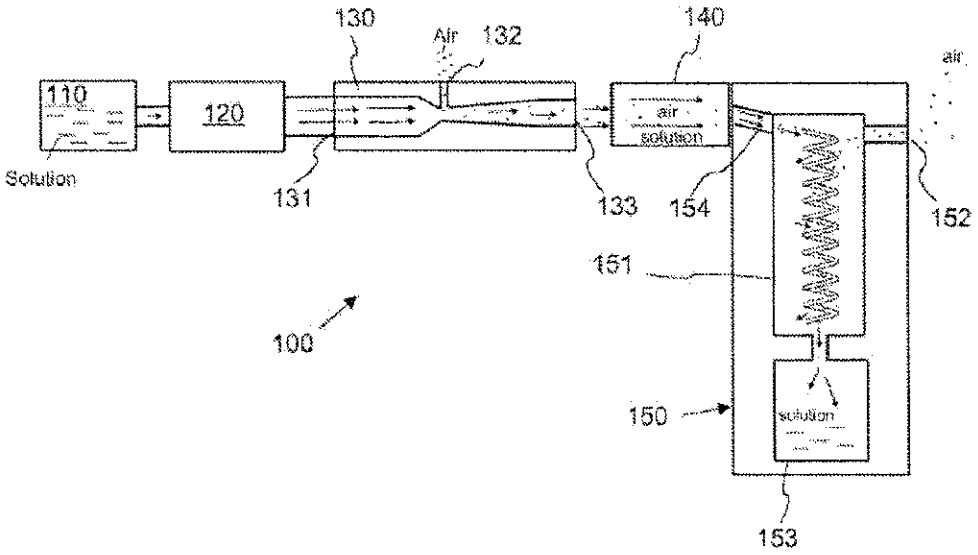

Figure 1

(57) Abstract: The present invention is an air-solution regeneration device (100) for providing equalization of the vapor pressure of a solution, which exists in a solution chamber (120), to the vapor pressure of the air which exists in the medium. Accordingly, the subject matter air-solution regeneration device (100) comprises a solution pump (110) for increasing the pressure of the solution which exists in said solution chamber (120); an air-solution injector (130) which is in venturi type and which has a drive end (131) which receives the solution, having increased pressure, as input (154), a suction end (132) for realizing air suctioning when there is liquid input (154), having increased pressure, through the drive end (131), a spray end (133) where the solution, received from said drive end (131), and the air, suctioned from said suction end (132), are sprayed; an electrostatic filter (140) where the air-solution mixture is sprayed; and an air-solution separator (150) which has a centrifuge unit (151) for providing separation of the air solution mixture, received from the input (154), from each other, and an output chamber (153) for collecting the solution which is separated from air and which has been

WO 2022/060325 A1

[Continued on next page]

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

brought to equal vapor pressure as the air vapor pressure.

AIR-SOLUTION REGENERATION DEVICE

TECHNICAL FIELD

The present invention relates to air-solution regeneration for providing equalization of the vapor pressure of a solution which exists in a solution chamber to the vapor pressure of the air which exists in the medium.

PRIOR ART

It may be desired that solutions have vapor pressure which is equal to the vapor pressure of the air which exists in the medium where said solutions exist, in order to be used for various purposes. When a solution stays in an open medium, said solution obtains vapor pressure, which is equal to the vapor pressure of the medium where said solution exists, by time. However, since this duration is long and since the vapor pressures between day/night and relative humidity are different, it becomes difficult to obtain vapor pressure so as to have the desired vapor pressure.

As a result, because of the abovementioned problems, an improvement is required in the related technical field.

BRIEF DESCRIPTION OF THE INVENTION

The present invention relates to an air-solution regeneration device, for eliminating the abovementioned disadvantages and for bringing new advantages to the related technical field.

An object of the present invention is to provide an air-solution regeneration device for equalizing the vapor pressure of a solution to the vapor pressure of air, which exists in the medium, in an accelerated manner.

