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(54) **ATOMIZER**

(57) An atomizer includes a housing including an e-liquid chamber. The e-liquid chamber is equipped with an e-liquid injection member. The e-liquid injection member includes at least one first e-liquid inlet. The e-liquid injection member is movable between a first position and a second position; in the first position, the at least one first e-liquid inlet communicates with the e-liquid chamber; and in the second position, the at least one first e-liquid inlet is not in communication with the e-liquid chamber.

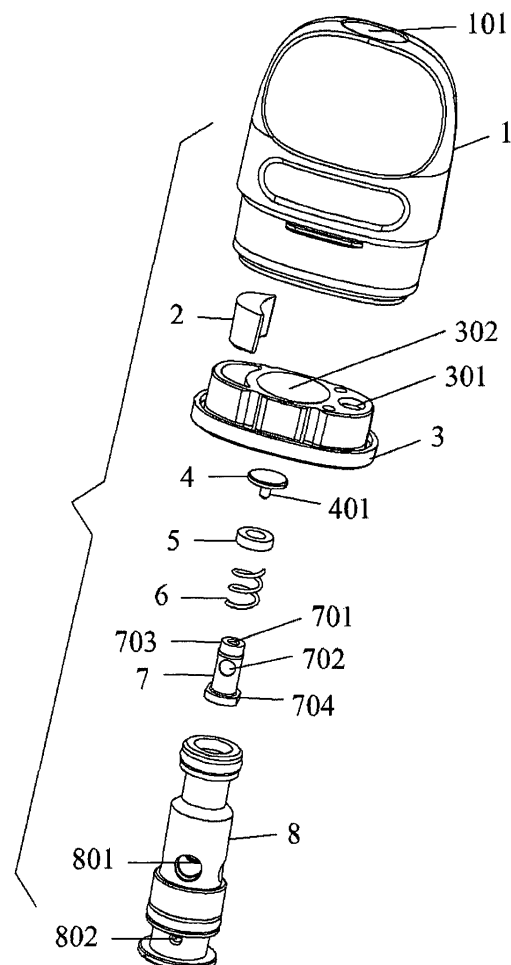


FIG. 1

Description

[0001] The disclosure relates to an atomizer.

[0002] Conventionally, the e-liquid inlet of an atomizer is blocked by a rubber plug. When the atomizer needs refilling with e-liquid, the rubber plug is pulled out. The pulled rubber plug tends to be missing. In addition, after the refilling, the e-liquid inlet is blocked by the rubber plug again. However, the pulled rubber plug is loose and fails to seal the e-liquid inlet, and thus the e-liquid leaks out.

[0003] An atomizer comprises a housing comprising an e-liquid chamber, the e-liquid chamber is equipped with an e-liquid injection member; the e-liquid injection member comprises at least one first e-liquid inlet; the e-liquid injection member is movable between a first position and a second position; in the first position, the at least one first e-liquid inlet communicates with the e-liquid chamber; and in the second position, the at least one first e-liquid inlet is not in communication with the e-liquid chamber.

[0004] In a class of this embodiment, the housing further comprises a first e-liquid channel communicating with the e-liquid chamber; the e-liquid injection member is disposed into the first e-liquid channel and is movable in the first e-liquid channel; the e-liquid injection member further comprises a proximal end toward the e-liquid chamber.

[0005] In a class of this embodiment, the e-liquid injection member comprises a second e-liquid channel communicating with the at least one first e-liquid inlet; and the proximal end of the e-liquid injection member is sealed.

[0006] In a class of this embodiment, the first e-liquid channel comprises an inner wall comprising a first flange; the e-liquid injection member comprises an outer wall comprising a second flange; the atomizer further comprises an elastic member disposed around the e-liquid injection member; a top portion and a bottom portion of the elastic member abut against the first flange and the second flange, respectively; a channel is formed between the inner wall of the first e-liquid channel and the outer wall of the e-liquid injection member; and/or the at least one first e-liquid inlet extends into the e-liquid chamber.

[0007] In a class of this embodiment, in the first position, at least a part of the at least one first e-liquid inlet moves into the e-liquid chamber when the elastic member is compressed by the e-liquid injection member; or in the first position, the at least one first e-liquid inlet is not in the e-liquid chamber when the elastic member is compressed by the e-liquid injection member, the at least one first e-liquid inlet communicates with the e-liquid chamber through the channel.

[0008] In a class of this embodiment, in the first position, at least a part of the at least one first e-liquid inlet moves into the e-liquid chamber.

[0009] In a class of this embodiment, the outer wall of the e-liquid injection member comprises a male thread and the inner wall of the first e-liquid channel comprises

a female thread; the e-liquid injection member is secured within the first e-liquid channel through the cooperation of the male thread and the female thread; and the e-liquid injection member is movable between the first position and the second position when the male thread moves with respect to the female thread.

[0010] In a class of this embodiment, one of the outer wall of the e-liquid injection member and the inner wall of the first e-liquid channel comprises a female buckle, and the other comprises a male buckle fitted to the female buckle.

[0011] In a class of this embodiment, the proximal end of the e-liquid injection member is concave to form a narrow-necked portion; the atomizer further comprises a seal ring sleeving the narrow-necked portion; the atomizer further comprises a plug disposed in a top part of the narrow-necked portion; when the e-liquid injection member is moved to the second position, the channel is sealed by the seal ring.

[0012] In a class of this embodiment, the plug comprises a cap and a column; one end of the column is connected to the cap and the other end of the column is disposed into the second e-liquid channel; the seal ring is fixedly disposed between the cap and an upper opening of the second e-liquid channel.

[0013] In a class of this embodiment, the at least one first e-liquid inlet is in the shape of a cone with a wider outside opening and a narrow inside opening at both ends.

[0014] In a class of this embodiment, the atomizer further comprises a sealing member disposed in one end of the housing; and the first e-liquid channel is disposed in the sealing member.

