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(71) Applicant: **Changzhou Patent Electronic Technology Co., Ltd**
Changzhou, Jiangsu 213022 (CN)

(72) Inventors:
- **QIU, Weihua**
  Changzhou
  Jiangsu 213125 (CN)
- **LIAO, Wei**
  Shenzhen
  Guangdong 213125 (CN)

(74) Representative: **Zaboliene, Reda**
Metida
Business center Vertas
Gyneju str. 16
01109 Vilnius (LT)

(54) ATOMIZER AND ELECTRONIC CIGARETTE

(57) An atomizer and an electronic cigarette, the atomizer comprising an upper cover assembly (3) and a filling cover (1); the upper cover assembly (3) being provided with a filling port (33), the filling cover (1) being provided at one end of the upper cover assembly (3) and covering the filling port (33), the upper cover assembly (3) being provided with a locking structure (10), the filling cover (1) being provided with a snap groove (13), or the upper cover assembly (3) being provided with a snap groove (13), the filling cover (1) being provided with a locking structure (10), and when the locking structure (10) is snap-fitted in the snap groove (13), the filling cover (1) being limited at a position for covering the filling port (33), and when the locking structure (10) slides out of the snap groove (13), the filling cover (1) being able to slide to expose the filling port (33). The atomizer is provided with a safety lock, such that the child cannot easily open the filling hole when using the atomizer, thereby preventing the child from coming in contact with the E-liquid, and ensuring the atomizer is safer to use.

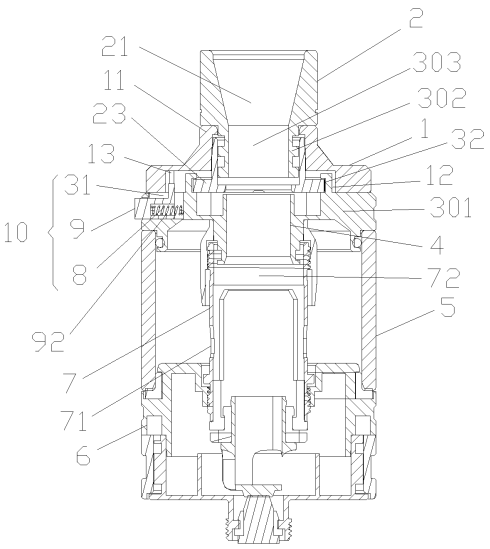

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to the technical field of simulated smoking, and in particular, to an atomizer and an electronic cigarette using the atomizer.

BACKGROUND

[0002] In the current electronic cigarette market, the atomizers are basically injected with liquid from the bottom, from the side or from the top. In the early stage, most atomizers are injected with liquid from the bottom. Because of the inconvenience of injecting from the bottom and the poor sealing effect, now most of them are injected with liquid from the top or from the side. However, at present, children's protection is not taken into account when top liquid injection or side liquid injection is used. Children are easy to open the atomizer to contact the e-liquid, which has a large potential safety hazard.

SUMMARY

[0003] The purpose of the present invention is to solve the problems in the prior art, and provide an atomizer and an electronic cigarette, which are provided with a safety lock so that the children cannot easily open the liquid injection hole, thereby preventing children from contacting e-liquid and making it safer to use.

[0004] The technical solution adopted by the present invention is as follows:

[0005] An atomizer includes an upper cover assembly and a liquid injection cover. The upper cover assembly is provided with a liquid injection hole. The liquid injection cover is provided at one end of the upper cover assembly and covers the liquid injection hole. The upper cover assembly is provided with a locking structure, and the liquid injection cover is provided with a locking groove, or the upper cover assembly is provided with a locking groove, and the liquid injection cover is provided with a locking structure. When the locking structure is locked in the locking groove, the liquid injection cover is limited at a position for covering the liquid injection hole. When the locking structure moves out of the locking groove, the liquid injection cover is able to slide to expose the liquid injection hole.

[0006] Further, the upper cover assembly includes an upper cover and a connection seat. The liquid injection cover is sleeved on the connection seat. A slider is provided on the connection seat. A sliding groove is provided in the upper cover. The slider is received in the sliding groove and can slide along the sliding groove.

[0007] Further, the locking structure includes a mounting groove provided in the upper cover assembly, and a locking member and an elastic member received in the mounting groove. The mounting groove is provided with an upper opening and a side opening. The locking member is provided with a locking arm. The elastic member is arranged at the inner end of the mounting groove. The locking member and the elastic member are received in the mounting groove in series. The locking member and the elastic member abut against each other. The locking member extends from the side opening to an outside of the atomizer. The locking arm is exposed through the upper opening.