Another object of the present invention is to provide an air-solution regeneration device which provides cleaning of ambient air.

In order to realize the abovementioned objects and the objects which are to be deducted from the detailed description below, the present invention is an air-solution regeneration device for providing equalization of the vapor pressure of a solution, which exists in a solution chamber, to the vapor pressure of the air which exists in the medium. Accordingly, the improvement is that the subject matter air-solution regeneration device comprises a solution pump for increasing the pressure of the solution which exists in said solution chamber; an air-solution injector which is in venturi type and which has a drive end which receives the solution, having increased pressure, as input, a suction end for realizing air suctioning when there is liquid input, having increased pressure, through the drive end, a spray end where the solution, received from said drive end, and the air, suctioned from said suction end, are sprayed; an electrostatic filter where the air-solution mixture is sprayed; and an air-solution separator which has a centrifuge unit for providing separation of the air solution mixture, received from the input, from each other, and an output chamber for collecting the solution which is separated from air and which has been brought to equal vapor pressure as the air vapor pressure. Thus, by means of passing of the accelerated air-solution mixture through the electrostatic filter and by means of separating thereof in the separator, the vapor pressure of the solution, which exists in the output chamber of the mixer, is equalized to the air vapor pressure by means of a surprise effect.

In a possible embodiment of the present invention, said electrostatic filter comprises a conductive first plate which allows liquid passage, a conductive second plate which allows liquid passage, and an ionizer provided between the first plate and the second plate for providing separation of the charged particles after the sprayed solution-air mixture passes through the first plate and for providing generation of electricity by forming voltage difference between the first plate and the second plate when the air-solution mixture, which has the charged particles which are separated, contacts the second plate. Thus, the electricity needed by the electrostatic filter and the pump is met from here, and energy consumption is reduced, or the operation of the system is provided automatically in case there is sufficient solution.

In another possible embodiment of the present invention, said air-solution separator comprises an air output opening. Thus, the air, cleaned by separating the particles, is given back to the medium.

The structural and characteristic properties and all advantages of the present invention will be understood in a more clear manner by means of the below mentioned figures and the

detailed description written by making reference to these figures, and therefore, evaluation shall be made by taking into consideration these figures and the detailed description.

BRIEF DESCRIPTION OF THE FIGURES

In Figure 1, a representative view of the present invention is given.

In Figure 2, a representative view of the electrostatic filter is given.

The drawings shall not be scaled and the details which are not necessary for understanding the present invention may be omitted. Besides, the elements, which are at least substantially identical or which has at least substantially identical functions, are shown with the same number.

REFERENCE NUMBERS

100 Air-solution regeneration device
110 Solution pump
120 Solution chamber
130 Air-solution injector
- 131 Drive end
- 132 Suction end
- 133 Spray end

140 Electrostatic filter
- 141 Ionizer
- 142 First plate
- 143 Second plate

150 Air-solution separator
- 151 Centrifuge unit
- 152 Air output opening
- 153 Output chamber
- 154 Input

DETAILED DESCRIPTION OF THE INVENTION

In this detailed description, the subject matter is explained with references to examples without forming any restrictive effect only in order to make the subject more understandable.

The present invention is an air-solution regeneration device (100) for providing equalization of the vapor pressure of a solution to the vapor pressure of the air, which exists in the medium, in an accelerated manner. The device moreover provides cleaning of the air which exists in the medium and purification from foreign substances at least partially. The present invention can be used in all fields related to air humidity balance and dehumidification and control systems, cooling systems with adsorption, electricity generation systems based on relative humidity.

The air-solution regeneration device (100) is associated with a solution chamber (120). Said solution chamber (120) keeps solution therein. Here, the mentioned solution describes a liquid and substance dissolved in said liquid. The solution can be sea water.

A solution pump (110) provides pressuring of the liquid which exists in the solution chamber (120). The solution pump (110) receives the solution as input (154) and provides giving of the solution in the form of an output with increased pressure.