[0015] In a class of this embodiment, the sealing member comprises a through hole; the atomizer further comprises an atomizing core disposed into the through hole; the atomizing core comprises a heating chamber; the atomizer further comprises a heating element disposed in the heating chamber; the heating core comprises an outer wall comprising at least one second e-liquid inlet and at least one air inlet; the at least one second e-liquid inlet corresponds to the position of the e-liquid chamber; one end of the atomizing core is disposed through the through hole into the e-liquid chamber; the at least one air inlet is exposed outside the through hole and communicates with the heating chamber.

[0016] In a class of this embodiment, the housing comprises an opening and side walls surrounding the opening; the side walls extend internally to form an air duct for air conduction and smoke emission; the atomizing core is disposed through the through hole and extends into the e-liquid chamber to communicate with the air duct.

[0017] The following advantages are associated with the atomizer of the disclosure: the atomizer comprises the liquid injection member capable of being moved. The liquid injection member is configured to enter and exit the e-liquid chamber to ensure that the e-liquid chamber

is filled with the e-liquid and sealed, which simplifies the injection process for greater efficiency.

FIG. 1 is an exploded view of an atomizer according to one embodiment of the disclosure;

FIG. 2 is a perspective view of an atomizer according to one embodiment of the disclosure;

FIG. 3 is a cross-sectional view of an atomizer according to one embodiment of the disclosure;

FIG. 4 is a perspective view of a combination of a liquid injection member 7 and an elastic member according to one embodiment of the disclosure;

FIG. 5 is a cross-sectional view of a combination of a liquid injection member 7 and an elastic member according to one embodiment of the disclosure;

FIG. 6 is a perspective view of a liquid injection member 7 according to one embodiment of the disclosure; and

FIG. 7 is a cross-sectional view including arrows showing the direction of air flow in an atomizer according to one embodiment of the disclosure.

[0018] In the drawings, the following reference numbers are used: 1. Housing; 2. Supporting member; 3. Sealing member; 4. Plug; 5. Seal ring; 6. Elastic member; 7. Liquid injection member; 8. Atomizing core; 101. Mouthpiece; 102. E-liquid chamber; 103. Air duct; 301. First e-liquid channel; 302. Second through hole 302; 303. First flange; 400. Cap; 401. Column; 701. Second e-liquid channel; 702. Second e-liquid inlet; 703. Narrow-necked portion; 704. Second flange; 801. Second e-liquid inlet; 802. Air inlet; 803. Heating element; 804. Heating chamber.

[0019] Referring to FIGS. 1-3, an atomizer comprises a housing 1. The housing comprises an opening functioning as a mouthpiece 101. The mouthpiece 101 extends internally to form an air duct 103. An e-liquid chamber 102 is defined by an inner wall of the housing and an outer wall of the air duct 103.

[0020] The atomizer further comprises an e-liquid injection member 7 through which the e-liquid can flow into the e-liquid chamber 102. The e-liquid injection member 7 comprises at least one first e-liquid inlet 702. The e-liquid injection member 7 is movable to a first position in which the at least one first e-liquid inlet 702 enters the e-liquid chamber 102. The e-liquid injection member 7 is further movable to a second position in which the at least one first e-liquid inlet 702 exits the e-liquid chamber 102. The e-liquid injection member 7 is movable between the first position and the second position. Preferably, the e-liquid injection member 7 comprises two first e-liquid inlets 702, which provides a fast supply of the e-liquid and

prevents leakage of the e-liquid.

[0021] Referring to FIG. 6, the at least one first e-liquid inlet 702 is in the shape of a cone 700 with a wider outside opening and a narrow inside opening at both ends, thus preventing leakage of the e-liquid.

[0022] The housing further comprises a first e-liquid channel 301 communicating with the e-liquid chamber 102. The e-liquid injection member 7 is disposed in the first e-liquid channel 301 so as to move up and down the first e-liquid channel 301. The first e-liquid channel 301 is disposed along a horizontal, a vertical, or an oblique direction with respect to the atomizer.

[0023] In certain examples, the e-liquid chamber 102 and the first e-liquid channel 301 are disposed in the housing 1 and separated from each other. In certain examples, the first e-liquid channel 301 is formed in other components of the atomizer. In certain examples, the atomizer further comprises a sealing member 3 disposed in the e-liquid chamber 102. The first e-liquid channel 301 is disposed in the sealing member 3.

[0024] In certain examples, the e-liquid injection member 7 comprises a proximal end toward the e-liquid chamber 102. The first e-liquid channel 301 comprises an outlet communicating with the e-liquid chamber 102. As the e-liquid injection member 7 moves, the proximal end enters or exits the e-liquid chamber 102. When the e-liquid injection member 7 moves to the first position, the at least one first e-liquid inlet 702 extends into the e-liquid chamber 102. When the e-liquid injection member 7 moves to the second position, the at least one first e-liquid inlet 702 returns back to the first e-liquid channel 301.

[0025] In certain examples, a channel is formed between an inner wall of the first e-liquid channel 301 and an outer wall of the e-liquid injection member 7. The atomizer further comprises a seal ring 5 disposed around the proximal end of the e-liquid injection member 7. When the e-liquid injection member 7 is moved to the first position, the seal ring moves as well, thus communicating channel with the e-liquid chamber 102. The e-liquid flows through the at least one first e-liquid inlet 702 into the channel and enters the e-liquid chamber 102. After filling of the e-liquid chamber is complete, the e-liquid injection member 7 is moved back to the second position and the channel is sealed by the seal ring 5, thus separating the at least one first e-liquid inlet 702 and the e-liquid chamber 102 from each other.

[0026] In certain examples, the e-liquid chamber 102 and the first e-liquid channel 301 are separated by a partition and disposed in parallel. One side of the partition functions as an inner wall of the e-liquid chamber 102 and the other side of the partition functions as the inner wall of the first e-liquid channel 301. The partition comprises one first through hole. When the e-liquid injection member 7 is moved to the first position, the at least one first e-liquid inlet 702 corresponds to the position of the first through hole, thus communicating the at least one first e-liquid inlet 702 with the e-liquid chamber 102. After filling of the e-liquid chamber is complete, the e-liquid

injection member 7 is moved to the second position to ensure that the at least one first e-liquid inlet 702 is sealed by the inner wall of the first e-liquid channel 301.

