(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 845 497 A1

# (12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
**11.03.2015 Bulletin 2015/11**

(51) Int Cl.:
***A24F 1/30*** *(2006.01)* ***A24F 47/00*** *(2006.01)*

(21) Application number: **14250100.6**

(22) Date of filing: **22.08.2014**

(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**

(30) Priority: **23.08.2013 GB 201315101**

(71) Applicants:
- **Asghar-Sheikh, Sami**
  **Chingford E4 7HZ (GB)**
- **Asghar-Sheikh, Rafi**
  **Chingford E4 7HZ (GB)**

(72) Inventors:
- **Asghar-Sheikh, Sami**
  **Chingford E4 7HZ (GB)**
- **Asghar-Sheikh, Rafi**
  **Chingford E4 7HZ (GB)**

(74) Representative: **Beresford, Keith Denis Lewis**
**Beresford & Co**
**16 High Holborn**
**London WC1V 6BX (GB)**

## (54) Improved shisha

(57) A shisha head comprises an air inlet, an air outlet suitable for connection to a shisha, at least one vapourizer and an air flow sensor arranged to detect air flow through the shisha head. The vapourizer is arranged to produce vapour in response to the air flow sensor detecting a flow of air through the shisha head.

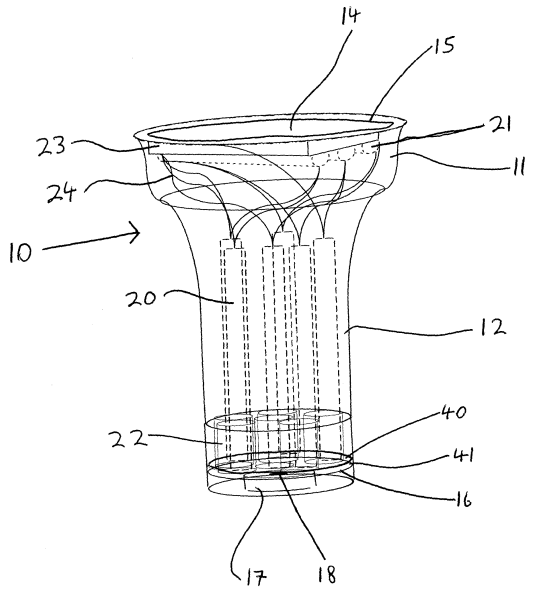


FIGURE 4

EP 2 845 497 A1

## Description

**[0001]** This invention relates to an improved shisha, and in particular to an improved shisha head.

**[0002]** A cut away view of a traditional shisha is shown in figure 14. The shisha 100 comprises a bowl 102 containing tobacco 103 beneath a screen 104 of perforated aluminium foil, metal or glass. Optionally, the top of the bowl 102 may be closed by a windscreen or cover. The bowl 102 is mounted on top of a hollow body 106 containing a chamber 107 partially filled with water 108. The bottom of the bowl 102 is connected to a first hollow tube 109 which extends into the body 106 and has a lower end 109a opening beneath the surface of the water 108. A user mouthpiece 110 is connected through a second hollow tube 111, which is generally flexible, to the air space 112 within the hollow body 106 above the surface of the water 108.

**[0003]** In use, lit coals 113 are placed on top of the screen 104 to heat the tobacco 103 and generate smoke. When a user sucks on the mouthpiece 110, producing a partial vacuum within the chamber 107, smoke is pulled from within the bowl 102 down the first tube 109, and bubbles through the water 108 into the air space 112 within the chamber 107. The smoke is then sucked along the second tube 111 to the mouthpiece 110 and can be inhaled by the user.

**[0004]** Shishas of this type are well known, having been widely used for many years.

**[0005]** The inhaling of tobacco smoke using a shisha is believed to be less harmful than some other methods of smoking, but there is still concern that shisha use may have long term negative health effects.

**[0006]** Further, many countries have introduced, or have proposed, legislation making smoking illegal in some locations, and such legislation generally applies to shishas as well as other types of smoking.

**[0007]** The problem addressed by the present invention is how to provide an improved shisha which is less likely to have negative health effects and will not be affected by legislation controlling or limiting smoking.

**[0008]** The present invention was made in order to solve these problems, at least in part.

**[0009]** A first aspect of the invention provides a shisha head comprising an air inlet, an air outlet suitable for connection to a shisha, at least one vapourizer and an air flow sensor arranged to detect air flow through the shisha head, wherein the vapourizer is arranged to produce vapour in response to the air flow sensor detecting a flow of air through the shisha head.

**[0010]** Preferably, the vapourizer contains e-liquid.

**[0011]** Preferably, the vapourizer is arranged to produce a vapour mixture of e-liquid that contains nicotine.

**[0012]** Preferably, the vapourizer contains a liquid solution of nicotine.

**[0013]** Preferably, the vapourizer is arranged to produce a mixture of vapour and at least one flavouring substance.

**[0014]** Preferably, the vapourizer contains a liquid solution of the at least one flavouring substance

**[0015]** Preferably, the shisha head comprises a plurality of vapourizers.

**[0016]** Preferably, the shisha head comprises six vapourizers.

**[0017]** Preferably, the air flow sensor is arranged to detect air flow through the air outlet.

**[0018]** Preferably, the shisha head further comprising a power supply.

**[0019]** Preferably, the power supply is at least one battery.

**[0020]** Preferably, the power supply is three batteries.

**[0021]** Preferably, the shisha head further comprises an outer casing.

**[0022]** Preferably, the casing is circular in cross section and comprises a first section having a first diameter and a second section having a second diameter larger than the first diameter.

