

(19)



(11)

**EP 3 711 506 A1**

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
**23.09.2020 Bulletin 2020/39**

(51) Int Cl.:  
**A24F 40/10 (2020.01)**

(21) Application number: **19188046.7**

(22) Date of filing: **24.07.2019**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB  
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO  
PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**  
Designated Validation States:  
**KH MA MD TN**

(30) Priority: **20.03.2019 CN 201920360306 U**

(71) Applicant: **Liu, Tuanfang  
518000 Shenzhen, Guangdong (CN)**

(72) Inventor: **Liu, Tuanfang  
518000 Shenzhen, Guangdong (CN)**

(74) Representative: **Hryszkiewicz, Danuta  
Matthias Scholl, Inc.  
Friedrichstrasse 123  
10117 Berlin (DE)**

### (54) ELECTRONIC CIGARETTE

(57) An electronic cigarette, including an atomization assembly (A) and a battery assembly (B). The atomization assembly is directly connected to the battery assembly. The atomization assembly includes a mouthpiece (1), a glass tube (15), a first seal ring (2) sealing the glass tube, an atomizer including a head (4) and a base (8), a second seal ring (3) sealing the head, a vent tube (5), a third seal ring (6) sealing the base of the atomizer, and an atomization core, the atomization core including a silica seal (9), a silica sleeve (10) including a vent, a ceramic core (11), a pedestal (12), an first insulation ring (13), a heating tube (7), and a joint (14). The battery assembly includes an electrode (16), a second insulation ring (17) coating the electrode, a connector (18), a cartridge (19), a silica insulator (20), a battery core (21), a silica sleeve (22), a pneumatic switch (23), a USB-PCB (27), and a pedestal (24). The first seal ring is disposed in the mouthpiece.

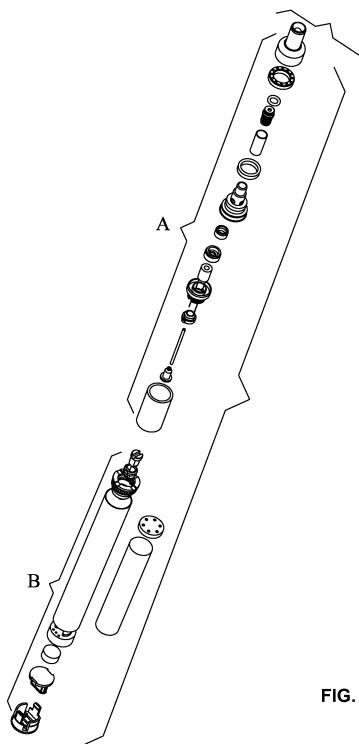


FIG. 1

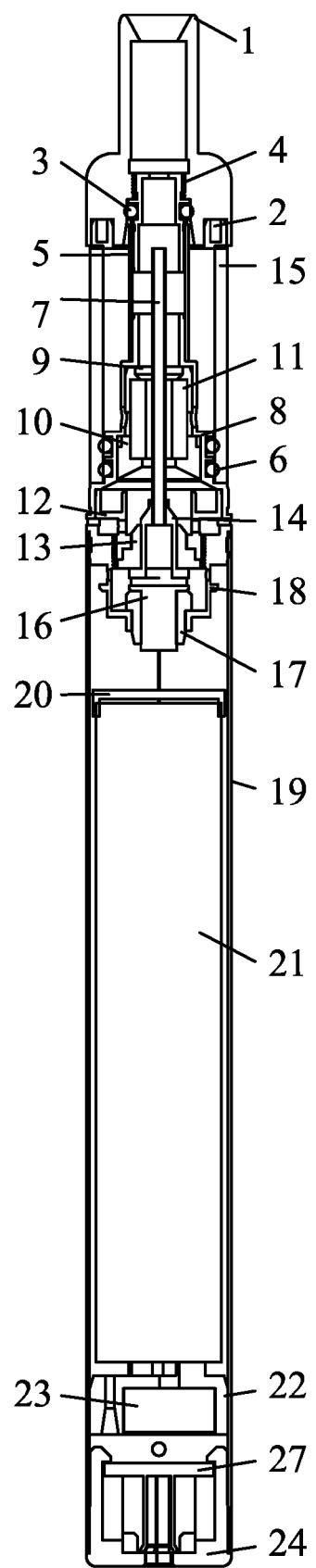


FIG. 5

## Description

**[0001]** The disclosure relates to an electronic cigarette. Electronic cigarettes atomize nicotine-containing e-liquid.