[0008] Further, the liquid injection cover is provided with an accommodating groove, and the sliding groove and the slider are received in the accommodating groove.

[0009] Further, a limiting groove is provided inside the locking member, and one end of the elastic member near the locking member is received in the limiting groove.

[0010] Further, the upper cover is provided with an air outlet tube. The connection seat is provided with a smoke outlet hole. The air outlet tube penetrates the upper and lower ends of the upper cover. The upper end of the air outlet tube is in communication with the smoke outlet hole of the connection seat.

[0011] Further, the atomizer further includes a base assembly and a liquid storage tube. The upper end of the liquid storage tube abuts against the upper cover assembly. The lower end of the liquid storage tube abuts against the base assembly.

[0012] Further, the atomizer further includes an atomizing head. The atomizing head is provided on the base assembly. The atomizing head is located in the liquid storage tube. The atomizing head is provided with an atomizing liquid inlet hole. The upper end of the atomizing head is provided with an atomizing air outlet hole. The upper end of the atomizing head is connected to the air outlet tube. The atomizing air outlet hole is in communication with the air outlet tube.

[0013] Further, the atomizer further includes a mouthpiece. The mouthpiece is detachably connected to the connection seat. The mouthpiece is provided with a smoking hole. The smoking hole is in communication with the smoke outlet hole.

[0014] An electronic cigarette includes the atomizer as described above.

[0015] The beneficial effects of the present invention are:

[0016] In the atomizer and electronic cigarette of the present invention, the liquid injection cover exposes or covers the liquid injection hole through a sliding manner, and the liquid injection cover and the upper cover assembly are

respectively provided with the locking groove and the locking structure. When the locking structure is locked into the locking groove, the liquid injection cover is restricted and cannot slide. Therefore, the atomizer and the electronic cigarette of the present invention cannot easily open the liquid injection hole by the children, thereby preventing the children from contacting the e-liquid and making it safer to use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The drawings are used to provide a further understanding of the present invention and constitute a part of the description. Together with the following specific embodiments, they are used to explain the present invention, but should not constitute a limitation on the present invention. In the drawings,

FIG. 1 is a cross-sectional view of an atomizer in an embodiment of the present invention;

FIG. 2 is an exploded view of an upper cover assembly, a mouthpiece assembly, and a liquid injection cover in the embodiment of the present invention;

FIG. 3 is an exploded view of the upper cover assembly, the mouthpiece assembly, and the liquid injection cover from another aspect in the embodiment of the present invention;

FIG. 4 is an exploded view of the atomizer in the embodiment of the present invention.

[0018] The part names and reference signs in the figures are as follows:

liquid injection cover 1	mouthpiece 2
upper cover assembly 3	air outlet tube 4
liquid storage tube 5	base assembly 6
atomizing head 7	elastic member 8
locking member 9	locking structure 10
protrusion 11	connection hole 12
locking groove 13	accommodating groove 14
upper cover 301	connection seat 302
slider 23	smoke outlet hole 303
mounting groove 31	sliding groove 32
liquid injection hole 33	atomizing liquid inlet hole 71
atomizing air outlet hole 72	locking arm 91
limiting groove 92	upper opening 311
side opening 312	smoking hole 21

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0019] Hereinafter, specific embodiments of the present invention will be described in detail with reference to the drawings. It should be understood that the specific embodiments described herein are only used to illustrate and explain the present invention, and are not intended to limit the present invention.

[0020] An embodiment of the present invention provides an electronic cigarette, and the electronic cigarette includes an atomizer.

[0021] Please refer to FIG. 1 to FIG. 4, the atomizer includes an upper cover assembly 3 and a liquid injection cover 1. The upper cover assembly 3 is provided with a liquid injection hole 33. The liquid injection cover 1 is provided at one end of the upper cover assembly 3 and covers the liquid injection hole 33. The upper cover assembly 3 is provided with a locking structure 10, and the liquid injection cover 1 is provided with a locking groove 13, or the upper cover assembly 3 is provided with a locking groove 13, and the liquid injection cover 1 is provided with a locking structure 10. When the locking structure 10 is locked in the locking groove 13, the liquid injection cover 1 is limited at a position for covering the

liquid injection hole 33. When the locking structure 10 moves out of the locking groove 13, the liquid injection cover 1 is able to slide to expose the liquid injection hole 33.