**[0023]** Preferably, the first and second sections are linked by an intermediate tapered section.

**[0024]** Preferably, the first diameter is 4.5cm and the second diameter is 8.5cm.

**[0025]** Preferably, the shisha head has a height of 11 cm.

**[0026]** Preferably, the air outlet is located at the centre of the second section.

**[0027]** Preferably, the end of the first section remote from the second section comprises a pair of inner and outer concentric circular walls extending outwardly and defining an annular space between them, wherein the inner circular wall surrounds the air outlet.

**[0028]** Preferably, the outer wall is contiguous with the outer casing.

**[0029]** Preferably, the inner wall has a diameter of 2.2cm and the outer wall has a diameter of 4.5cm.

**[0030]** Preferably, the inner and outer walls define an annular space having a depth of 2cm.

**[0031]** A second aspect of the invention provides a shisha comprising a shisha head according to any preceding claim.

**[0032]** Preferably, the shisha further comprises a water reservoir and a tube arranged to communicate with the air outlet of the shisha head, the tube having an opening beneath the surface of the water in the reservoir.

**[0033]** Preferably, the water in the reservoir comprises at least one flavouring substance dissolved in the water.

**[0034]** Preferably, the flavouring substance has been added to the water in the form of a dissolvable flavouring material.

**[0035]** Preferably, the flavouring substance has been added to the water in the form of a dissolvable flavouring capsule.

## Brief Description of the Drawings

**[0036]** Embodiments of the invention will now be described by way of example with reference to the accom-

panying figures in which:

Figure 1 shows a perspective view of an improved shisha head according to the present invention;

Figure 2 shows another perspective view of the shisha head of figure 1;

Figure 3 shows a bottom plan view of the shisha head of figure 1;

Figure 4 shows a perspective view of the interior of the shisha head of figure 1;

Figure 5 shows another perspective view of the interior of the shisha head of figure 1;

Figure 6 shows a bottom plan view of the interior of the shisha head of figure 1;

Figure 7 shows an exploded view of the shisha head of figure 1;

Figure 8 shows the arrangement of batteries within the shisha head of figure 1;

Figure 9 shows the wiring arrangement of the shisha head of figure 1;

Figure 10 shows an external view of a vapouriser capsule part of the shisha head of figure 1;

Figure 11 shows a partial view of internal components of the vapouriser capsule of figure 10;

Figure 12 shows an example of the shisha head of figure 1 mounted on a conventional shisha;

Figure 13 shows a further example of the shisha head of figure 1 mounted on a conventional shisha; and

Figure 14 shows a cut away view of a known shisha.

Detailed Description

**[0037]** Figure 1 shows an external upper perspective view of an improved shisha head 10 according to the present invention. The shisha head 10 is hollow and comprises a circular upper bowl section 11 having a larger diameter and a lower circular tubular section 12 having a smaller diameter. The upper and lower sections 11 and 12 are connected by a tapered section 13 of the lower section 12. The upper end of the upper section 11 is substantially closed by a plate 14 located inside the upper edge of the upper section 11. A circumferential slot or slots 15 is defined between the edge of the plate 14 and the inner surface of the upper section 11. These slots 15 allow air to pass into the interior of the shisha head 10.

**[0038]** In the illustrated example the upper section 11 has a diameter of about 8.5cm and a height of about 2cm, and the lower section 12 has a diameter of about 4.5 cm and a height of about 9cm.

**[0039]** Figure 2 shows a lower perspective view of the shisha head 10. In figure 2 some parts are shown as transparent in order to allow the structure of the shisha head 10 to be readily understood.

**[0040]** As is shown in figure 2, the lower section 12 has a plate 16 substantially closing the lower section 12 towards the lower end 12a of the lower section 12. The plate 16 is located about 2cm from the lower edge 12a of the lower section 12, and a outwardly extending part 12b of an outer surface of the shisha head 10 extends between the plate 16 and the lower edge 12a. A circular cylindrical wall 17 extends downwardly from the plate 16. The wall 17 is concentric with the lower circular tubular section 12 and has a diameter of about 2.2cm. The wall 17 extends downwardly about 2cm so that a bottom edge 17a of the wall 17 is level with the bottom edge 12a of the lower section 12. A small hole 18 passes through the lower plate 16 approximately in the centre of the plate 16. The hole 18 allows air to pass out of the interior of the shisha head 10.

**[0041]** The shisha head 10 has dimensions selected so that it can be placed on top of a typical conventional shisha body in place of the conventional bowl.

**[0042]** hen the shisha head 10 is in place on a conventional shisha body, for example the shisha body 106, an upper edge of the shisha body 106 will be located between the wall 17 and the outwardly extending part 12b. A seal may be formed between the upper edge of the shisha body 106 and the plate 16. In some examples a grommet or other sealing element may be located on the upper edge of the shisha body 106, or between the wall 17 and the inner surface of the lower section 12, to improve the quality of this seal.

**[0043]** In the illustrated example, when the shisha head 10 is in place on a conventional shisha body 106, an upper end of the tube 109 will be located inside the wall 17, so that the hole 18 will form an air passage allowing air to pass from the interior of the shisha head 10 and down the tube 109. A seal may be formed between the upper end of the tube 109 and the plate 16. In some examples a grommet or other sealing element may be located on the upper edge of the tube 109, or within the wall 17, to improve the quality of this seal.

**[0044]** The dimensions of the illustrated example will allow the shisha head 10 to be used together with many conventional shisha bodies. In alternative examples different dimensions may be used. In any specific example the dimensions may be selected to cooperate with specific designs of shisha bodies.

**[0045]** perspective views from above and below of the shisha head 10, with parts of the shisha head 10 shown as transparent so that the interior components of the shisha head 10 are visible. Figure 6 shows a plan view of

the shisha head 10 from below, again with parts shown as transparent so that the interior components of the shisha head 10 are visible. Figure 7 shows a partially exploded view of the shisha head 10.