The air-solution regeneration device (100) comprises an air-solution injector (130) which receives the solution, having increased pressure, as input (154) from the solution pump (110). The air-solution injector (130) is an injector which is in venturi type. In other words, the air-solution injector (130) comprises a channel having a drive end (131) and a spray end (133). A throat is provided between the drive end (131) and the spray end (133). A suction end (132) is also provided which is opened outwardly from the throat. While the liquid, which enters through the drive end (131), is passing through this throat, the speed and the pressure thereof increase, and vacuum effect occurs at said suction end (132), and the fluid is suctioned from the medium where the suction end (132) exists, and the fluid is mixed from the spray end (133) to the liquid which exists at the drive end (131) and spraying is provided. This is realized thanks to the venturi and coanda effects.

The air-solution regeneration device (100) comprises an air-solution separator (150) for providing separation of the air and the solution from each other for the air-solution mixture sprayed from the air-solution injector (130).

An electrostatic filter (140) is provided between the air solution separator and the air-solution injector (130). The air-solution mixture, which passes through the filter, comprises an ionizer (141) as also known in the art for the electrostatic filter (140). The particles, which exist in the solution and in the air, are passed through the high voltage electrical field region. Here, the particles are charged with positive (+) electrical charge. These positively charged particles

pass through collection plates arranged in a parallel manner with equal intervals. These plates are negatively and positively charged. While the positively charged plates push these particles, the negatively charged surfaces attract and collect these particles. Thus, the foreign particles which exist in the air are cleaned. The electrostatic filter (140) also comprises electro hydrodynamic generator. For this reason, a metal first plate (142) and a metal second plate (143) are provided between the air-solution injector (130) and the air solution separator. The first plate (142) and the second plate (143) are configured to provide passing of liquid. The solution, which hits the plates, deteriorates the ion balance of the plates and provides formation of voltage between the two plates. Thanks to the voltage formed by the conductor connected between the first plate (142) and the second plate (143), electricity is generated. The generated electricity can be used for the electricity need of the solution pump (110) and the electrostatic filter (140).

The air-solution separator (150) comprises an input (154) for entering of the air solution mixture, a centrifuge unit for providing separation of the air and the solution from each other by means of centrifuge effect, at least one air output opening (152) for exiting of the air separated from the solution, and an output chamber (153) associated with the centrifuge unit (151) for preserving of the solution separated from the air. The vapor pressure of the solution accumulated in the output chamber (153) is equalized to the air vapor pressure by giving vapor to the air or by taking vapor from the air during centrifuge.

The operation of the present invention whose details are described above is as follows:

The air-solution pump draws the solution from the solution chamber (120) and increases the pressure. The solution having increased pressure realizes input (154) through the drive end (131) of the air-solution injector (130), and in this case, air suctioning is realized through the suction end (132) of the air-solution injector (130). The suctioned air and solution is sprayed outwardly through the spray end (133). The sprayed air-solution mixture passes through the electrostatic filter (140). While the mixture passes through the electrostatic filter (140), it is subjected to electrical field and charged, and while the mixture passes through the ionizer (141), the charged particles are caught by the ionizer (141), and when the solution-air mixture, whose ion balance is changed, contacts the first and the second plates (142, 143), electricity is generated. The generated electricity is used for energizing the ionizer and pump, and the automatic operation of the system is provided. The air-solution mixture, which passes through the electrostatic filter (140), passes through spiral channels as a result of the effect of kinetic energy and gravity of the air-solution mixture by the air-solution separator, and the air and the solution are separated from each other as a result of centrifuge. The

solution flows to the output chamber (153), and the air exits the air output opening (152) in a cleaned manner.

The protection scope of the present invention is set forth in the annexed claims and cannot be restricted to the illustrative disclosures given above, under the detailed description. It is because a person skilled in the relevant art can obviously produce similar embodiments under the light of the foregoing disclosures, without departing from the main principles of the present invention.