**[0002]** Provided is an electronic cigarette, comprising an atomization assembly and a battery assembly. The atomization assembly is directly connected to the battery assembly. The atomization assembly comprises a mouthpiece, a glass tube, a first seal ring sealing the glass tube, an atomizer comprising a head and a base, a second seal ring sealing the head, a vent tube, a third seal ring sealing the base of the atomizer, and an atomization core, the atomization core comprising a silica seal, a silica sleeve comprising a vent, a ceramic core, a pedestal, an first insulation ring, a heating tube, and a joint. The first seal ring is disposed in the mouthpiece; the second seal ring is sheathed on the head; the head is disposed on the vent tube; the vent tube is disposed on the base; the third seal ring is sheathed on the base; the ceramic core and the silica sleeve comprising a vent are disposed on the pedestal; the silica seal is disposed on the ceramic core; the first insulation ring is disposed in the pedestal; the heating tube is disposed on the joint; the joint is embedded in the first insulation ring; the atomization core is embedded in the base; the glass tube is sheathed on the base, and the mouthpiece is in threaded connection to the head.

**[0003]** The battery assembly comprises an electrode, a second insulation ring coating the electrode, a connector, a cartridge, a silica insulator, a battery core, a silica sleeve, a pneumatic switch, a USB-PCB, and a pedestal. The pneumatic switch comprises positive and negative poles connected to positive and negative poles of an output end of the USB-PCB; the pneumatic switch is disposed in the silica sleeve and connected to positive and negative poles of the battery core; the silica insulator is disposed on the battery core; the battery core is disposed in the cartridge; the second insulation ring is disposed in the connector; the electrode is disposed in the second insulation ring; the connector is fixed on the cartridge; the USB-PCB is disposed in the pedestal; and the pedestal is fixed on a terminal end of the cartridge.

**[0004]** The head of the atomizer can comprise a plurality of gear grooves or knurling grooves.

**[0005]** The heating tube of the atomization assembly can be directly connected to the joint, and communicates with the mouthpiece and the pneumatic switch of the control plate.

**[0006]** The pedestal of the atomization assembly can be in threaded connection to the connector of the battery assembly.

**[0007]** Advantages of the electronic cigarette according to embodiments of the disclosure are summarized as follows:

1. The electronic cigarette is cylindrical, compact and easy to carry.

2. The head of the atomizer comprises a plurality of gear grooves or knurling grooves; the bubbles produced by the e-liquid can release from the gear grooves or knurling grooves thus preventing the blockage of the inlet of the e-liquid.

3. The thermal vapor flow can enter the heating tube to drive the pneumatic switch to work and heat the ceramic core, so that the e-liquid in the atomization assembly is heated to a free state, thus preventing the blockage of the conveying pipe by the condensed e-liquid.

FIG. 1 is a schematic view of an electronic cigarette according to one embodiment of the disclosure;

FIG. 2 is an exploded view of an atomization assembly of an electronic cigarette according to one embodiment of the disclosure;

FIG. 3 is an exploded view of a battery assembly of an electronic cigarette according to one embodiment of the disclosure;

FIG. 4 is a stereogram of an electronic cigarette according to one embodiment of the disclosure; and

FIG. 5 is a sectional view of an electronic cigarette according to one embodiment of the disclosure.

**[0008]** To further illustrate, embodiments detailing an electronic cigarette are described below. It should be noted that the following embodiments are intended to describe and not to limit the disclosure.

**[0009]** As shown in FIGS. 1-5, the disclosure provides an electronic cigarette comprising an atomization assembly **A** and a battery assembly **B**. The atomization assembly is directly connected to the battery assembly. The atomization assembly **A** comprises a mouthpiece **1**, a glass tube **15**, a first seal ring **2** sealing the glass tube, an atomizer comprising a head **4** and a base **8**, a second seal ring **3** sealing the head, a vent tube **5**, a third seal ring **6** sealing the base of the atomizer, and an atomization core, the atomization core comprising a silica seal **9**, a silica sleeve comprising a vent **10**, a ceramic core **11**, a pedestal **12**, a first insulation ring **13**, a heating tube **7**, and a joint **14**. The first seal ring **2** is disposed in the mouthpiece **1**; the second seal ring **3** is sheathed on the head **4**; the head **4** is disposed on the vent tube **5**; the vent tube **5** is disposed on the base **8**; the third seal ring **6** is sheathed on the base **8**; the ceramic core **11** and the silica sleeve comprising a vent **10** are disposed on the pedestal **12**; the silica seal **9** is disposed on the ceramic core **11**; the first insulation ring **13** is disposed in the pedestal **12**; the heating tube **7** is disposed on the joint **14**; the joint **14** is embedded in the first insulation ring **13**; the atomization core is embedded in the base **8**; the glass tube **15** is sheathed on the base **8**, and the

mouthpiece 1 is in threaded connection to the head 4.

[0010] Open the mouthpiece 1, the e-liquid can be injected in the atomizer through the opening of the glass tube 15. Thereafter, the e-liquid penetrates from the inlet of the base 8 of the atomizer into the ceramic core 11. During the penetration, the e-liquid will produce bubbles. The bubbles can release from the gear grooves or knurling grooves thus preventing the blockage of the inlet of the e-liquid.