**[0046]** The shisha head 10 contains six vapour generation capsules 20 and three batteries 21, which are arranged to supply power to the vapour generation capsules 20. Each vapour generation capsule 20 is cylindrical and about 7cm long. The vapour generation capsules 20 are oriented substantially vertically within the shisha head 10 and arranged with one capsule 20 in the centre of the shisha head, with the other capsules 20 arranged equidistantly in a circle around this central capsule.

**[0047]** An inner plate 40 is located inside the lower section 12 extending parallel and spaced apart from the plate 16, so that the plates 16 and 40 define a mixing chamber 41 between them.

**[0048]** The lower ends of the vapour generation capsules 20 are located within cylindrical tubular walls 22 extending upwardly from the upper, interior, surface of the inner plate 40 in order to support the capsules 20 and hold them in place. There is an aperture passing through the inner plate 40 inside each of the tubular walls 22 to allow air to pass into the mixing chamber 41 from a respective capsule 20.

**[0049]** The components of the shisha head 10 define a number of air flow paths through the shisha head. Each air flow path passes through a slot 15 in the plate 14, through a capsule 20 into the mixing chamber 41, and through the hole 18. All of the air flow paths pass through the mixing chamber 41 and the hole 18.

**[0050]** The vapour generation capsules 20 may be electrically powered atomizers or clearomizers.

**[0051]** The batteries 21 are arranged in a battery compartment 23 located on the lower, interior, surface of the plate 14.

**[0052]** The batteries 21 and the vapour generation capsules 20 are connected by wiring 24. The wiring 24 is shown schematically in the attached figures. The wiring 24 connects the batteries 21 to the capsules 20 so that each capsule 20 is connected to both a positive and a negative terminal of one of the batteries 21, as shown in figure 9.

**[0053]** In the illustrated example each battery is electrically connected to two of the capsules 20 by the wiring 24, and each capsule 20 is electrically connected to a single battery 21 by the wiring 24, so that each battery 21 supplies two of the capsules 20 with power. In alternative examples the batteries 21 may be electrically connected together in parallel and the capsules 20 may also be electrically connected in parallel.

**[0054]** As shown in figures 10 and 11, each capsule 20 comprises an outer hollow tube 26 and an inner hollow tube 27 arranged concentrically. The space between the inner and outer tubes 26 and 27 contains a layer 28 of cotton threads soaked in an e-liquid. The e-liquid typically comprises propylene glycol, vegetable glycerine or polyethylene glycol 400, or a mixture thereof as a base, with active ingredients dissolved in or mixed with this base. The active ingredients may comprise nicotine and/or flavourings, as discussed in more detail below. A plurality of resistance heater wires pass through the layer 28. In the illustrated example the heater wires are arranged to form a plurality of coils 29 distributed within the layer 28, with each coil 29 surrounding a group of cotton threads.

**[0055]** An airflow sensor 25 is positioned at the top of each capsule 20. Each airflow sensor 25 is located adjacent the top of the outer hollow tube 26 of the respective capsule 20 and is arranged to detect any flow of air through the capsule 20 and into the mixing chamber 41. When each airflow sensor 25 detects an air flow through a respective capsule 20 the airflow sensor 25 switches on the supply of electrical power from a battery 21 to the respective capsule 20.

**[0056]** When electrical power is supplied to the heater wires the coils 29 heat the cotton threads, producing e-liquid vapour.

**[0057]** The e-liquid within the capsules 20 which is used to produce the vapour may comprise a solution of e-liquid which contains nicotine so that the vapour comprises a mixture of e-liquid with nicotine vapour. The e-liquid within the capsules 20 may additionally, or alternatively, comprise one or more vaporisable flavourings so that the vapour is flavoured.

**[0058]** In the illustrated example the cotton threads of the layer 28 are soaked in water, with the amount of water contained in the capsule 20 being sufficient for the intended useage life of the capsule 20. In other examples the capsules may include a water reservoir to supply water to the cotton threads to replace the water which is vapourised.

**[0059]** In one example of use of the shisha head 10, the shisha head 10 is placed on top of a shisha body 30, as shown in figure 12. The shisha body 30 is a conventional shisha body as shown in figure 12, and the usual bowl used with the shisha body 30 is replaced by the shisha head 10 of the present invention. The shisha head 10 is arranged so that the first tube 109 of the shisha body 30 is in communication with the hole 18in the bottom of the shisha head 10.

**[0060]** When a user sucks at the mouthpiece 110, producing a partial vacuum within the chamber 107, air is pulled from the shisha head 10 and into the first tube 109 along the air flow paths passing through the capsules 20. This air flow is detected by the airflow sensors 25, which each switch on the flow of electrical power from the batteries 21 to a respective one of the capsules 20.

**[0061]** When supplied with electrical power the capsules 20 generate vapour, which may also comprise nicotine and/or flavour vapour when nicotine and/or flavours. The vapour from each of the capsules 20 passes into the mixing chamber 41 where the vapour and airflows from the different capsules 20 intermingle.

**[0062]** The vapour generated by the capsules 20 then leaves the mixing chamber 41 and the shisha head 10, and passes through the hole 18 in the bottom of the shi-

sha head 10 into the first tube 109 of the shisha body 30. The vapour then bubbles through the water 108 into the air space 112 within the chamber 107. The vapour is then sucked along the second tube 111 to the mouthpiece 110 and can be inhaled by the user.

**[0063]** Accordingly, the shisha head according to the present invention may allow a user to inhale vapour from the shisha, providing a similar experience to a conventional shisha without the potential health risks of inhaling tobacco smoke. Further, the shisha head according to the present invention may allow a user to enjoy a similar experience to a conventional shisha without breaking legal restrictions on smoking.