[0022] The locking structure 10 and the locking groove 13 together form a safety lock of the atomizer. When the liquid injection cover 1 covers the liquid injection hole 33, the locking structure 10 is locked in the locking groove 13, and the safety lock is in a locked state, so that the sliding of the liquid injection cover 1 is restricted. If the liquid injection hole 33 needs to be opened, the safety lock needs to be opened first, that is, the locking structure 10 is moved out of the locking groove 13, so that the liquid injection cover 1 can slide to expose the liquid injection hole 33.

[0023] In another embodiment not shown, the liquid injection cover 1 is connected to the upper cover assembly 3 through a pin in the axial direction. When the liquid injection cover 1 covers the liquid injection hole 33, the locking structure 10 is locked in the locking groove 13, and the safety lock is in a locked state, so that the rotation of the liquid injection cover 1 is restricted. Only when the safety lock is opened, that is, the locking structure 10 is moved out of the locking groove 13, can the liquid injection cover 1 be rotated to expose the liquid injection hole 33.

[0024] As shown in FIG. 2, the upper cover assembly 3 includes an upper cover 301 and a connection seat 302. The connection seat 302 is provided with a smoke outlet hole 303. The liquid injection cover 1 is disc-shaped, and the upper end of the liquid injection cover 1 is provided with a protrusion 11, and a connection hole 12 penetrating the upper and lower ends is provided in the middle of the liquid injection cover 1. The liquid injection cover 1 is sleeved on the connection seat 302.

[0025] As shown in FIG. 1, a mouthpiece 2 is further provided. The mouthpiece 2 is provided with a smoking hole 21. The mouthpiece 2 is disposed at the upper end of the connection seat 302, and the mouthpiece 2 is detachably connected to the connection seat 302. The smoking hole 21 is in communication with the smoke outlet hole 303. In this embodiment, the mouthpiece 2 is screwed with the connection seat 302.

[0026] In this embodiment, the mouthpiece 2 is screwed to the upper end of the connection seat 302, and the lower end surface of the mouthpiece 2 is larger than the upper end surface of the connection seat 302, so that the lower end surface of the mouthpiece 2 forms a limiting step protruding out relative to the outer surface the connection seat 302. When the liquid injection cover 1 is sleeved on the outer surface of the connection seat 302, the upper end of the liquid injection cover 1 abuts against the limiting step (i.e., the lower end surface of the mouthpiece 2) to form a limiting position.

[0027] As shown in FIG. 1 and FIG. 2, the upper cover 301 is provided with an air outlet tube 4. The air outlet tube 4 penetrates the upper and lower ends of the upper cover 301. The upper end of the upper cover 301 is provided with a sliding groove 32 on both sides of the air outlet tube 4. The sliding groove 32 is formed by a 7-shaped connecting piece protruding from the upper end of the upper cover 301.

[0028] A slider 23 is provided at the lower end of the connection seat 302. The liquid injection cover 1 covers the upper end of the upper cover 301, and the slider 23 at the lower end of the connection seat 302 is received in the sliding groove 32 and can slide along the sliding groove 32, so that the liquid injection cover 1 can slide on the upper end of the upper cover assembly 3. When the slider 23 slides along the sliding groove 32, the liquid injection cover 1 slides together with the connection seat 302, so that the liquid injection cover 1 covers the liquid injection hole 33 or slides out from the position of covering the liquid injection hole 33 to expose the liquid injection hole 33. When the liquid injection cover 1 covers the liquid injection hole 33, the air outlet tube 4 is in communication with the smoke outlet hole 303 of the connection seat 302.

[0029] As shown in FIG. 1 and FIG. 2, in this embodiment, the upper cover assembly 3 is provided with a locking structure 10, and the liquid injection cover 1 is provided with a locking groove 13. The locking structure 10 includes a mounting groove 31 provided in the upper cover assembly 3 (upper cover 301), and a locking member 9 and an elastic member 8 received in the mounting groove 31. The mounting groove 31 is provided with an upper opening 311 and a side opening 312. The locking member 9 is provided with a locking arm 91. The elastic member 8 is arranged at the inner end of the mounting groove 31, the locking member 9 and the elastic member 8 are received in the mounting groove 31 in series, the locking member 9 and the elastic member 8 abut against each other, the locking member 9 extends from the side opening 312 to an outside of the atomizer, and the locking arm 91 is exposed through the upper opening 311, so that the locking arm 9 is restricted in the mounting groove 31. The elastic member 8 may be a spring, an elastic sheet, or the like.