[0011] The heating tube 7 of the atomization assembly is directly connected to the joint 14, which means the heating tube is indirectly connected to the positive pole of the ceramic core 11, and communicates with the mouthpiece 1 and the pneumatic switch 23 of the battery assembly. During smoking, the thermal vapor flow can enter the heating tube to drive the pneumatic switch to work and heat the ceramic core, so that the e-liquid in the atomization assembly is heated to a free state, thus preventing the blockage of the conveying pipe by the condensed e-liquid.

[0012] The battery assembly comprises an electrode 16, a second insulation ring 17 coating the electrode, a connector 18, a cartridge 19, a silica insulator 20, a battery core 21, a silica sleeve 22, a pneumatic switch 23, a USB-PCB 27, and a pedestal 24. The pneumatic switch 23 comprises positive and negative poles connected to positive and negative poles of an output end of the USB-PCB 27; the pneumatic switch 23 is disposed in the silica sleeve 22 and connected to positive and negative poles of the battery core 21; the silica insulator 20 is disposed on the battery core 21; the battery core 21 is disposed in the cartridge 19; the second insulation ring 17 is disposed in the connector 18; the electrode 16 is disposed in the second insulation ring 17; the connector 18 is fixed on the cartridge 19; the USB-PCB 27 is disposed in the pedestal 24; and the pedestal 24 is fixed on a terminal end of the cartridge 19. The pedestal 12 of the atomization assembly is in threaded connection to the connector 18 of the battery assembly. The electronic cigarette is a three-dimensional cylindrical structure, and is compact and easy to carry.

[0013] It will be obvious to those skilled in the art that changes and modifications may be made, and therefore, the aim in the appended claims is to cover all such changes and modifications.

## Claims

1. An electronic cigarette, comprising:

an atomization assembly (A), the atomization assembly comprising a mouthpiece (1), a glass tube (15), a first seal ring (2) sealing the glass tube, an atomizer comprising a head (4) and a base (8), a second seal ring (3) sealing the head, a vent tube (5), a third seal ring (6) sealing the base of the atomizer, and an atomization core,

the atomization core comprising a silica seal (9), a silica sleeve comprising a vent (10), a ceramic core (11), a pedestal (12), an first insulation ring (13), a heating tube (7), and a joint (14); and a battery assembly (B), the battery assembly comprising an electrode (16), a second insulation ring (17) coating the electrode, a connector (18), a cartridge (19), a silica insulator (20), a battery core (21), a silica sleeve (22), a pneumatic switch (23), a USB-PCB (27), and a pedestal (24); wherein:

the atomization assembly is directly connected to the battery assembly; the first seal ring (2) is disposed in the mouthpiece (1); the second seal ring (3) is sheathed on the head (4); the head (4) is disposed on the vent tube (5); the vent tube (5) is disposed on the base (8); the third seal ring (6) is sheathed on the base (8); the ceramic core (11) and the silica sleeve comprising a vent (10) are disposed on the pedestal (12); the silica seal (9) is disposed on the ceramic core (11); the first insulation ring (13) is disposed in the pedestal (12); the heating tube (7) is disposed on the joint (14); the joint (14) is embedded in the first insulation ring (13); the atomization core is embedded in the base (8); the glass tube (15) is sheathed on the base (8), and the mouthpiece (1) is in threaded connection to the head (4); and

the pneumatic switch (23) comprises positive and negative poles connected to positive and negative poles of an output end of the USB-PCB (27); the pneumatic switch (23) is disposed in the silica sleeve (22) and connected to positive and negative poles of the battery core (21); the silica insulator (20) is disposed on the battery core (21); the battery core (21) is disposed in the cartridge (19); the second insulation ring (17) is disposed in the connector (18); the electrode (16) is disposed in the second insulation ring (17); the connector (18) is fixed on the cartridge (19); the USB-PCB (27) is disposed in the pedestal (24); and the pedestal (24) is fixed on a terminal end of the cartridge (19).

2. The electronic cigarette of claim 1, wherein the head of the atomizer comprises a plurality of gear grooves or knurling grooves.
3. The electronic cigarette of claim 1, wherein the heating tube of the atomization assembly is directly connected to the joint, and communicates with the

mouthpiece and the pneumatic switch of the control plate.