**[0064]** In examples where e-liquid and nicotine is in the capsules the shisha head according to the present invention may also allow a user to ingest nicotine by inhaling the vapour.

**[0065]** In examples where there are one or more e liquid flavourings in the capsules the shisha head according to the present invention may provide an enhanced user experience.

**[0066]** In another example of use of the shisha head 20, the shisha head 20 is placed on top of a shisha body 30, as shown in figure 13. The shisha body 30 is a conventional shisha body, as shown in previous example.

**[0067]** In the example of figure 13 flavour substances are added to the water 108 by dissolving a soluble flavour capsule 31 in the water 108. This flavouring may flavour the water resulting in an increased flavoured vapour provided to the user.

**[0068]** In this example the flavouring dissolved in the water in the shisha body according to the present invention may provide an enhanced user experience.

**[0069]** In other examples the flavouring material may be added to the water 108 in a different manner. For example, the flavouring material may be added in the form of a soluble tablet or powder, or a concentrated solution.

**[0070]** In the illustrated example each vapour generating capsule is associated with a separate dedicated air flow sensor which controls the supply of power to that capsule. This arrangement may provide improved reliability through redundancy because even if one or more of the air flow sensors fails to operate in response to an air flow, the remaining air flow sensors will still activate their respective capsules and generate vapour.

**[0071]** In alternative examples one or more air flow sensors may be used to control the supply of power to all of the capsules. These air flow sensors may not be associated with capsules. In one alternative example a single air flow sensor may be arranged to sense air flow through the hole 18 and arranged to control the supply of power to all of the capsules. In another alternative embodiment the central capsule may be replaced by a single air flow sensor arranged to control the supply of power to all of the remaining capsules.

**[0072]** In the illustrated examples the shisha head is intended to only be used for a single shisha session, that is a single "smoking" session, and then discarded. In other examples the shisha head may be designed for a longer useable life. In general the useable active life of the shisha head is determined by the amount of vapourisable water contained in the vapourizer capsules and the amount of power in the batteries. In some examples the shisha head may be designed to be refurbished to allow repeated use.

**[0073]** In some examples the shisha may further comprise a display to indicate information regarding usage to the user.

**[0074]** In some examples the display may indicate the number of vapourization operations carried out, or the number of vapourization operations remaining before the shisha is exhausted. In some examples the display may indicate the remaining charge level of the battery or batteries.

**[0075]** In the illustrated examples the shisha contains batteries as a power source. In other examples other power sources may be used.

**[0076]** The numbers of vapourizer capsules and batteries in the described examples are not essential. Different numbers may be used in other examples.

**[0077]** The use of batteries as a power supply is not essential. In other examples other forms of power supply may be used.

**[0078]** The description above uses directional terms such as upper, lower, top, bottom, vertical; and the like. It should be understood that these directional terms are relative and not absolute, and only apply when the shisha head is in the illustrated orientation.

**[0079]** The dimensions of the illustrated examples are not essential. Other dimensions may be used in other examples.

**[0080]** The above description relates to exemplary embodiments of the invention. The skilled person will be able to envisage alternatives within the scope of the present invention as set out in the appended claims.

**[0081]** Aspects of the invention are as set out in the following clauses:

1. A shisha head comprising an air inlet, an air outlet suitable for connection to a shisha, at least one vapourizer and an air flow sensor arranged to detect air flow through the shisha head, wherein the vapourizer is arranged to produce vapour in response to the air flow sensor detecting a flow of air through the shisha head.
2. A shisha head according to clause 1, wherein the vapourizer contains e-liquid.
3. A shisha head according to clause 1 or clause 2, wherein the vapourizer is arranged to produce a vapour mixture of e-liquid that contains nicotine.
4. A shisha head according to clause 3, wherein the vapourizer contains a liquid solution of nicotine.
5. A shisha head according to any preceding clause, wherein the vapourizer is arranged to produce a mixture of vapour and at least one flavouring substance.

6. A shisha head according to clause 5, wherein the vapourizer contains a liquid solution of the at least one flavouring substance
7. A shisha head according to any preceding clause, wherein the shisha head comprises a plurality of vapourizers.
8. A shisha head according to clause 7, wherein the shisha head comprises six vapourizers.
9. A shisha head according to any preceding clause, wherein the air flow sensor is arranged to detect air flow through the air outlet.
10. A shisha head according to any preceding clause, and further comprising a power supply.
11. A shisha head according to clause 10, wherein the power supply is at least one battery.
12. A shisha head according to clause 11, wherein the power supply is three batteries.
13. A shisha head according to any preceding clause, wherein the shisha head further comprises an outer casing.
14. A shisha head according to clause 13, wherein the casing is circular in cross section and comprises a first section having a first diameter and a second section having a second diameter larger than the first diameter.
15. A shisha head according to clause 14, wherein the first and second sections are linked by an intermediate tapered section.
16. A shisha head according to clause 14 or clause 15, wherein the first diameter is about 4.5cm and the second diameter is about 8.5cm.
17. A shisha head according to any one of clauses 14 to 16, wherein the shisha head has a height of about 11 cm.
18. A shisha head according to any one of clauses 14 to 17, wherein the air outlet is located at the centre of the second section.
19. A shisha head according to any one of clauses 14 to 18, wherein the end of the first section remote from the second section comprises a pair of inner and outer concentric circular walls extending outwardly and defining an annular space between them, wherein the inner circular wall surrounds the air outlet.
20. A shisha head according to clause 19, wherein the outer wall is contiguous with the outer casing.
21. A shisha head according to clause 19 or clause 20, wherein the inner wall has a diameter of about 2.2cm and the outer wall has a diameter of about 4.5cm.
22. A shisha head according to any one of clauses 19 to 21, wherein the inner and outer walls define an annular space having a depth of about 2cm.
23. A shisha comprising a shisha head according to any preceding clause.
24. A shisha according to clause 23, the shisha further comprising a water reservoir and a tube arranged to communicate with the air outlet of the shisha head, the tube having an opening beneath the surface of the water in the reservoir.
25. A shisha according to clause 24, wherein the water in the reservoir comprises at least one flavouring substance dissolved in the water.
26. A shisha according to clause 25, wherein the flavouring substance has been added to the water in the form of a dissolvable flavouring material.
27. A shisha according to clause 26, wherein the flavouring substance has been added to the water in the form of a dissolvable flavouring capsule.