CLAIMS

1. An air-solution regeneration device (100) for providing equalization of the vapor pressure of a solution, which exists in a solution chamber (120), to the vapor pressure of the air which exists in the medium, **wherein** the subject matter air-solution regeneration device (100) comprises a solution pump (110) for increasing the pressure of the solution which exists in said solution chamber (120); an air-solution injector (130) which is in venturi type and which has a drive end (131) which receives the solution, having increased pressure, as input (154), a suction end (132) for realizing air suctioning when there is liquid input (154), having increased pressure, through the drive end (131), a spray end (133) where the solution, received from said drive end (131), and the air, suctioned from said suction end (132), are sprayed; an electrostatic filter (140) where the air-solution mixture is sprayed; and an air-solution separator (150) which has a centrifuge unit (151) for providing separation of the air solution mixture, received from the input (154), from each other, and an output chamber (153) for collecting the solution which is separated from air and which has been brought to equal vapor pressure as the air vapor pressure.

2. The air-solution regeneration device (100) according to claim 1, **wherein** said electrostatic filter (140) comprises a conductive first plate (142) which allows liquid passage, a conductive second plate (143) which allows liquid passage, and an ionizer (141) connected between the first plate (142) and the second plate (143) for providing separation of the charged particles after the sprayed solution-air mixture passes through the first plate (142) and for providing generation of electricity by forming voltage difference between the first plate (142) and the second plate (143) when the air-solution mixture, which has the charged particles which are separated, contacts the second plate (143).

3. The air-solution regeneration device (100) according to claim 1, **wherein** said air-solution separator (150) comprises an air output opening (152).