[0030] As shown in FIG. 3, the liquid injection cover 1 is provided with an accommodating groove 14. The sliding groove 32 and the slider 23 are received in the accommodating groove 14. At this time, the lower end surface of the liquid injection cover 1 abuts against the upper end surface of the upper cover assembly 3 so as to cover the liquid injection hole 33.

[0031] In one embodiment, referring to FIG. 1, a limiting groove 92 is provided inside the locking member 9, and one end of the elastic member 8 near the locking member 9 is received in the limiting groove 92. When the locking structure 10 is installed, the elastic member 8 is first placed in the limiting groove 92, and then the locking member 9 is installed in the mounting groove 31, which is convenient for installation. After the installation is completed, one end of the elastic member 8 is always received in the limiting groove 92 to prevent the elastic member 8 from being bent or dislocated.

[0032] As shown in FIG. 4, the atomizer further includes a base assembly 6 and a liquid storage tube 5. The upper

end of the liquid storage tube 5 abuts against the upper cover assembly 3, and the lower end of the liquid storage tube 5 abuts against the base assembly 6. An atomizing head 7 is located in the liquid storage tube 5.

[0033] The atomizing head 7 is provided on the base assembly 6, and the atomizing head 7 is provided with an atomizing liquid inlet hole 71 for the e-liquid in the liquid storage tube 5 to enter the atomizing head 7. The upper end of the atomizing head 7 is provided with an atomizing air outlet hole 72, the upper end of the atomizing head 7 is connected to the air outlet tube 4, and the atomizing air outlet hole 72 is in communication with the air outlet tube 4.

[0034] The atomizing air outlet hole 72, the air outlet tube 4 and the smoke outlet hole 303 form a smoke outlet passage for the smoke generated by the atomizing head 7 to flow out. The user can inhale the smoke from the smoke outlet passage through the smoking hole 21 in the mouthpiece 2.

[0035] In summary, in the atomizer and the electronic cigarette of the present invention, the liquid injection cover 1 exposes or covers the liquid injection hole 33 through a sliding manner, and the liquid injection cover 1 and the upper cover assembly 3 are respectively provided with the locking groove 13 and the locking structure 10. When the locking structure 10 is locked into the locking groove 13, the liquid injection cover 1 is restricted and cannot slide. Therefore, the atomizer and the electronic cigarette of the present invention cannot easily open the liquid injection hole 33 by the children, thereby preventing the children from contacting the e-liquid and making it safer to use.

[0036] As long as it does not violate the basic idea of the present invention, any combination of the various embodiments of the present invention should be regarded as the disclosure of the present invention. Within the scope of the technical concept of the present invention, a variety of simple modifications of the technical solution and any combination of different embodiments that does not violate the idea of the present invention shall fall within the protection scope of the present invention.

Claims

1. An atomizer, wherein the atomizer comprises an upper cover assembly (3) and a liquid injection cover (1), the upper cover assembly (3) is provided with a liquid injection hole (33), the liquid injection cover (1) is provided at one end of the upper cover assembly (3) and covers the liquid injection hole (33), the upper cover assembly (3) is provided with a locking structure (10), and the liquid injection cover (1) is provided with a locking groove (13), or the upper cover assembly (3) is provided with a locking groove (13), and the liquid injection cover (1) is provided with a locking structure (10), when the locking structure (10) is locked in the locking groove (13), the liquid injection cover (1) is limited at a position for covering the liquid injection hole (33), and when the locking structure (10) moves out of the locking groove (13), the liquid injection cover (1) is able to slide to expose the liquid injection hole (33).

2. The atomizer according to claim **1,** wherein the upper cover assembly (3) comprises an upper cover (301) and a connection seat (302), the liquid injection cover (1) is sleeved on the connection seat (302), a slider (23) is provided on the connection seat (302), a sliding groove (32) is provided in the upper cover (301), the slider (23) is received in the sliding groove (32) and can slide along the sliding groove (32).

3. The atomizer according to claim **1,** wherein the locking structure (10) comprises a mounting groove (31) provided in the upper cover assembly (3), and a locking member (9) and an elastic member (8) received in the mounting groove (31), the mounting groove (31) is provided with an upper opening (311) and a side opening (312), the locking member (9) is provided with a locking arm (91), the elastic member (8) is arranged at the inner end of the mounting groove (31), the locking member (9) and the elastic member (8) are received in the mounting groove (31) in series, the locking member (9) and the elastic member (8) abut against each other, the locking member (9) extends from the side opening (312) to an outside of the atomizer, and the locking arm (91) is exposed through the upper opening (311).