**Claims**

1. A shisha head comprising an air inlet, an air outlet suitable for connection to a shisha, at least one vapourizer and an air flow sensor arranged to detect air flow through the shisha head, wherein the vapourizer is arranged to produce vapour in response to the air flow sensor detecting a flow of air through the shisha head.

2. A shisha head according to claim 1, wherein the vapourizer contains e-liquid.

3. A shisha head according to claim 1 or claim 2, wherein the vapourizer is arranged to produce a vapour mixture of e-liquid that contains nicotine.

4. A shisha head according to claim 3, wherein the vapourizer contains a liquid solution of nicotine.

5. A shisha head according to any preceding claim, wherein the vapourizer is arranged to produce a mixture of vapour and at least one flavouring substance.

6. A shisha head according to claim 5, wherein the vapourizer contains a liquid solution of the at least one flavouring substance

7. A shisha head according to any preceding claim, wherein the shisha head comprises a plurality of vapourizers.

8. A shisha head according to any preceding claim, wherein the air flow sensor is arranged to detect air flow through the air outlet.

9. A shisha head according to any preceding claim, and further comprising a power supply.

10. A shisha head according to any preceding claim, wherein the shisha head further comprises an outer casing.

11. A shisha head according to claim 10, wherein the casing is circular in cross section and comprises a

first section having a first diameter and a second section having a second diameter larger than the first diameter.

**12.** A shisha comprising a shisha head according to any preceding claim.

**13.** A shisha according to claim 12, the shisha further comprising a water reservoir and a tube arranged to communicate with the air outlet of the shisha head, the tube having an opening beneath the surface of the water in the reservoir.

**14.** A shisha according to claim 13, wherein the water in the reservoir comprises at least one flavouring substance dissolved in the water.

**15.** A shisha according to claim 14, wherein the flavouring substance has been added to the water in the form of a dissolvable flavouring material.