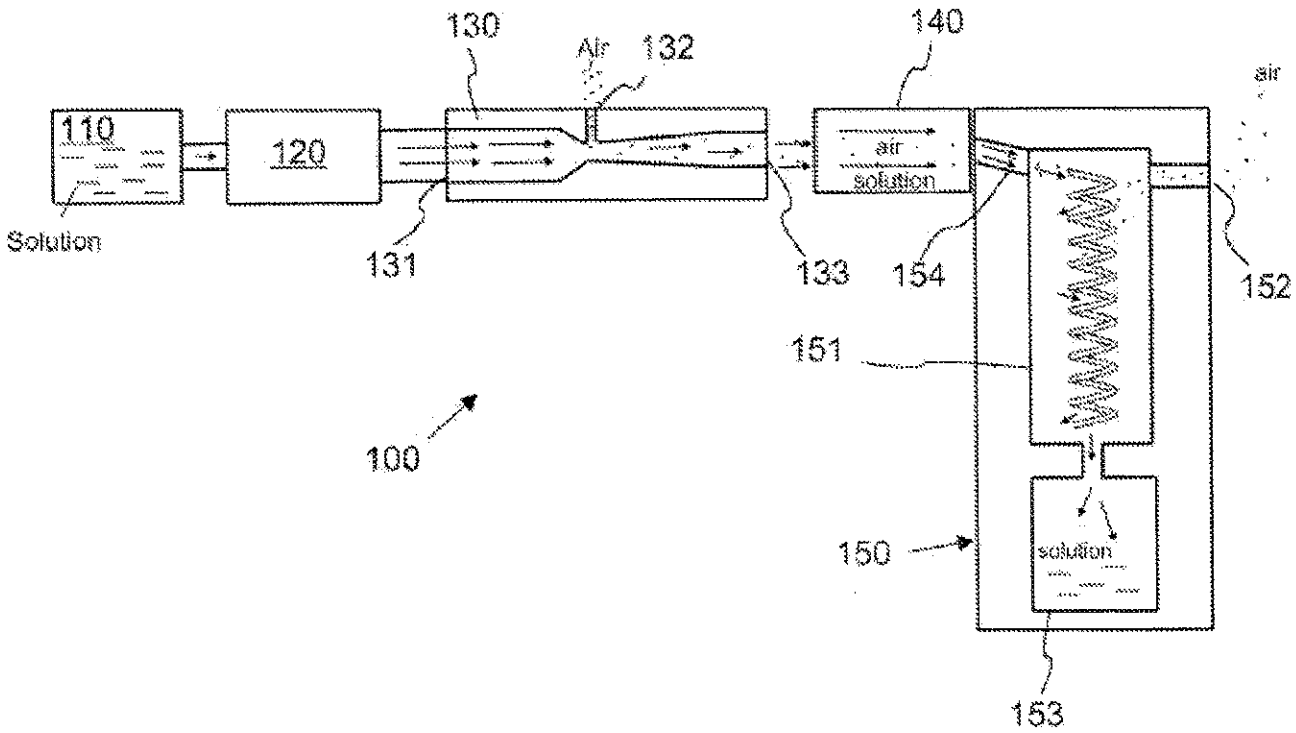

Figure 1

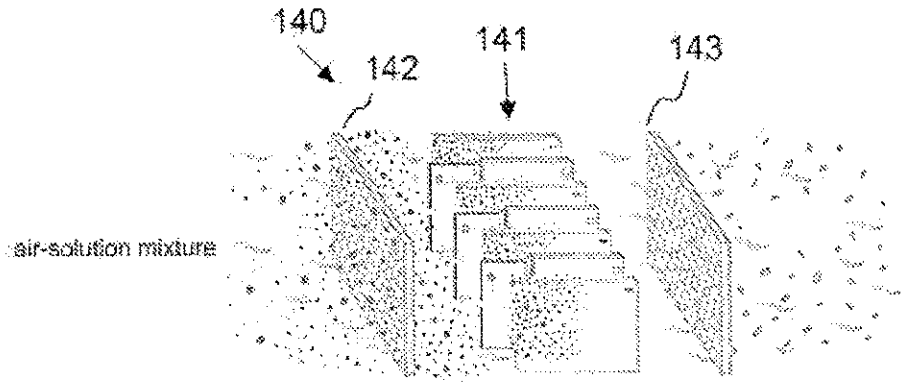

Figure 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/TR2021/050806

A. CLASSIFICATION OF SUBJECT MATTER

B01D 45/00 (2006.01)i; B01D 46/00 (2006.01)i; B01D 47/00 (2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B01D

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 101158672B B1 (KOREA ENERGY RESEARCH INST [KR]) 22 June 2012 (2012-06-22) whole document	1-3
A	CN 210425397U U (HAO ZHANNING) 28 April 2020 (2020-04-28) whole document	1-3
A	CN 206473940U U (MENG XIANGLEI) 08 September 2017 (2017-09-08) whole document	1-3
A	CN 106215579 A (MENG XIANGLEI) 14 December 2016 (2016-12-14) whole document	1-3
A	US 2010219373 A1 (SEEKER WILLIAM RANDALL [US]; CONSTANTZ BRENT [US]; KHOSLA VINOD [US]; CALERA CORP [US]) 02 September 2010 (2010-09-02) whole document	1-3

☑ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 December 2021	**13 December 2021**
Name and mailing address of the ISA/TR **Turkish Patent and Trademark Office (Turkpatent)** **Hipodrom Caddesi No. 13** **06560 Yenimahalle** **Ankara** **Turkey** Telephone No. **(90-312) 303 11 82** Facsimile No. **+903123031220**	Authorized officer **Harun Tarık KARAYOL** Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/TR2021/050806

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2011077144 A1 (RAYNE DEALERSHIP CORP [US] (B2)JESSEN H MARTIN [US]; DOLE ERIC JOHN [US]: MORGAN DAVID [US]; RAYNE DEALERSHIP CORP [US]) 31 March 2011 (2011-03-31) whole document	1-3
A	US 3029578 A (METALLGESELLSCHAFT AG) 17 April 1962 (1962-04-17) whole document	1-3

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference YP21-173-WO	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/TR2021/050806	International filing date *(day/month/year)* 13 August 2021 (13.08.2021)	Priority date *(day/month/year)* 15 September 2020 (15.09.2020)
International Patent Classification (IPC) or national classification and IPC See relevant information in Form PCT/ISA/237		
Applicant REPG ENERJI SISTEMLERI SANAYI VE TICARET ANONIM SIRKETI		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. 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 and 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

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis*.2).