[0027] The e-liquid injection member 7 further comprises a second e-liquid channel 701 communicating with the at least one first e-liquid inlet 702. The proximal end of the e-liquid injection member 7 is sealed. The e-liquid flows through the second e-liquid channel 701 into the at least one first e-liquid inlet 702 and enters the e-liquid chamber 102.

[0028] The proximal end of the e-liquid injection member 7 is concave to form a narrow-necked portion 703. The seal ring 5 is sleeving the narrow-necked portion 703. The atomizer further comprises a plug 4 disposed in a top part of the narrow-necked portion 703. When the e-liquid injection member 7 is moved back to the first e-liquid channel 301, the seal ring 5 abuts against an upper opening of the second e-liquid channel 701 to ensure that the first e-liquid channel 301 is sealed, thus preventing the e-liquid from flowing out of the atomizer.

[0029] Referring to FIG. 5, the plug 4 comprises a cap 400 and a column 401 formed integrally with the cap 400. One end of the column 401 is connected to the cap 400 and the other end of the column 401 is disposed into the second e-liquid channel 701. The seal ring 5 is fixedly disposed between the cap 400 and the upper opening of the second e-liquid channel 701.

[0030] In certain examples, the first e-liquid channel 301 is disposed in the sealing member 3. In certain examples, the first e-liquid channel 301 is disposed in the housing 1; specifically, the housing 1 comprises an e-liquid injection tube disposed internally and functioning as the first e-liquid channel 301.

[0031] The sealing member 3 comprises a second through hole 302. The atomizer further comprises an atomizing core 8 disposed into the second through hole 302. The atomizing core 8 comprises a heating chamber 804. The atomizer further comprises a heating element 803 disposed in the heating chamber 804. The heating core 8 comprises an outer wall comprising at least one second e-liquid inlet 801 and at least one air inlet 802. The at least one second e-liquid inlet 801 corresponds with the position of the e-liquid chamber 102. One end of the atomizing core 8 is disposed through the second through hole 302 into the e-liquid chamber 102 to communicate with the air duct 103. The at least one air inlet 802 is exposed outside the second through hole 302. The at least one second e-liquid inlet 801 communicates with the heating chamber 804. External air flows through the at least one air inlet 802 into the heating chamber 804, causing the heating element 803 to atomize the e-liquid. The smoke generated flows through the air duct 103 and the mouthpiece 101 successively and is inhaled by a user.

Example 1

[0032] Referring to FIGS. 1-6, the atomizer comprises

a housing 1, a supporting member 2, a sealing member 3, a plug 4, a seal ring 5, an elastic member 6, an e-liquid injection member 7, and an atomizing core 8. The housing 1 comprises an e-liquid chamber 102 configured to store e-liquid. The e-liquid injection member 7 comprises an outer wall comprising two first e-liquid inlets 702. The housing comprises an opening functioning as a mouthpiece 101. The sealing member 3 is disposed in a bottom part of the housing 1 so as to seal the e-liquid chamber 102. The sealing member 3 comprises a first e-liquid channel 301 and a second through hole 302. The atomizing core 8 is disposed through the second through hole 302 and extends into the heating chamber 804. The e-liquid injection member 7 is disposed into the first e-liquid channel 301. The first e-liquid channel 301 communicates with the e-liquid chamber 102 and the two first e-liquid inlets 702 so that the e-liquid can flow through the two first e-liquid inlets 702 into the first e-liquid channel 301 and enters the e-liquid chamber 102. The sealing member 3 comprises a top part recessed to form a concave portion. The supporting member 2 is disposed in the concave portion so as to prevent deformation of the sealing member 3 during injection molding. The first e-liquid channel 301 comprises an inner wall comprising a first flange 303. The first flange 303 is configured to support and prevent changes in the position of a top portion of the elastic member 6. The elastic member 6 is in the form of a spring or an elastic piece and is disposed around the e-liquid injection member 7. An upper portion of the e-liquid injection member 7 is concave to form a narrow-necked portion 703. The seal ring 5 is sleeving the narrow-necked portion 703 to seal an upper opening of the second e-liquid channel 701. The narrow-necked portion 703 is disposed through the first flange 303. The e-liquid injection member 7 comprises a lower portion comprising a second flange 704 configured to limit changes in the position of a bottom portion of the elastic member 6. The e-liquid injection member 7 comprises a second e-liquid channel 701 communicating with the two first e-liquid inlets 702. The e-liquid is injected through the second e-liquid channel 701 into the two first e-liquid inlets 702 and enters the e-liquid chamber 102. The top portion and the bottom portion of the elastic member 6 abut against the first flange 303 and the second flange 704, respectively. The first flange 303 and the second flange 704 are configured to limit changes in the position of the elastic member 6. The plug 4 comprises a cap 400 and a column 401 formed integrally with the cap 400. The plug 4 is disposed into the second e-liquid channel 701. The seal ring 5 is fixedly disposed between the cap 400 and the upper opening of the second e-liquid channel 701. A channel is formed between the inner wall of the first e-liquid channel 301 and the outer wall of the e-liquid injection member 7. The elastic member 6 is disposed in the channel.

[0033] When the e-liquid injection member 7 is pressed, the elastic member 6 deforms, causing the e-liquid injection member 7 to enter the e-liquid chamber 102. The seal ring 5 is separated from the upper opening

of the second e-liquid channel 701 so that the first e-liquid channel 301 communicate with the e-liquid chamber 102. The e-liquid flows through the second e-liquid channel 701, the two first e-liquid inlets 702, and the channel successively, and enters the e-liquid chamber 102. The housing 1 comprises an air duct 103 configured for air conduction and smoke emission. The mouthpiece 101 is configured to communicate with a top opening of the air duct 103 to ensure that the smoke can be inhaled by a user. An upper end of the atomizing core 8 is disposed through the second through hole 302 into the e-liquid chamber 102 to communicate with the air duct 103. A lower part is exposed outside the second through hole 302. The atomizing core 8 comprises a heating chamber 804. The atomizer further comprises a heating element 803 disposed in the heating chamber 804. The heating core 8 comprises an outer wall comprising four second e-liquid inlet 801 and one air inlet 802. The four second e-liquid inlet 801 are disposed in the e-liquid chamber 102 and the air inlet 802 is exposed outside the second through hole 302. The second e-liquid inlet 801 communicates with the heating chamber 804.