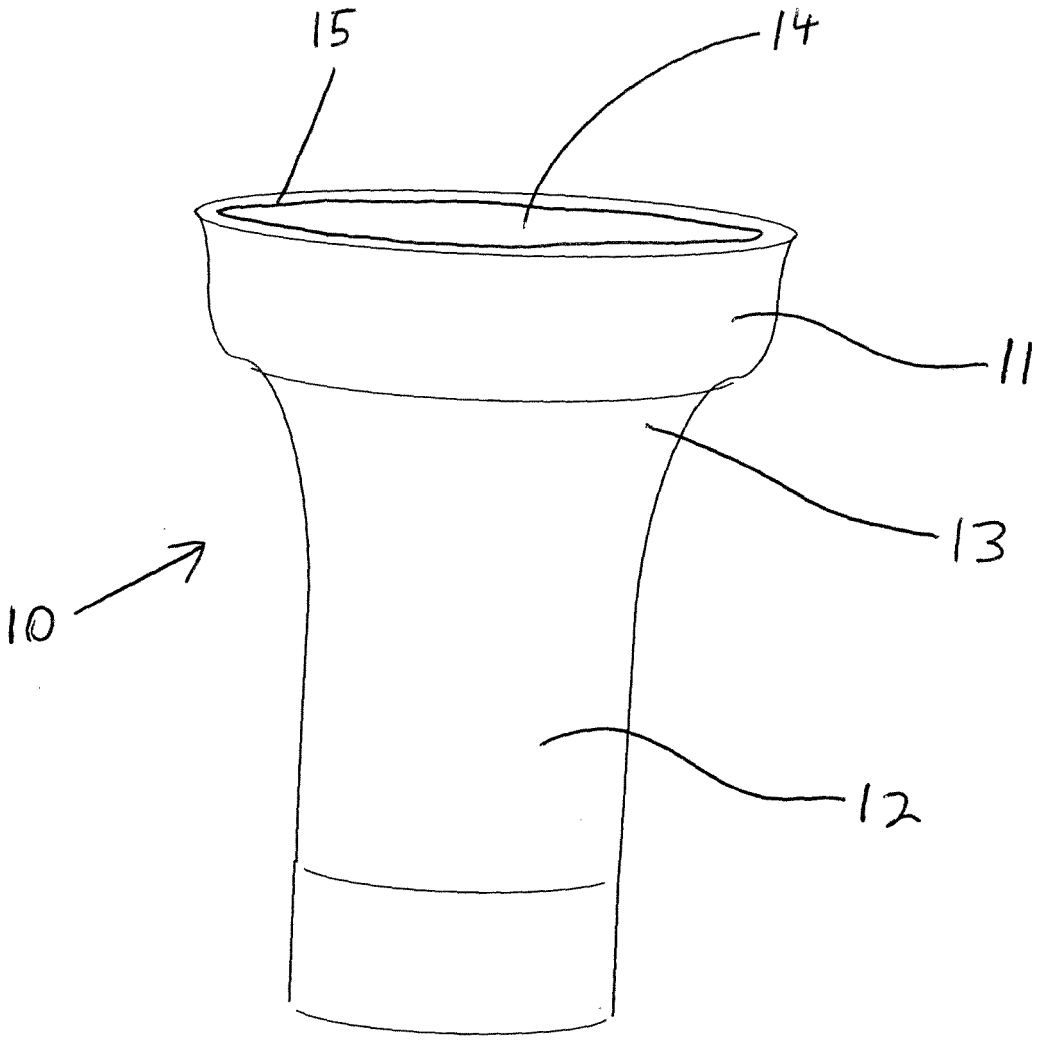


FIGURE 1

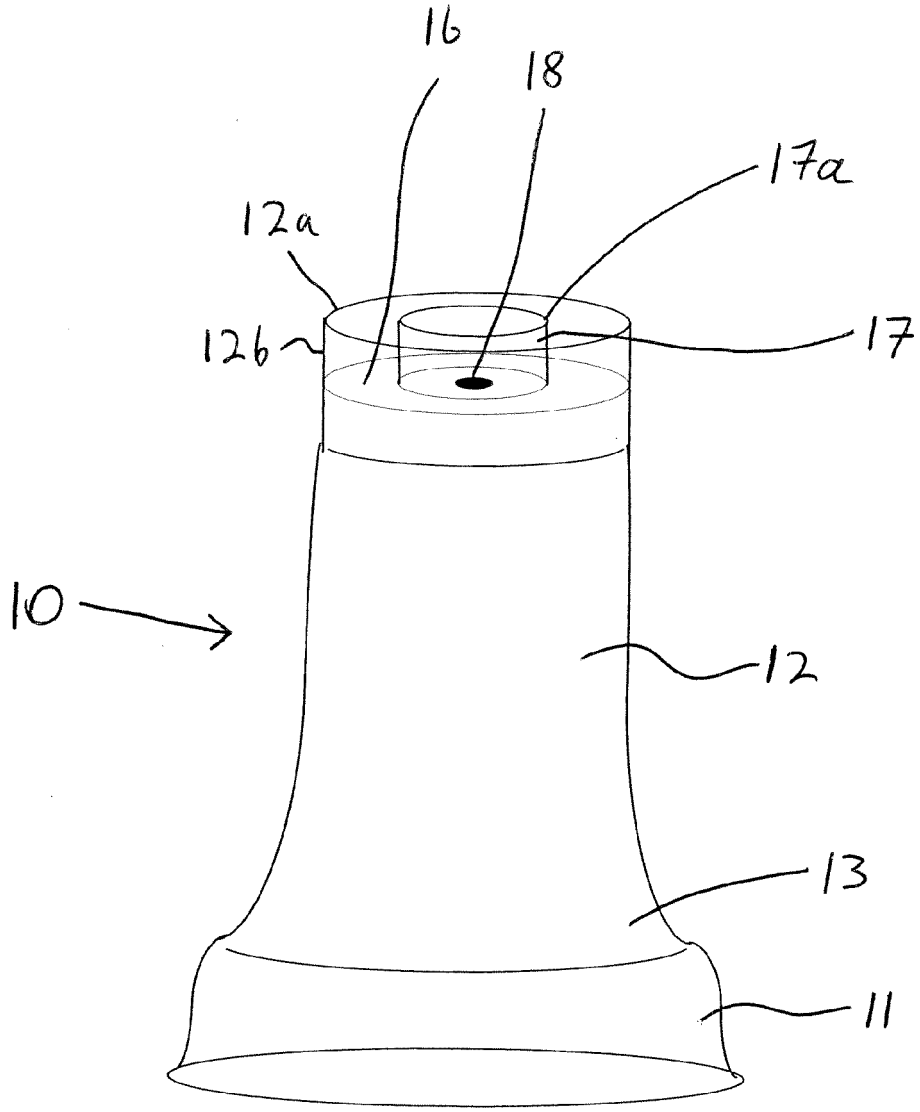


FIGURE 2