4. The atomizer according to claim **2,** wherein the liquid injection cover (1) is provided with an accommodating groove (14), and the sliding groove (32) and the slider (23) are received in the accommodating groove (14).

5. The atomizer according to claim **3,** wherein a limiting groove (92) is provided inside the locking member (9), and one end of the elastic member (8) near the locking member (9) is received in the limiting groove (92).

6. The atomizer according to claim **2,** wherein the upper cover (301) is provided with an air outlet tube (4), the connection seat (302) is provided with a smoke outlet hole (303), the air outlet tube (4) penetrates the upper and lower ends of the upper cover (301), and the upper end of the air outlet tube (4) is in communication with the smoke outlet hole (303) of the connection seat (302).

7. The atomizer according to claim **6,** wherein the atomizer further comprises a base assembly (6) and a liquid storage tube (5), the upper end of the liquid storage tube (5) abuts against the upper cover assembly (3), and the lower end of the liquid storage tube (5) abuts against the base assembly (6).

8. The atomizer according to claim **7,** wherein the atomizer further comprises an atomizing head (7), the atomizing head (7) is provided on the base assembly (6), the atomizing head (7) is located in the liquid storage tube (5), the atomizing head (7) is provided with an atomizing liquid inlet hole (71), the upper end of the atomizing head (7) is provided with an atomizing air outlet hole (72), the upper end of the atomizing head (7) is connected to the air outlet tube (4), and the atomizing air outlet hole (72) is in communication with the air outlet tube (4).

9. The atomizer according to claim **6,** wherein the atomizer further comprises a mouthpiece (2), the mouthpiece (2) is detachably connected to the connection seat (302), the mouthpiece (2) is provided with a smoking hole (21), and the smoking hole (21) is in communication with the smoke outlet hole (303).