[0034] FIG. 7 is a cross-sectional view including arrows showing the direction of the air flow in the atomizer. External air flows through the air inlet 802 and enters the heating chamber 804, causing the heating element 803 to atomize the e-liquid. The smoke generated flows through the air duct 103 into the mouthpiece 101 and is inhaled by a user.

Example 2

[0035] A second example is similar to Example 1, except for the following specific differences: when the e-liquid injection member 7 is moved to the first position, the two first e-liquid inlets 702 enters the e-liquid chamber 102. When the e-liquid injection member 7 is moved to the second position, the two first e-liquid inlets 702 exits the e-liquid chamber 102 and sealed by the inner wall of the first e-liquid channel 301. The outer wall of the e-liquid injection member 7 comprises a male thread and the inner wall of the first e-liquid channel 301 comprises a female thread. The male thread is screwed to the female thread so that the e-liquid injection member 7 is disposed into the first e-liquid channel 301. The e-liquid injection member 7 is movable between the first position and the second position through threads. The liquid injection member 7 further comprises a handle. The handle is turned, causing the e-liquid injection member 7 to rotate. Or an inner wall of the second e-liquid channel 701 is knurled or frosted, thus increasing friction in the second e-liquid channel 701. The second e-liquid channel 701 can be rotated by a finger.

Example 3

[0036] A third example is similar to Example 2, except for the following specific differences: when the e-liquid

injection member 7 is moved to the first position, the two first e-liquid inlets 702 enters the e-liquid chamber 102. When the e-liquid injection member 7 is moved to the second position, the two first e-liquid inlets 702 exits the e-liquid chamber 102 and is sealed by the inner wall of the first e-liquid channel 301. The outer wall of the e-liquid injection member 7 comprises a female buckle. The inner wall of the first e-liquid channel 301 comprises a male buckle fitted to the female buckle. When the e-liquid injection member 7 is moved toward the e-liquid chamber 102, the male buckle is separated from the female buckle. When the e-liquid injection member 7 is moved back to the first e-liquid channel 301, the female buckle is fitted to the male buckle. The e-liquid injection member 7 further comprises a handle. The handle is turned, causing the e-liquid injection member 7 to rotate.

Claims

1. An atomizer, comprising a housing comprising an e-liquid chamber, the e-liquid chamber is equipped with an e-liquid injection member, wherein the e-liquid injection member comprises at least one first e-liquid inlet; the e-liquid injection member is movable between a first position and a second position; in the first position, the at least one first e-liquid inlet communicates with the e-liquid chamber; and in the second position, the at least one first e-liquid inlet is not in communication with the e-liquid chamber.
2. The atomizer of claim 1, wherein the housing further comprises a first e-liquid channel communicating with the e-liquid chamber; the e-liquid injection member is disposed into the first e-liquid channel and is movable in the first e-liquid channel; the e-liquid injection member further comprises a proximal end toward the e-liquid chamber.
3. The atomizer of claim 2, wherein the e-liquid injection member comprises a second e-liquid channel communicating with the at least one first e-liquid inlet; and the proximal end of the e-liquid injection member is sealed.
4. The atomizer of claim 2, wherein

the first e-liquid channel comprises an inner wall comprising a first flange; the e-liquid injection member comprises an outer wall comprising a second flange; the atomizer further comprises an elastic member disposed around the e-liquid injection member; a top portion and a bottom portion of the elastic member abut against the first flange and the second flange, respectively; and

a channel is formed between the inner wall of the first e-liquid channel and the outer wall of

the e-liquid injection member, the is disposed in the channel.

5. The atomizer of claim 4, wherein in the first position, at least a part of the at least one first e-liquid inlet moves into the e-liquid chamber when the elastic member is compressed by the e-liquid injection member; or in the first position, the at least one first e-liquid inlet is not in the e-liquid chamber when the elastic member is compressed by the e-liquid injection member, the at least one first e-liquid inlet communicates with the e-liquid chamber through the channel. 5
6. The atomizer of claim 2, wherein in the first position, at least a part of the at least one first e-liquid inlet moves into the e-liquid chamber. 10
7. The atomizer of claim 6, wherein the outer wall of the e-liquid injection member comprises a male thread and the inner wall of the first e-liquid channel comprises a female thread; the e-liquid injection member is secured within the first e-liquid channel through the cooperation of the male thread and the female thread; and the e-liquid injection member is movable between the first position and the second position when the male thread moves with respect to the female thread. 20
8. The atomizer of claim 6, wherein one of the outer wall of the e-liquid injection member and the inner wall of the first e-liquid channel comprises a female buckle, and the other comprises a male buckle fitted to the female buckle. 25
9. The atomizer of claim 3, wherein the proximal end of the e-liquid injection member is concave to form a narrow-necked portion; the atomizer further comprises a seal ring sleeving the narrow-necked portion; the atomizer further comprises a plug disposed in a top part of the narrow-necked portion; when the e-liquid injection member is moved to the second position, the channel is sealed by the seal ring. 30
10. The atomizer of claim 9, wherein the plug comprises a cap and a column; one end of the column is connected to the cap and the other end of the column is disposed into the second e-liquid channel; the seal ring is fixedly disposed between the cap and an upper opening of the second e-liquid channel. 35
11. The atomizer of claim 1, wherein the at least one first e-liquid inlet is in the shape of a cone with a wider outside opening and a narrow inside opening at both ends. 40
12. The atomizer of claim 2, wherein the atomizer further comprises a sealing member disposed in one end 45

of the housing; and the first e-liquid channel is disposed in the sealing member.

13. The atomizer of claim 12, wherein the sealing member comprises a through hole; the atomizer further comprises an atomizing core; and one end of the atomizing core is disposed through the through hole and extends into the e-liquid chamber, and the other end of the atomizing core is exposed outside the through hole. 50
14. The atomizer of claim 13, wherein the atomizing core comprises a heating chamber; the atomizer further comprises a heating element disposed in the heating chamber, the heating core comprises an outer wall comprising at least one air inlet, the at least one air inlet is exposed outside the through hole and communicates with the heating chamber. 55
15. The atomizer of claim 13, wherein the outer wall further comprises at least one second e-liquid inlet, and the at least one second e-liquid inlet corresponds to the position of the e-liquid chamber.
16. The atomizer of claim 1, wherein the housing comprises an opening and side walls surrounding the opening; the side walls extend internally to form an air duct for air conduction and smoke emission; the atomizing core is disposed through the through hole and extends into the heating chamber to communicate with the air duct.