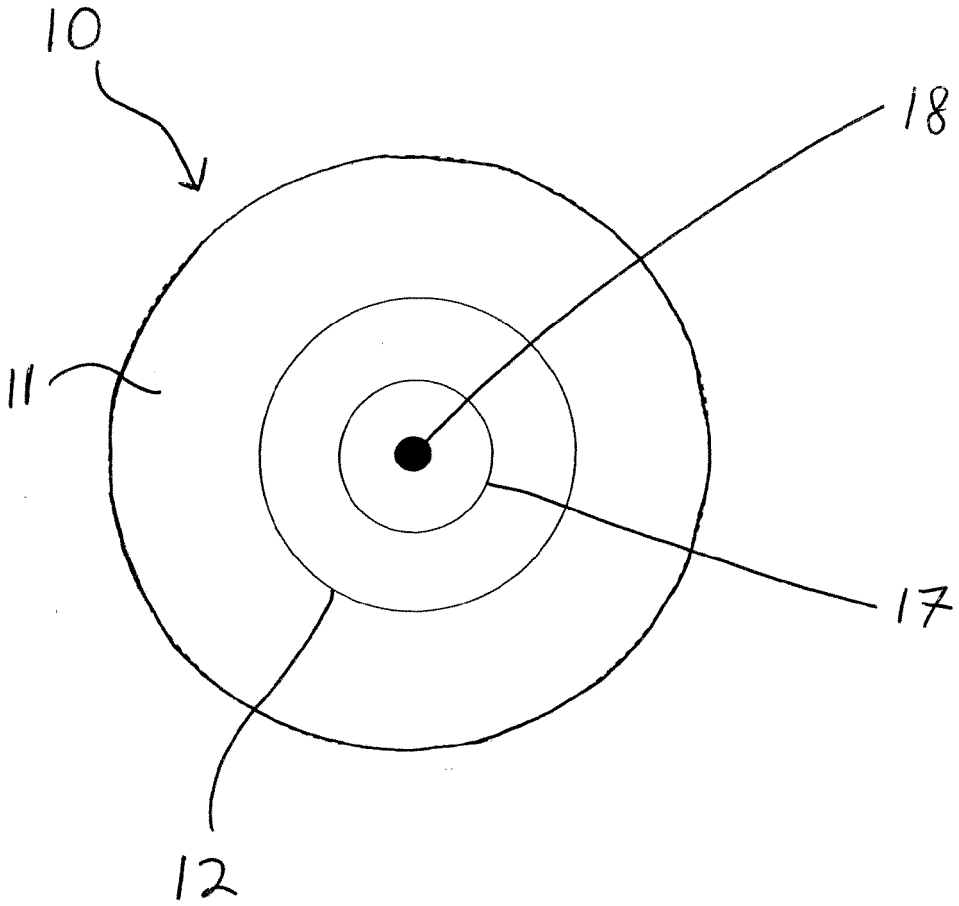


FIGURE 3

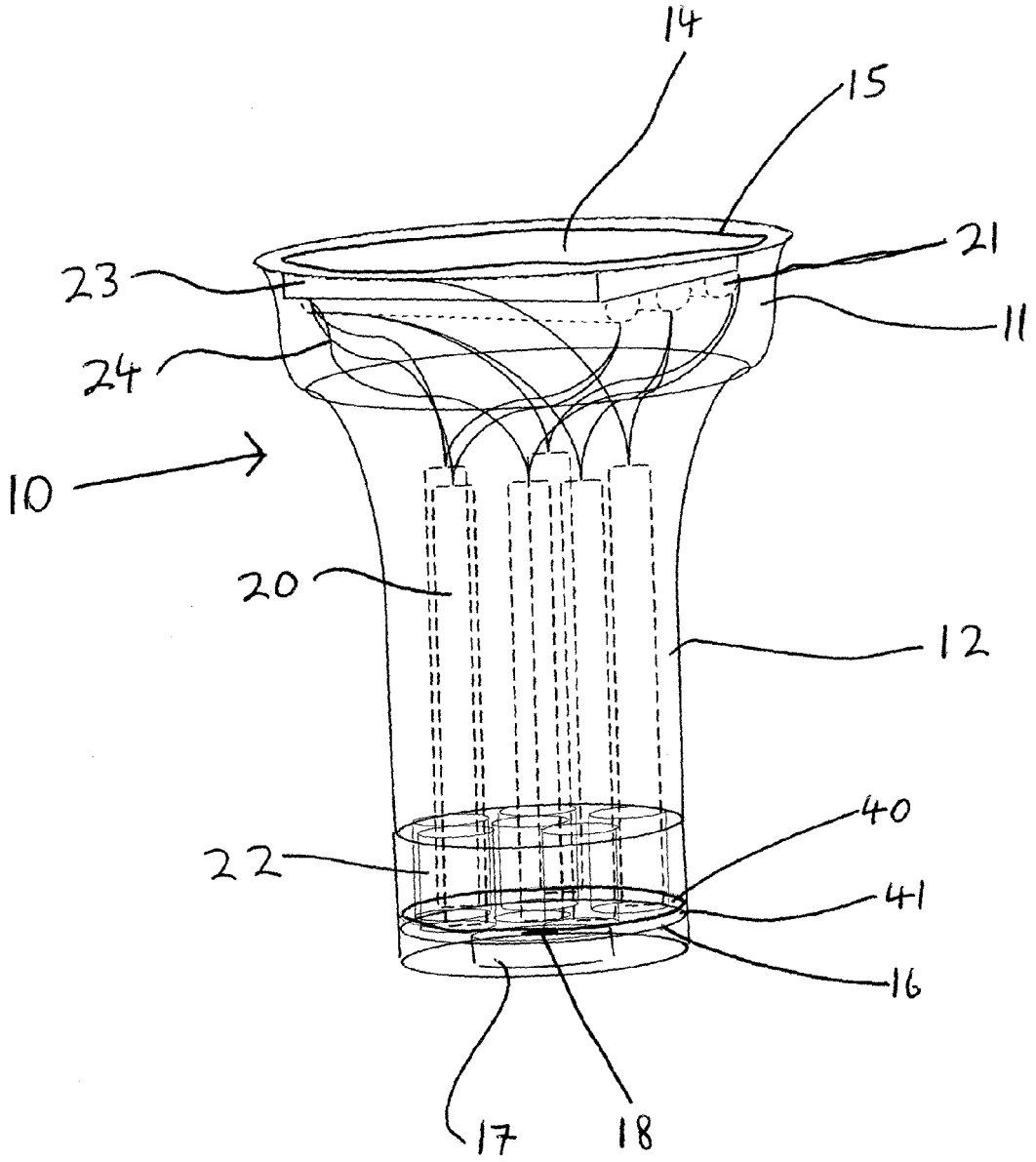


FIGURE 4