	Date of issuance of this report 21 March 2023 (21.03.2023)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Xin Wang e-mail pct.team2@wipo.int

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
KAYA, Erdem
Konak Mh. Kudret Sok. Elitpark Park Sit. Ofisler
Apt. No:12/27
16110 Nilufer/Bursa
Turkey

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	**13 December 2021**
Applicant's or agent's file reference **YP21-173-WO**	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/TR2021/050806	**13 August 2021**	**15 September 2020**

International Patent Classification (IPC) or both national classification and IPC
B01D 45/00(2006.01)i; **B01D 46/00**(2006.01)i; **B01D 47/00**(2006.01)i

Applicant: **REPG ENERJI SISTEMLERI SANAYI VE TICARET ANONIM SIRKETI**

1. This opinion contains indications relating to the following items:

- [✓] Box No. I Basis of the opinion
- [ ] 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 Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and 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

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/TR	Date of completion of this opinion	Authorized officer
Turkish Patent and Trademark Office (Turkpatent) **Hipodrom Caddesi No. 13** **06560 Yenimahalle** **Ankara** **Turkey** Telephone No. **(90-312) 303 11 82** Facsimile No. **+903123031220**	**13 December 2021**	**Harun Tarık KARAYOL** Telephone No. Facsimile No.

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/TR2021/050806

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
   - ☐ the international application in the language in which it was filed.
   - ☑ a translation of the international application into **English** which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(b)).

3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
   - a. ☐ forming part of the international application as filed:
     - ☐ in the form of an Annex C/ST.25 text file.
     - ☐ on paper or in the form of an image file.
   - b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
   - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
     - ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
     - ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/TR2021/050806

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-3	YES
	Claims		NO
Inventive step (IS)	Claims	1-3	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-3	YES
	Claims		NO

2. Citations and explanations :

Reference is made to the following documents:

D1: KR101158672B B1
D2: CN210425397U U
D3: CN206473940U U
D4: CN106215579 A
D5: US2010219373 A1
D6: US2011077144 A1
D7: US3029578 A

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1.

D1 discloses an integrated fine dust eliminating apparatus includes a centrifugal-based dust collecting part, a filtering-based dust collecting part, an electric dust collecting part, a rapper, and a cleaning part.

The invention as set forth in claim 1 of the present application essentially differs from D1 in an air-solution regeneration device (100) for providing equalization of the vapor pressure of a solution, which exists in a solution chamber (120), to the vapor pressure of the air which exists in the medium, a solution pump (110) for increasing the pressure of the solution which exists in said solution chamber (120), and an output chamber (153) for collecting the solution which is separated from air and which has been brought to equal vapor pressure as the air vapor pressure.

The subject-matter of Claim 1 is therefore novel (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as how to provide an air purifier embodiment which also enables air-solution regeneration for providing equalization of the vapor pressure of a solution which exists in a solution chamber to the vapor pressure of the air which exists in the medium.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) because all distinguishing features of claim 1 mentioned above all together contribute to structural formation of the embodiment which solves the technical problem.

The said embodiment is considered as not obvious to a person skilled in the art to apply from cited documents, so the subject-matter of Claim 1 is therefore inventive (Article 33(3) PCT).

Therefore, the subject matter of claim 1 and dependent claims which are claims 2-3 fulfil the requirements of novelty, inventive step and industrial applicability according to PCT Article 33(2,3,4).