4. The electronic cigarette of claim 1, wherein the pedestal (12) of the atomization assembly is in threaded connection to the connector (18) of the battery assembly. 5

10

15

20

25

30

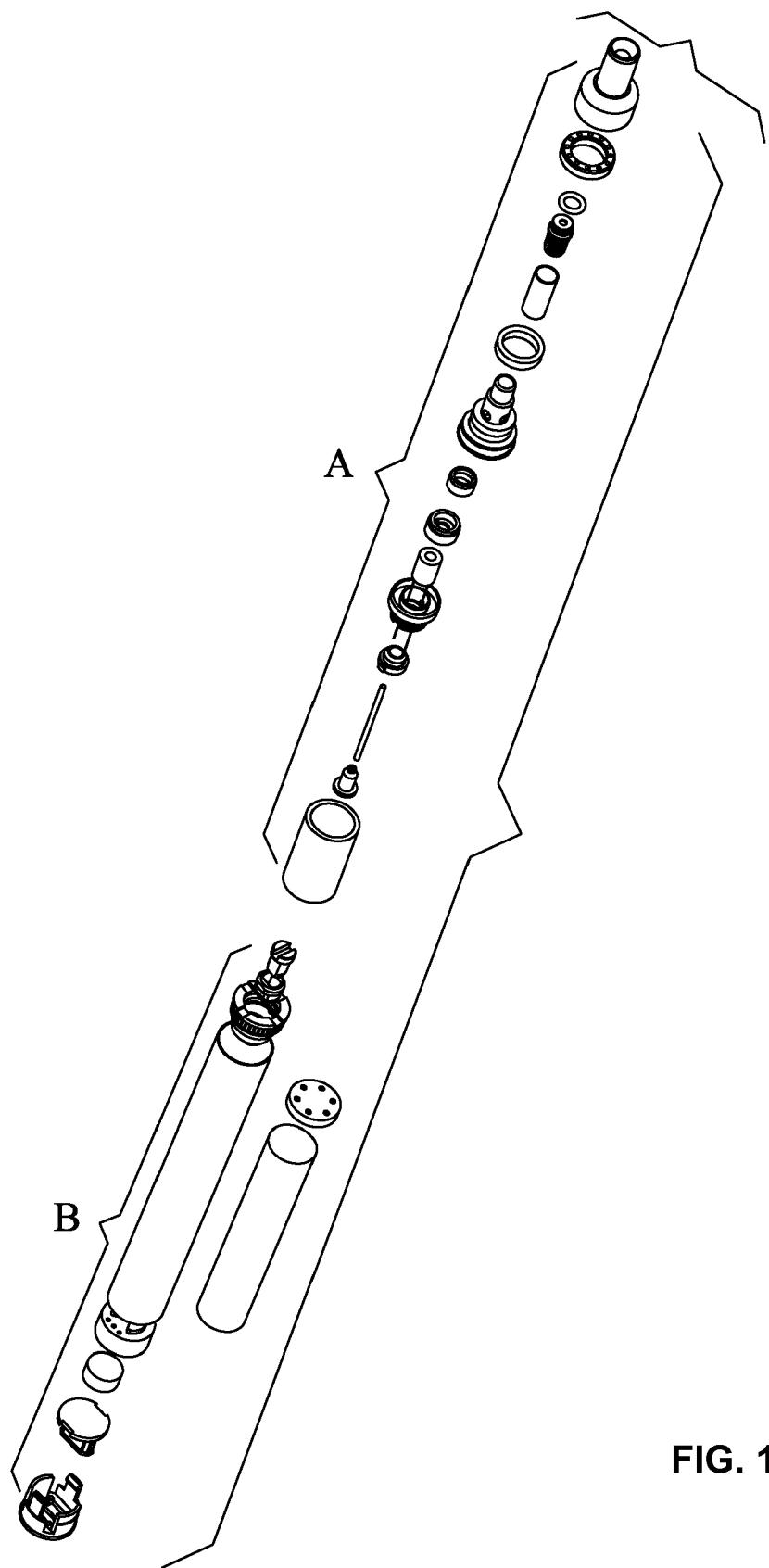
35

40

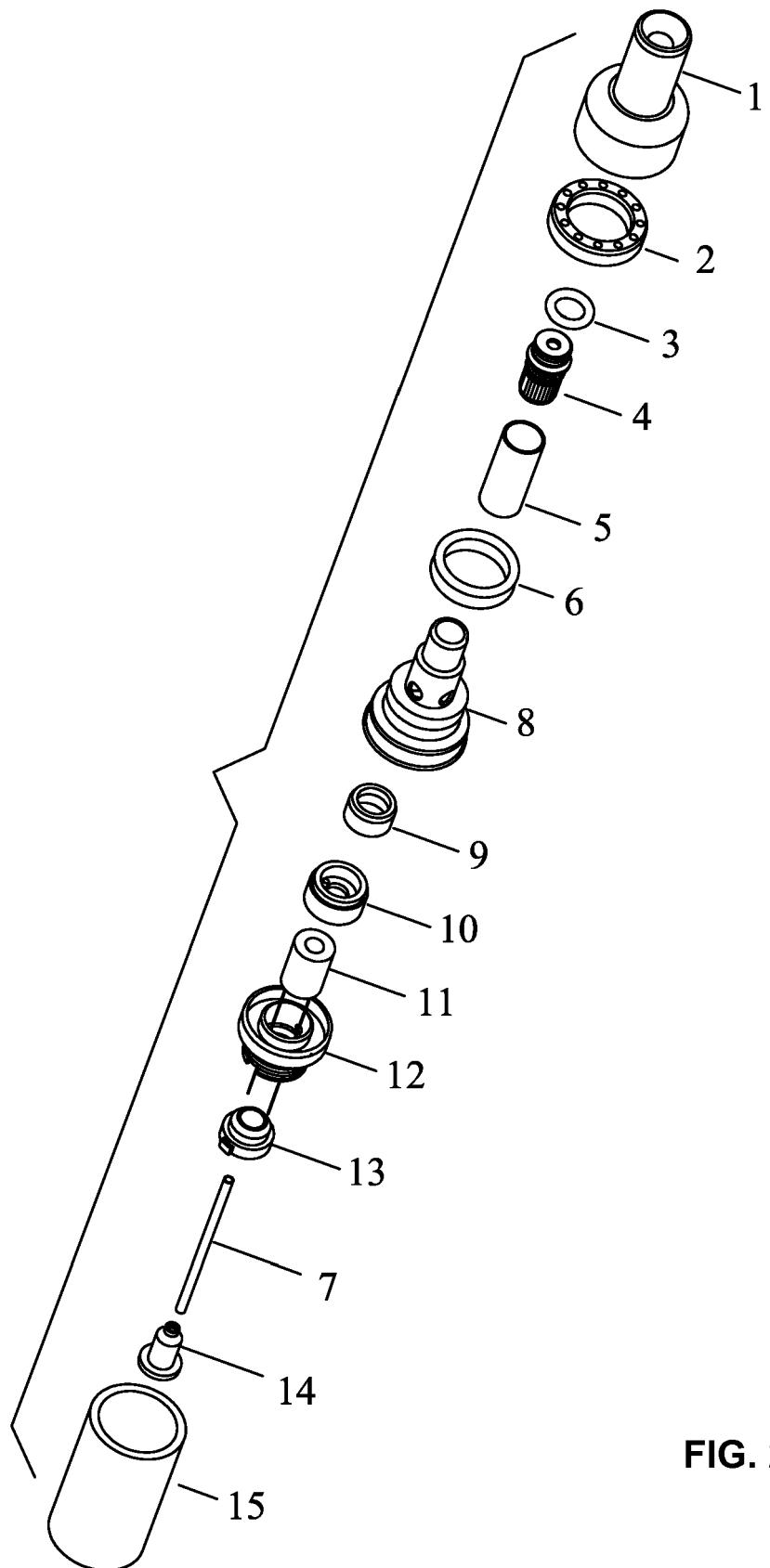
45

50

55



**FIG. 1**



**FIG. 2**

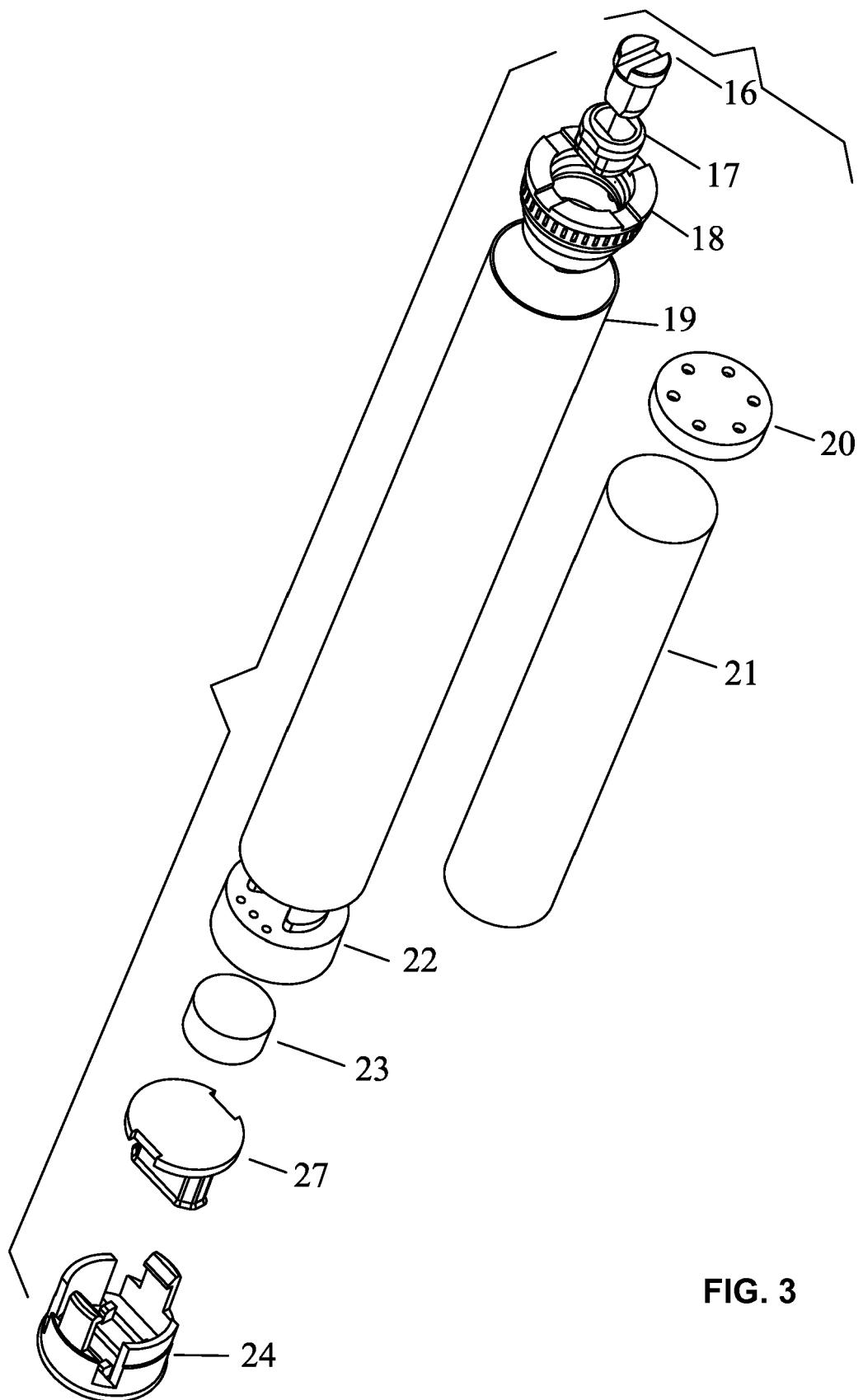


FIG. 3

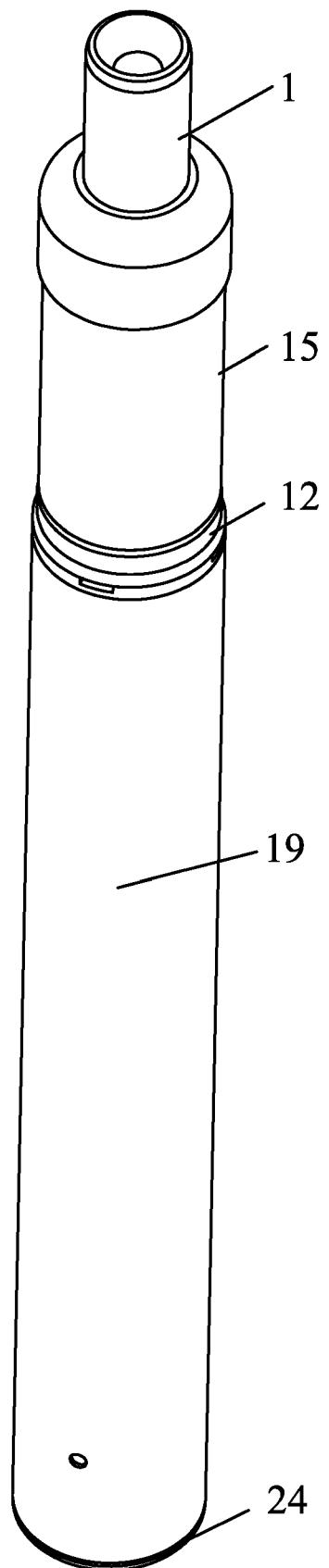


FIG. 4

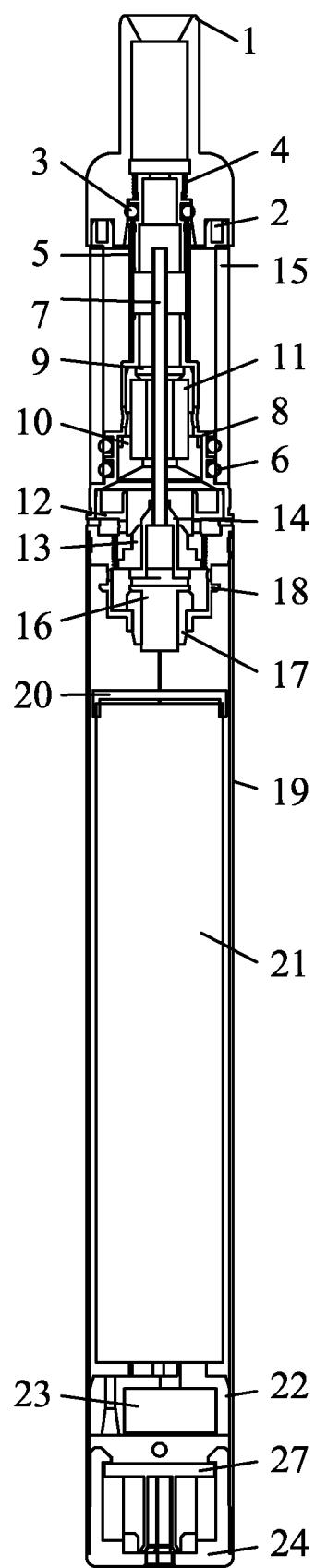


FIG. 5



## EUROPEAN SEARCH REPORT

Application Number

EP 19 18 8046

5

DOCUMENTS CONSIDERED TO BE RELEVANT			
	Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
10	A	CN 208 510 076 U (SHENZHEN SMOORE TECHNOLOGY LTD) 19 February 2019 (2019-02-19) * paragraph [0001] - paragraph [0016] * * paragraph [0024] - paragraph [0054] * * figures 1-4 * -----	1-4