10. An electronic cigarette, comprising the atomizer according to any one of claims **1** to **9.**

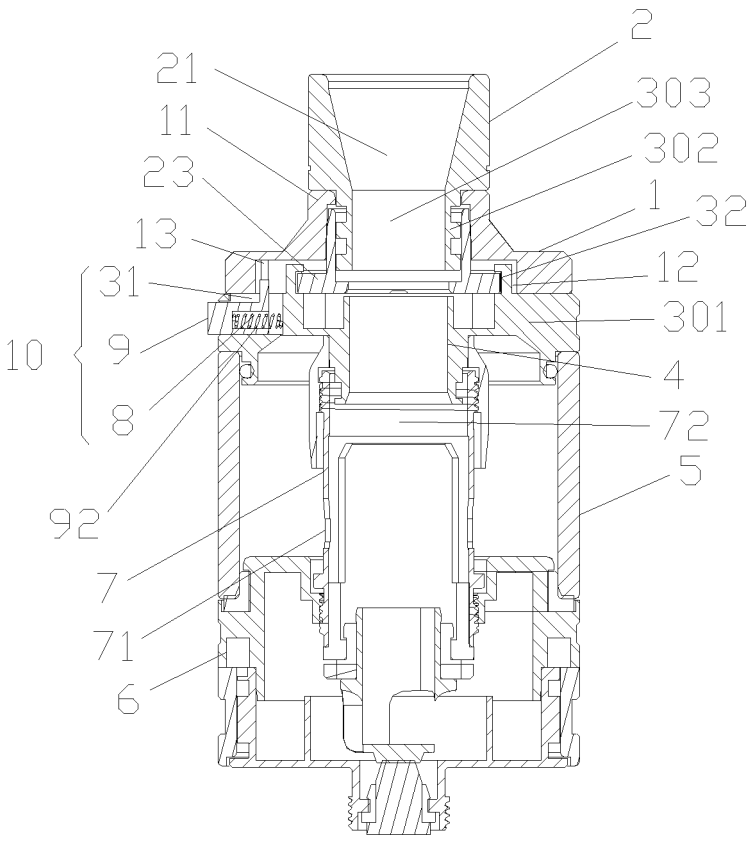

FIG. 1

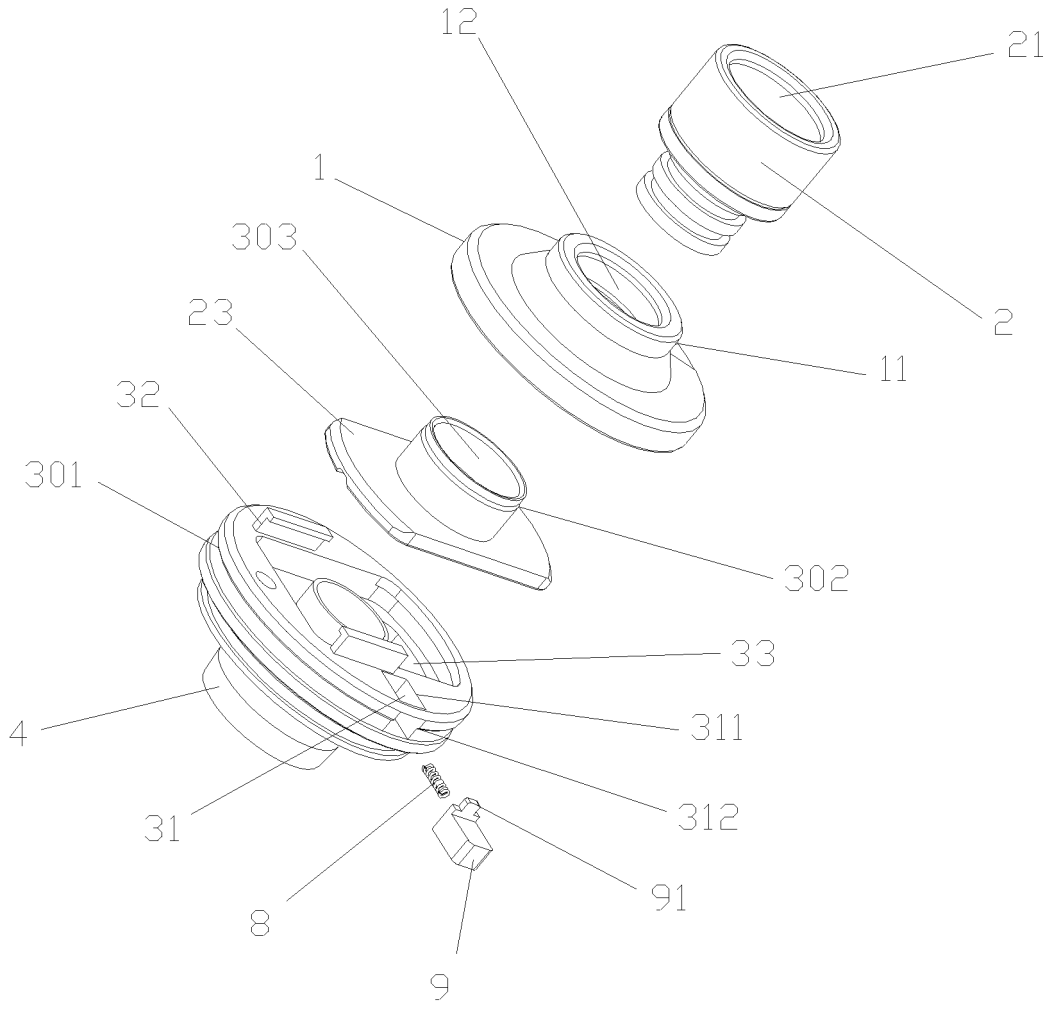

FIG. 2

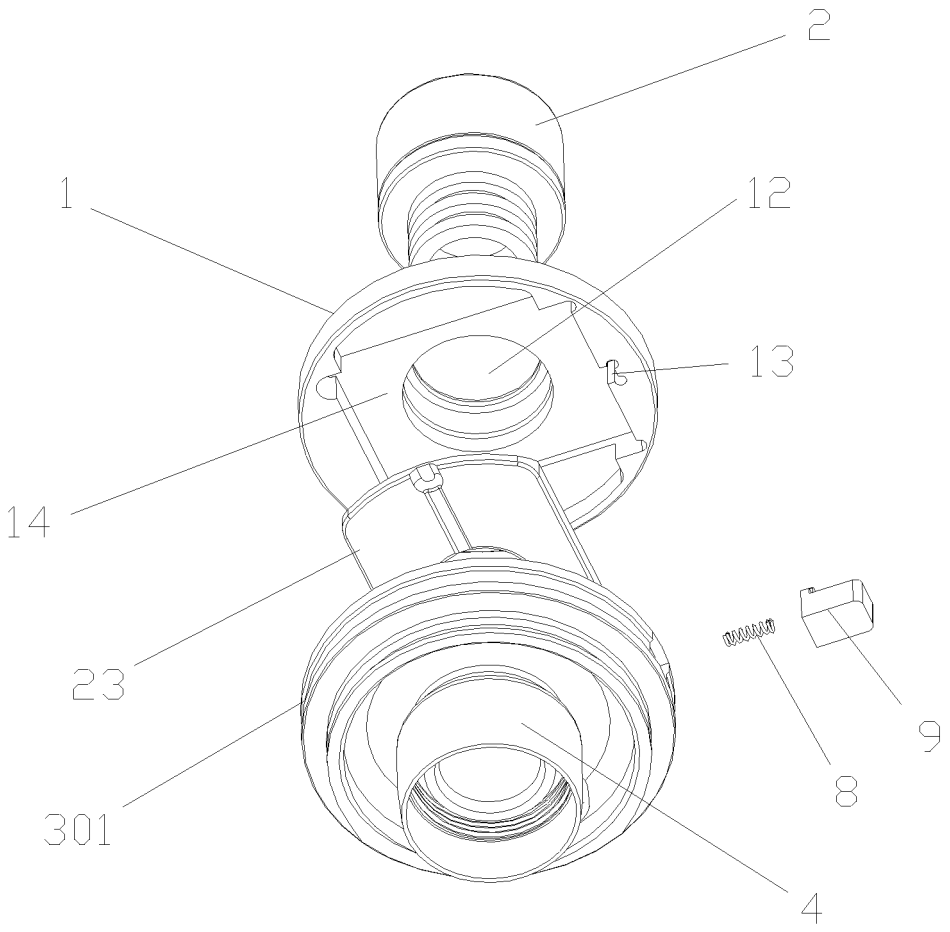

FIG. 3

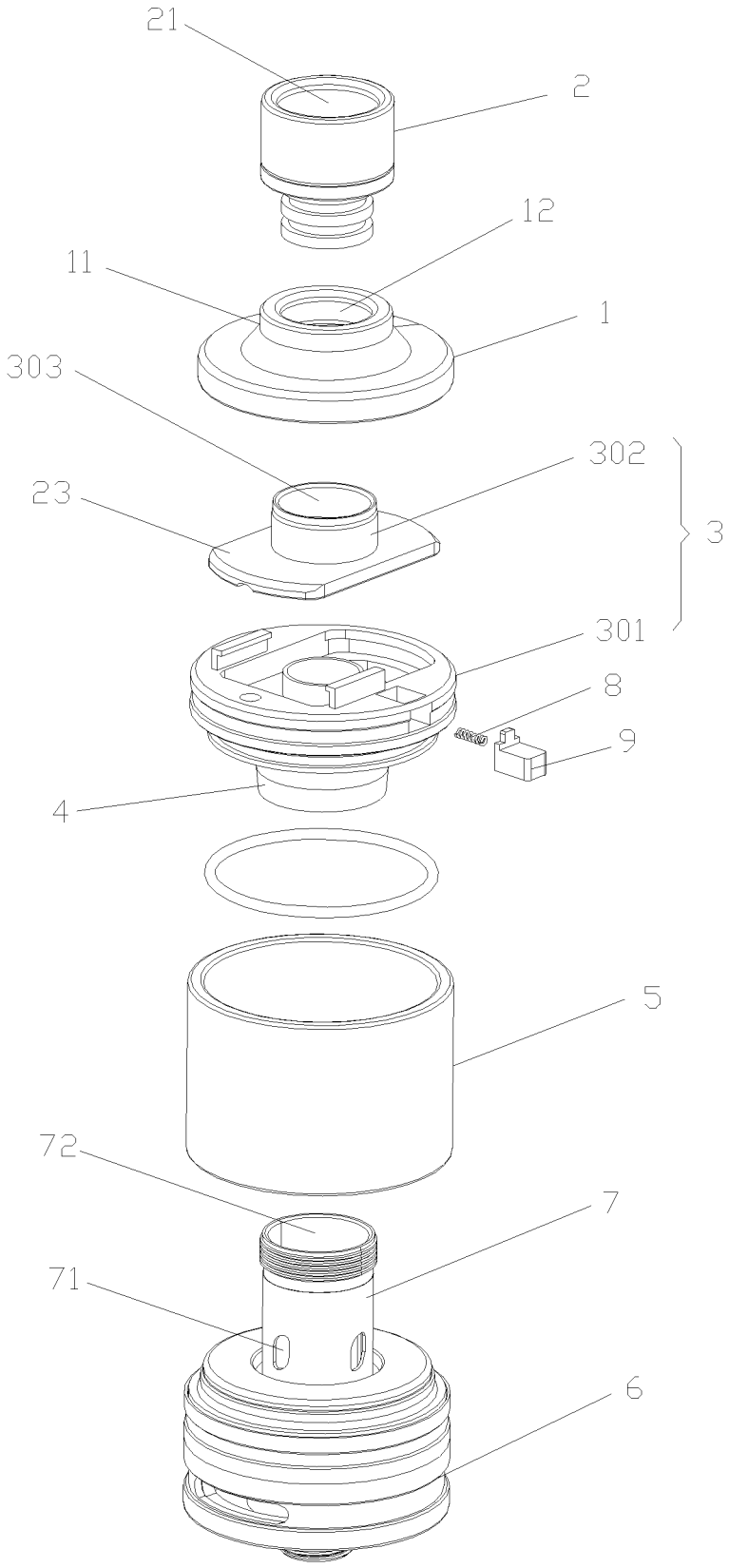

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/115599

A. CLASSIFICATION OF SUBJECT MATTER

A24F 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)

A24F

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)

CNPAT, CNKI, EPODOC, WPI: 常州市派腾电子技术服务有限公司, 电子烟, 雾化器, 锁, 安全, 儿童, 盖, 槽, 滑动, 连接, 弹性, 弹簧, 底座, 雾化头, 储液, 注液, atomiz+, elastic, spring, liquid, seal+, cigarette, electronic, lock, safe+, child, sliding, base

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 207821089 U (CHANGZHOU PATENT ELECTRONIC TECHNOLOGY CO., LTD.) 07 September 2018 (2018-09-07) description, paragraphs [0026]-[0040], and figures 1-4	1-10
X	CN 206507314 U (JOYETECH EUROPE HOLDING GMBH) 22 September 2017 (2017-09-22) description, paragraphs [0034]-[0051], and figures 1-14	1-10