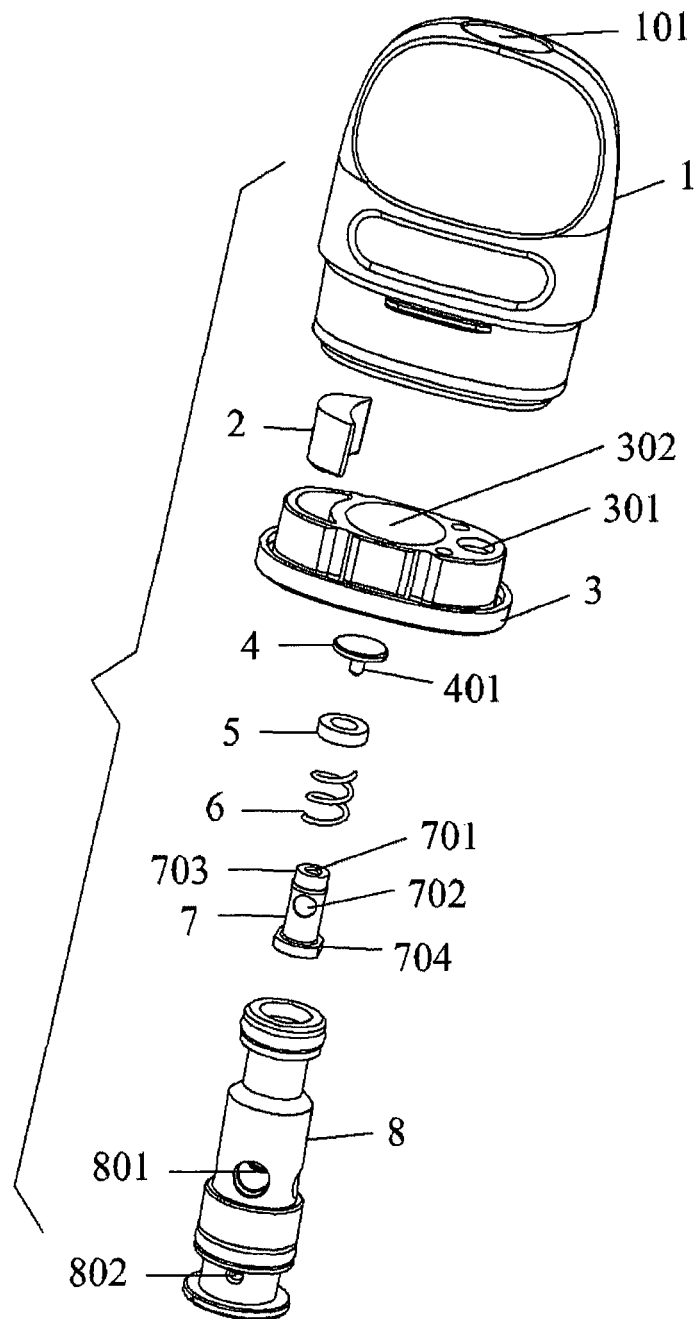


FIG. 1

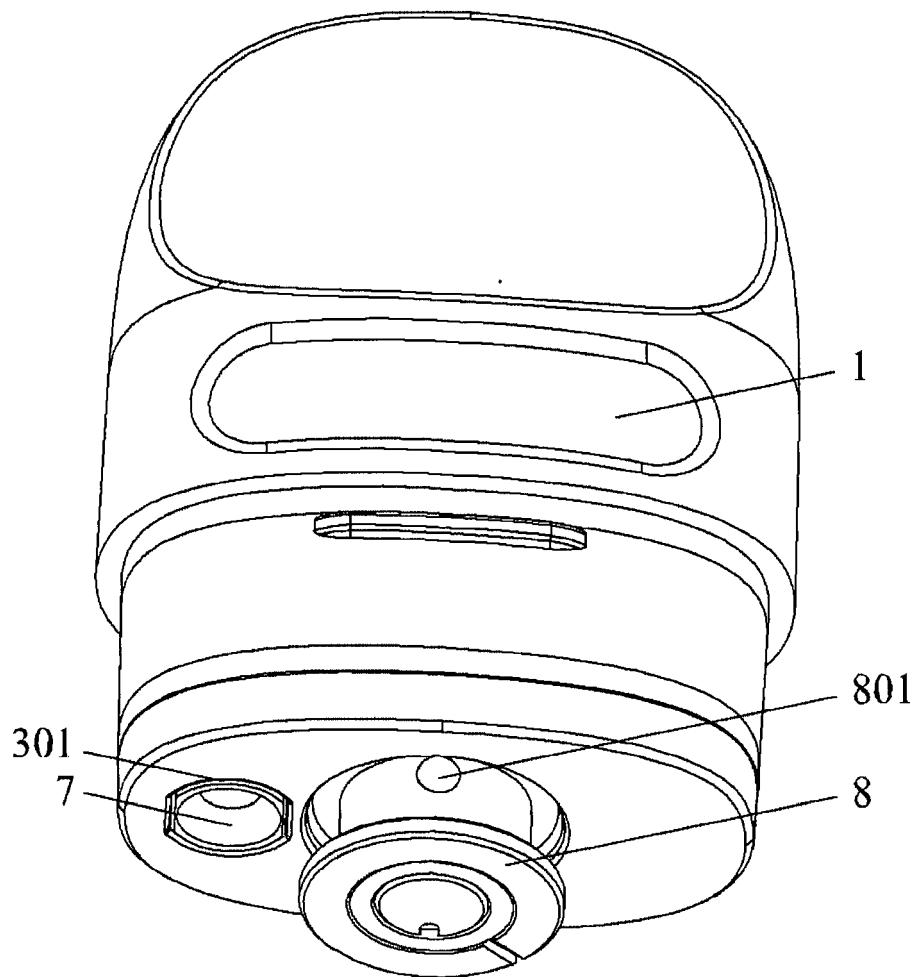


FIG. 2

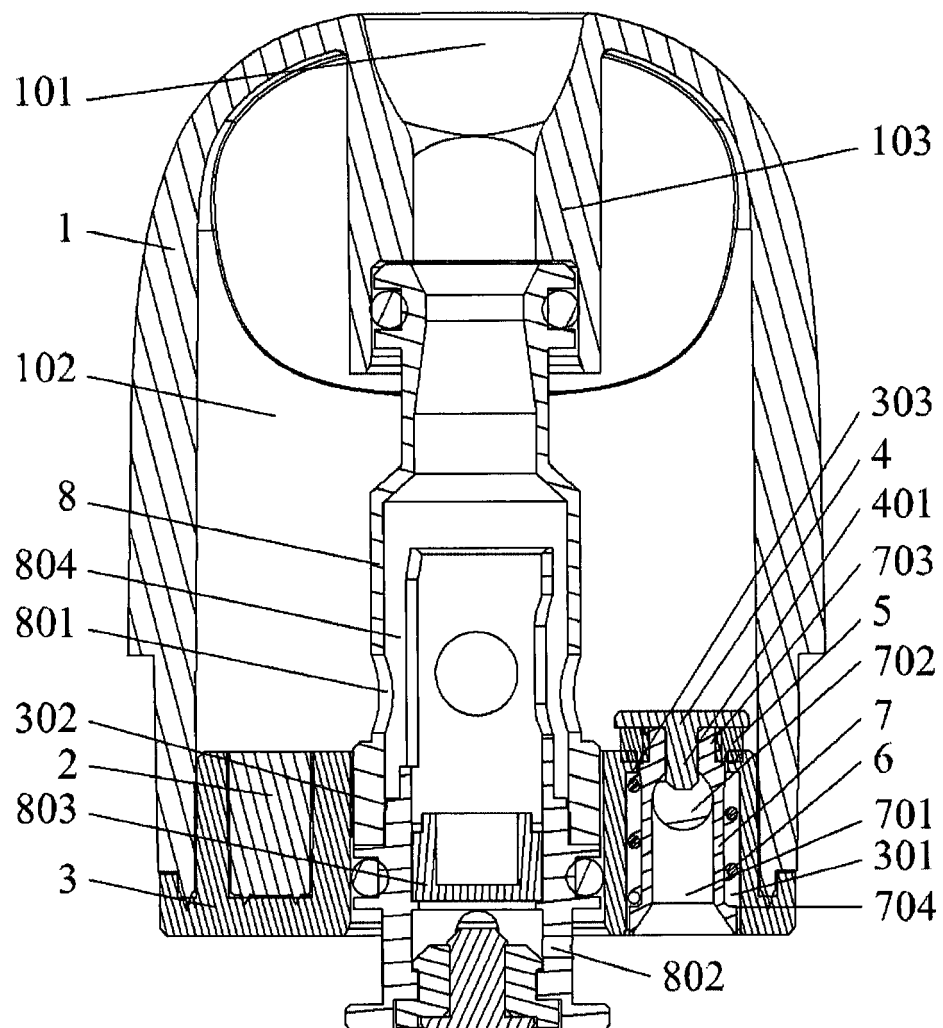


FIG. 3

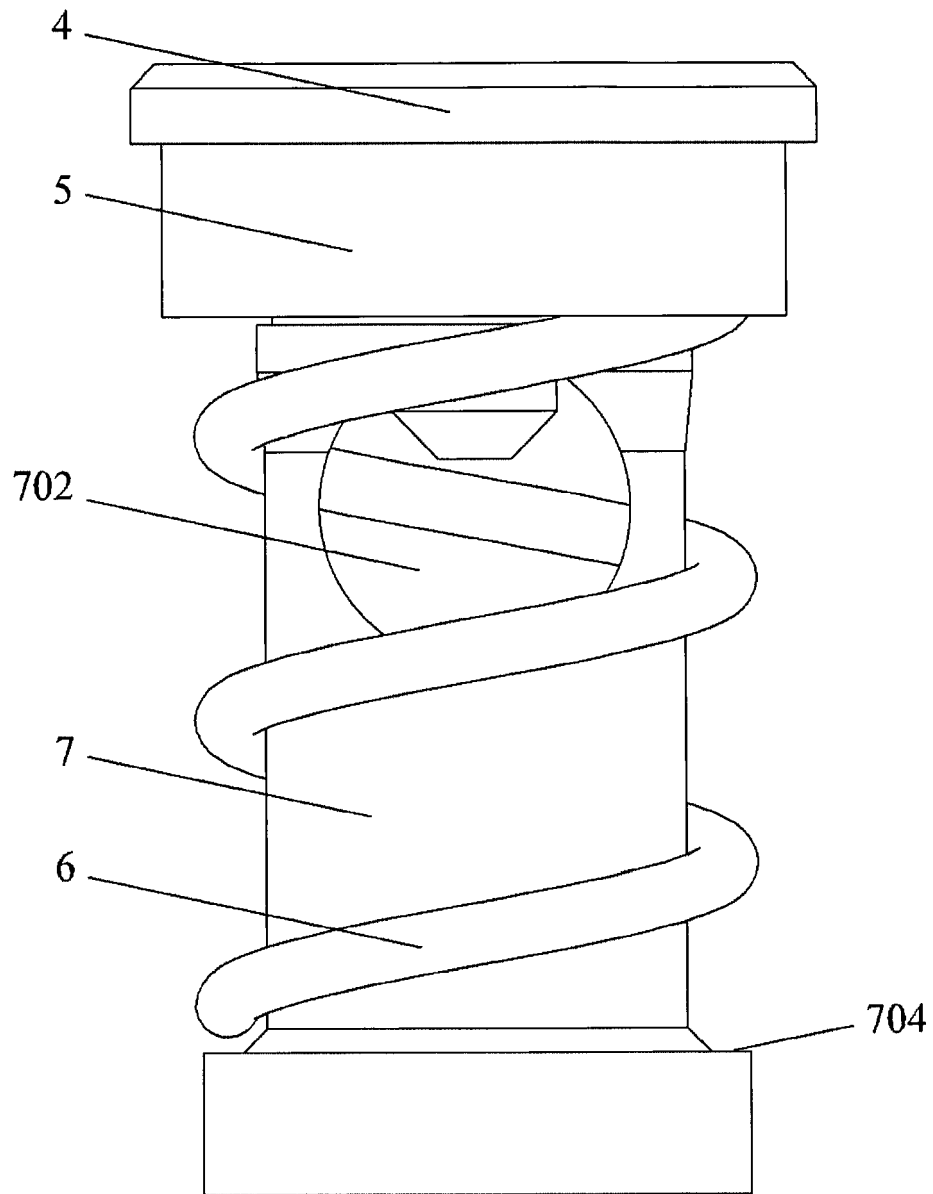


FIG. 4

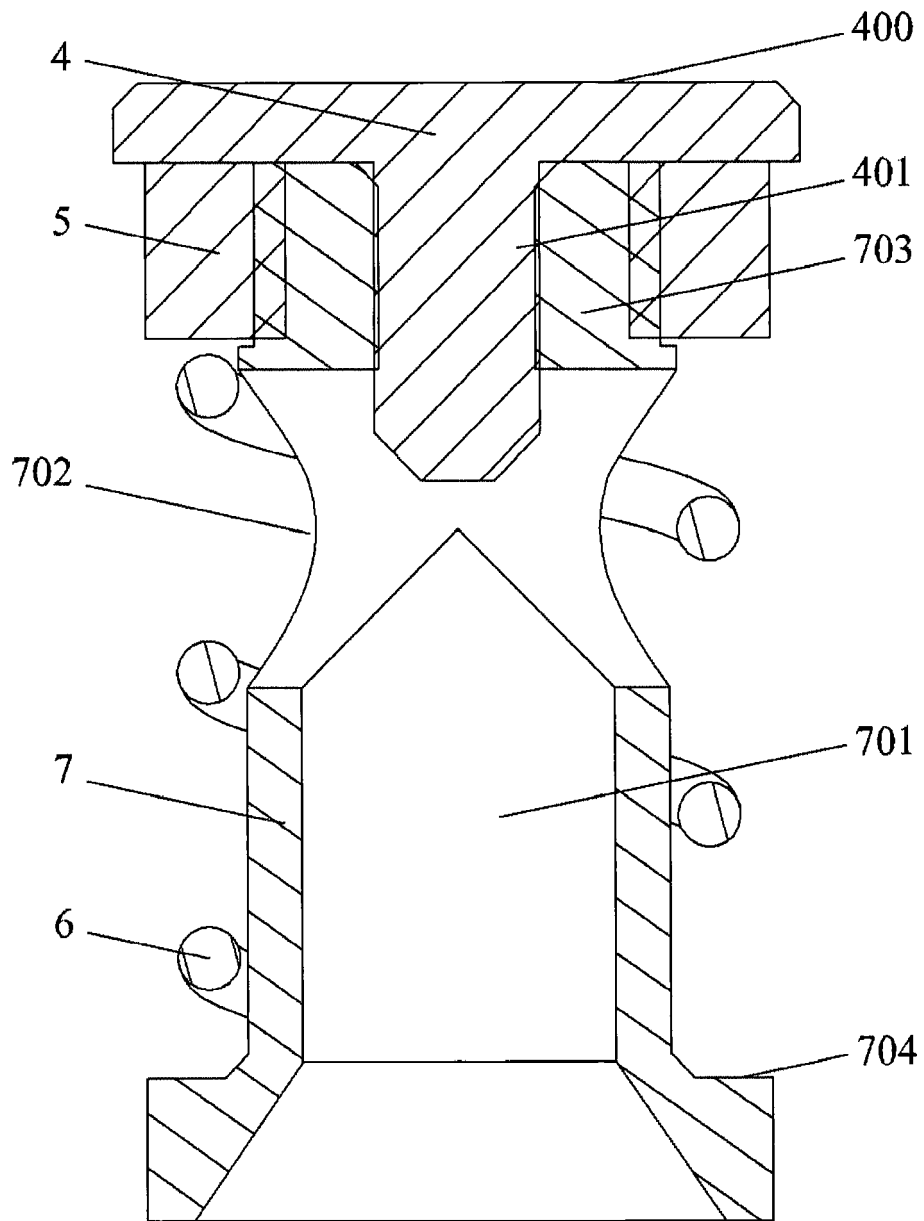


FIG. 5

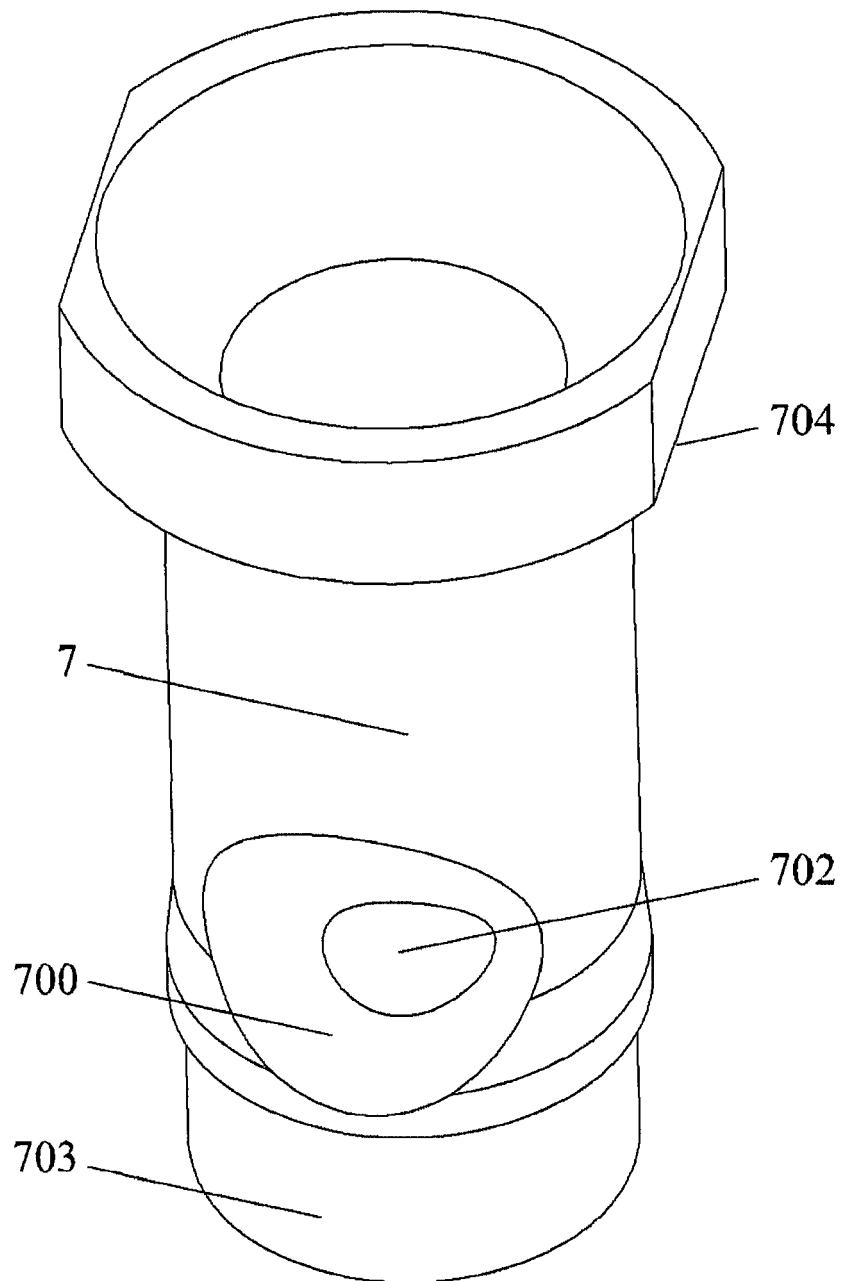


FIG. 6