15	A	CN 208 030 281 U (LIU TUANFANG) 2 November 2018 (2018-11-02) * paragraph [0001] - paragraph [0014] * * paragraph [0023] - paragraph [0026] * * figures 1-5 *	1-4
20	A	US 2019/069604 A1 (VERLEUR JAN ANDRIES [US] ET AL) 7 March 2019 (2019-03-07) * paragraph [0002] - paragraph [0006] * * paragraph [0032] - paragraph [0070] * * figures 1-22 *	1-4
25	A	CN 109 480 343 A (LIU TUANFANG) 19 March 2019 (2019-03-19) * paragraph [0001] - paragraph [0016] * * paragraph [0026] - paragraph [0031] * * figures 1-6 *	1-4
30	A	US 2016/183592 A1 (LIU TUANFANG [CN]) 30 June 2016 (2016-06-30) * paragraph [0002] - paragraph [0020] * * paragraph [0026] - paragraph [0056] * * figures 1-4 *	1-4
35	A	CN 203 952 452 U (LIU TUANFANG) 26 November 2014 (2014-11-26) * paragraph [0001] - paragraph [0017] * * paragraph [0023] - paragraph [0027] * * figures 1-4 *	1-4
40		----- -----	-/-
45		The present search report has been drawn up for all claims	
1	Place of search	Date of completion of the search	Examiner
	Munich	27 January 2020	Aguado, Miguel
50	CATEGORY OF CITED DOCUMENTS		
	X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)



## EUROPEAN SEARCH REPORT

Application Number

EP 19 18 8046

5

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
10	A CN 207 912 054 U (YAN ZHIGUO) 28 September 2018 (2018-09-28) * paragraph [0001] - paragraph [0021] * * paragraph [0034] - paragraph [0044] * * figures 1-9 *	1-4	
15	A WO 2017/166263 A1 (SHENZHEN SMOORE TECHNOLOGY LTD [CN]) 5 October 2017 (2017-10-05) * paragraph [0001] - paragraph [0022] * * paragraph [0032] - paragraph [0053] * * figures 1-7 *	1-4	
20	A CN 206 137 207 U (WANG WEICAI) 3 May 2017 (2017-05-03) * paragraph [0001] - paragraph [0007] * * paragraph [0010] * * figure 1 *	1-4	
25	A CN 208 080 545 U (YGREEN TECH CO LTD) 13 November 2018 (2018-11-13) * paragraph [0001] - paragraph [0015] * * paragraph [0019] - paragraph [0027] * * figure 1 *	1-4	
30	A CN 106 510 000 A (ETSONG IND CO LTD) 22 March 2017 (2017-03-22) * paragraph [0001] - paragraph [0010] * * paragraph [0018] - paragraph [0030] * * figures 1-5 *	1-4	
35	A US 2015/013700 A1 (LIU TUANFANG [CN]) 15 January 2015 (2015-01-15) * paragraph [0002] - paragraph [0011] * * paragraph [0016] - paragraph [0017] * * figures 1-3 *	1-4	
40			
45			
1	The present search report has been drawn up for all claims		
50	Place of search Munich	Date of completion of the search 27 January 2020	Examiner Aguado, Miguel
	CATEGORY OF CITED DOCUMENTS		
	X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		
	T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document		

EPO FORM 1503 03.82 (P04C01)