A	CN 206423570 U (CHANGZHOU PATENT ELECTRONIC TECHNOLOGY CO., LTD.) 22 August 2017 (2017-08-22) entire document	1-10
A	CN 206659106 U (CHANGZHOU PATENT ELECTRONIC TECHNOLOGY CO., LTD.) 24 November 2017 (2017-11-24) entire document	1-10
A	CN 105520196 A (JOYETECH EUROPE HOLDING GMBH) 27 April 2016 (2016-04-27) entire document	1-10
A	CN 206284395 U (JOYETECH EUROPE HOLDING GMBH) 30 June 2017 (2017-06-30) entire document	1-10

☑ 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
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"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
16 January 2019	**14 February 2019**
Name and mailing address of the ISA/CN **National Intellectual Property Administration, PRC (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/115599

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 205962843 U (SHENZHEN INNOKIN TECHNOLOGY CO., LTD.) 22 February 2017 (2017-02-22) entire document	1-10
A	CN 106923381 A (SHENZHEN HANGSEN STAR TECHNOLOGY CO., LTD.) 07 July 2017 (2017-07-07) entire document	1-10
A	CN 206472853 U (SHENZHEN UWELL TECHNOLOGY CO., LTD.) 08 September 2017 (2017-09-08) entire document	1-10
A	US 2014182612 A1 (SHENZHEN SMOORE TECHNOLOGY LTD.) 03 July 2014 (2014-07-03) entire document	1-10

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2018/115599

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	207821089	U	07 September 2018	DE	202018102898	U1	12 July 2018
CN	206507314	U	22 September 2017		None		
CN	206423570	U	22 August 2017	WO	2018113278	A1	28 June 2018
CN	206659106	U	24 November 2017		None		
CN	105520196	A	27 April 2016	KR	20180081620	A	16 July 2018
				US	2018310628	A1	01 November 2018
				DE	212017000046	U1	06 September 2018
				EP	3406146	A1	28 November 2018
				US	2018271174	A1	27 September 2018
				WO	2017124957	A1	27 July 2017
CN	206284395	U	30 June 2017	WO	2018086443	A1	17 May 2018
CN	205962843	U	22 February 2017		None		
CN	106923381	A	07 July 2017		None		
CN	206472853	U	08 September 2017	WO	2018153086	A1	30 August 2018
US	2014182612	A1	03 July 2014		None		

Form PCT/ISA/210 (patent family annex) (January 2015)