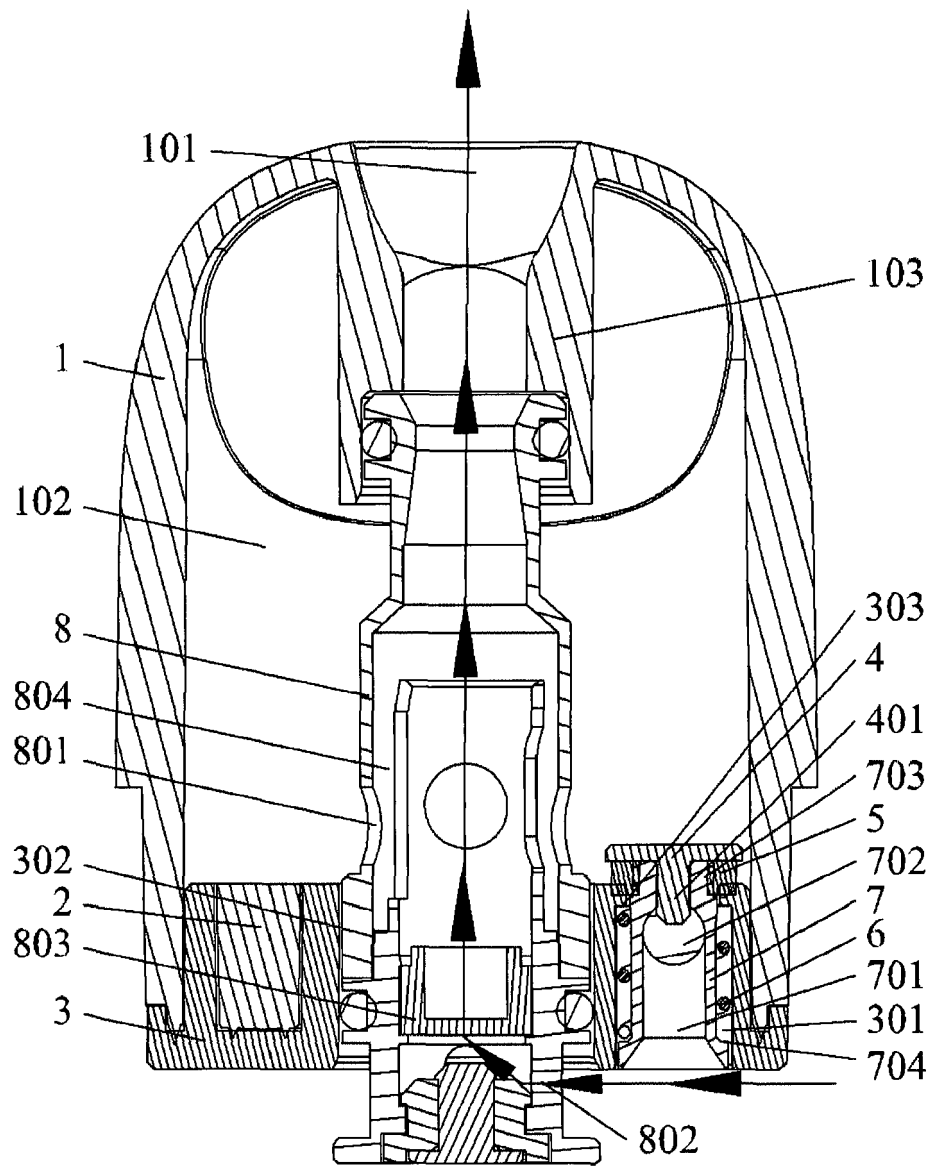


FIG. 7



EUROPEAN SEARCH REPORT

Application Number

EP 21 00 0348

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
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A	* page 12, line 8 - page 20, line 18; figures 1-8 *	7	

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A	* paragraph [0007] - paragraph [0059]; figures 1-12 *	4, 5, 7, 9, 10, 12-15	

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A	* paragraph [0007] - paragraph [0084]; figures 1-14 *	4, 5, 7, 9, 10, 12-15	

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 May 2022	Examiner Klintebäck, Daniel
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	

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

EP 21 00 0348

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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
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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