## EUROPEAN SEARCH REPORT

Application Number  
EP 19 18 8046

5

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
10	A CN 203 762 290 U (SHENZHEN FIRST UNION TECH CO) 13 August 2014 (2014-08-13) * paragraph [0001] - paragraph [0021] * * paragraph [0034] - paragraph [0049] * * figures 1-9 *	1-4	
15	A CN 208 550 033 U (XU YUNLIN) 1 March 2019 (2019-03-01) * paragraph [0001] - paragraph [0032] * * paragraph [0046] - paragraph [0078] * * figures 1-6 *	1-4	
20	A CN 109 077 357 A (SHENZHEN DONGXIANGDA TECH CO LTD) 25 December 2018 (2018-12-25) * paragraph [0001] - paragraph [0017] * * paragraph [0030] - paragraph [0042] * * figures 1-8 *	1-4	
25	A CN 109 123 818 A (LIU TUANFANG) 4 January 2019 (2019-01-04) * paragraph [0001] - paragraph [0015] * * paragraph [0019] - paragraph [0023] * * figures 1-5 *	1-4	TECHNICAL FIELDS SEARCHED (IPC)
30	A US 2014/360516 A1 (LIU QIUMING [CN]) 11 December 2014 (2014-12-11) * paragraph [0001] - paragraph [0021] * * paragraph [0030] - paragraph [0066] * * figures 1-7 *	1-4	
35	A US 2017/311646 A1 (LIU TUANFANG [CN]) 2 November 2017 (2017-11-02) * paragraph [0002] - paragraph [0020] * * paragraph [0025] - paragraph [0037] * * figures 1-3 *	1-4	
40		-/-	
45	The present search report has been drawn up for all claims		
1	Place of search Munich	Date of completion of the search 27 January 2020	Examiner Aguado, Miguel
50	CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document
55	EPO FORM 1503 03.82 (P04C01)		



## EUROPEAN SEARCH REPORT

Application Number

EP 19 18 8046

5

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)						
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim							
10	A US 9 497 998 B2 (SHENZHEN SMOORE TECHNOLOGY LTD [CN]) 22 November 2016 (2016-11-22) * column 1, line 5 - column 2, line 25 * * column 3, line 23 - column 9, line 20 * * figures 1-12 *	1-4							
15	A EP 3 141 136 A1 (LIU TUANFANG [CN]) 15 March 2017 (2017-03-15) * paragraph [0001] - paragraph [0011] * * paragraph [0013] - paragraph [0018] * * figures 1-4C *	1-4							
20	A CN 206 260 850 U (LIU TUANFANG) 20 June 2017 (2017-06-20) * paragraph [0001] - paragraph [0014] * * paragraph [0021] - paragraph [0023] * * figures 1-4 *	1-4							
25		-----							
30			TECHNICAL FIELDS SEARCHED (IPC)						
35									
40									
45									
50	The present search report has been drawn up for all claims								
55	<table border="1"> <tr> <td>Place of search</td> <td>Date of completion of the search</td> <td>Examiner</td> </tr> <tr> <td>Munich</td> <td>27 January 2020</td> <td>Aguado, Miguel</td> </tr> </table>			Place of search	Date of completion of the search	Examiner	Munich	27 January 2020	Aguado, Miguel
Place of search	Date of completion of the search	Examiner							
Munich	27 January 2020	Aguado, Miguel							
	<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... &amp; : member of the same patent family, corresponding document</p>								
	<p>EPO FORM 1503 03.82 (P04C01)</p>								

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO. [REDACTED]**

EP 19 18 8046

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-01-2020

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 19 18 8046

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-01-2020

10	Patent document cited in search report	Publication date	Patent family member(s)		Publication date
15	CN 208080545 U	13-11-2018	CA 3038938 A1		10-10-2019
			CN 208080545 U		13-11-2018
			EP 3552504 A1		16-10-2019
			US 2019307169 A1		10-10-2019
20	CN 106510000 A	22-03-2017	NONE		
25	US 2015013700 A1	15-01-2015	CN 203341011 U		18-12-2013
			US 2015013700 A1		15-01-2015
30	CN 203762290 U	13-08-2014	NONE		
35	CN 208550033 U	01-03-2019	NONE		
40	CN 109077357 A	25-12-2018	NONE		
45	CN 109123818 A	04-01-2019	NONE		
50	US 2014360516 A1	11-12-2014	AU 2013391954 A1		28-01-2016
			CA 2914640 A1		11-12-2014
			CN 204796733 U		25-11-2015
			EP 3005890 A1		13-04-2016
			JP 6237893 B2		29-11-2017
			JP 2016521981 A		28-07-2016
			KR 20160013208 A		03-02-2016
			PL 3005890 T3		31-08-2018
			US 2014360516 A1		11-12-2014
			WO 2014194510 A1		11-12-2014
55	US 2017311646 A1	02-11-2017	CN 205671479 U		09-11-2016
			EP 3238553 A1		01-11-2017
			US 2017311646 A1		02-11-2017
	US 9497998 B2	22-11-2016	US 2015150306 A1		04-06-2015
			WO 2015081483 A1		11-06-2015
	EP 3141136 A1	15-03-2017	EP 3141136 A1		15-03-2017
			US 2017042228 A1		16-02-2017
	CN 206260850 U	20-06-2017	CN 206260850 U		20-06-2017
			RU 2017114178 A		26-10-2018

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

55

page 2 of 2