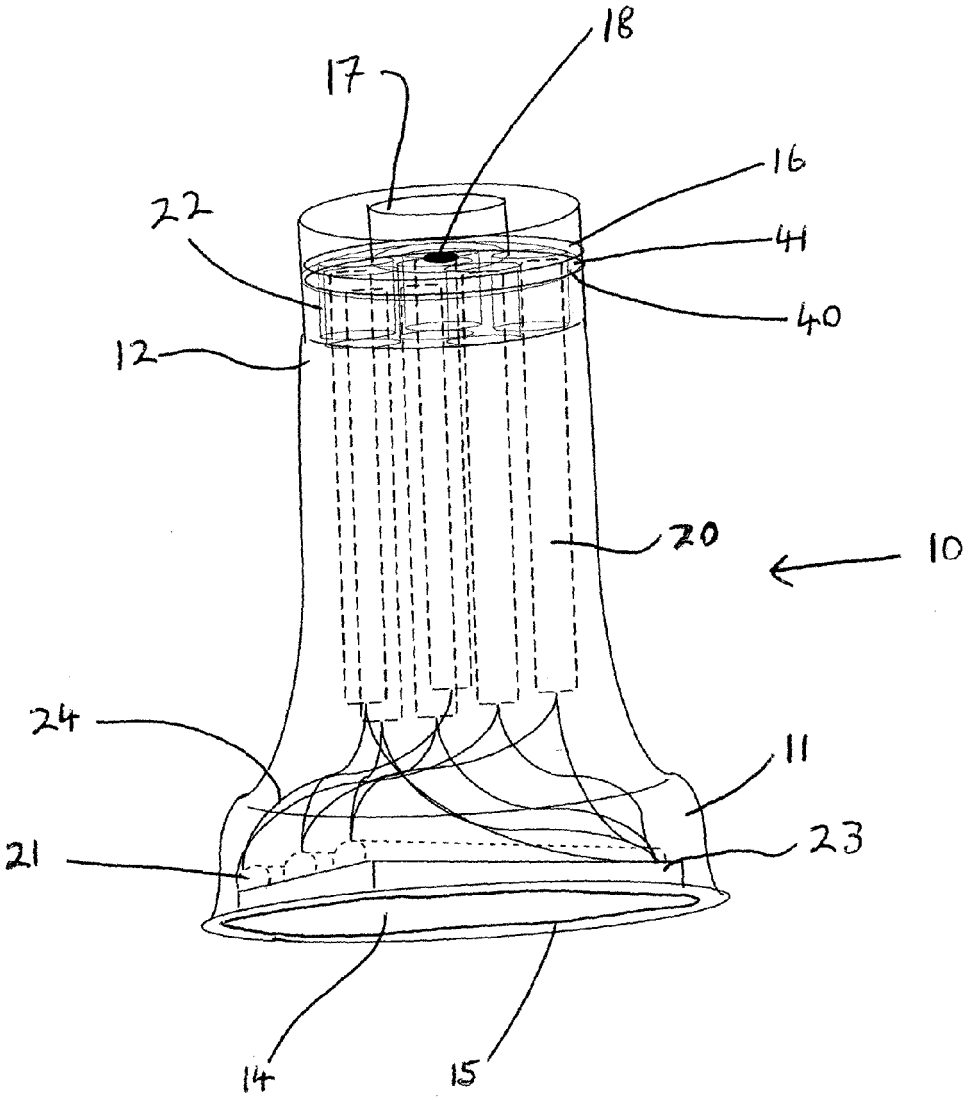


FIGURE 5

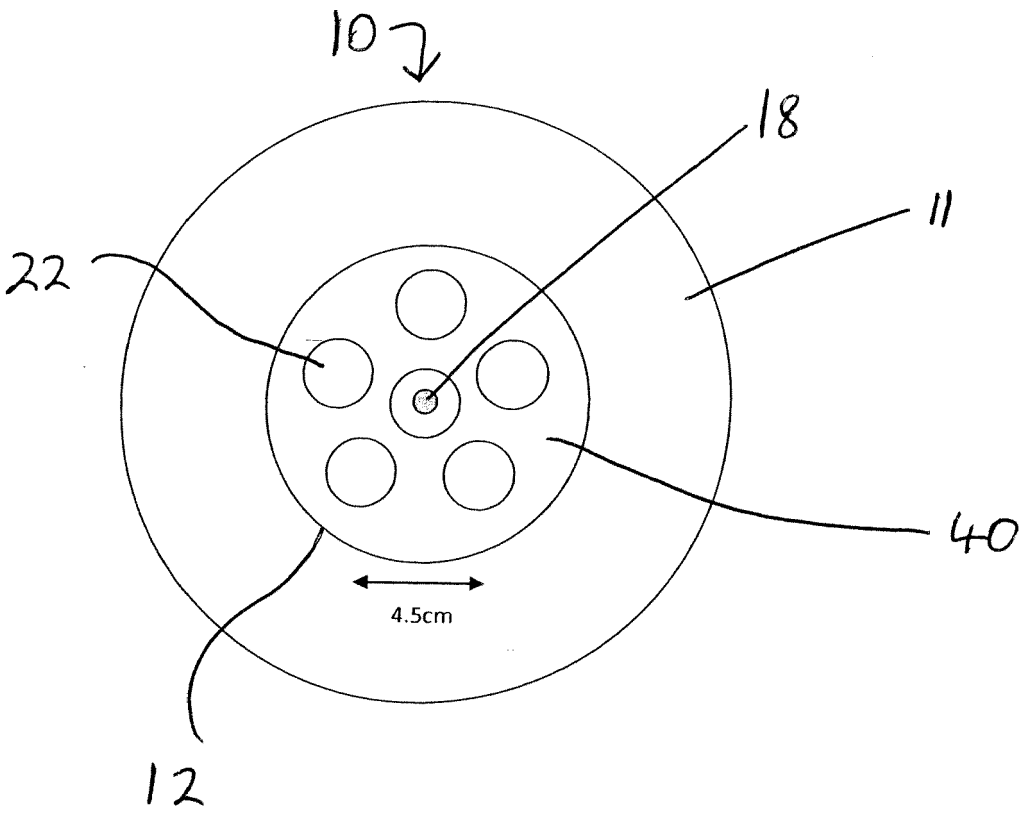


FIGURE 6

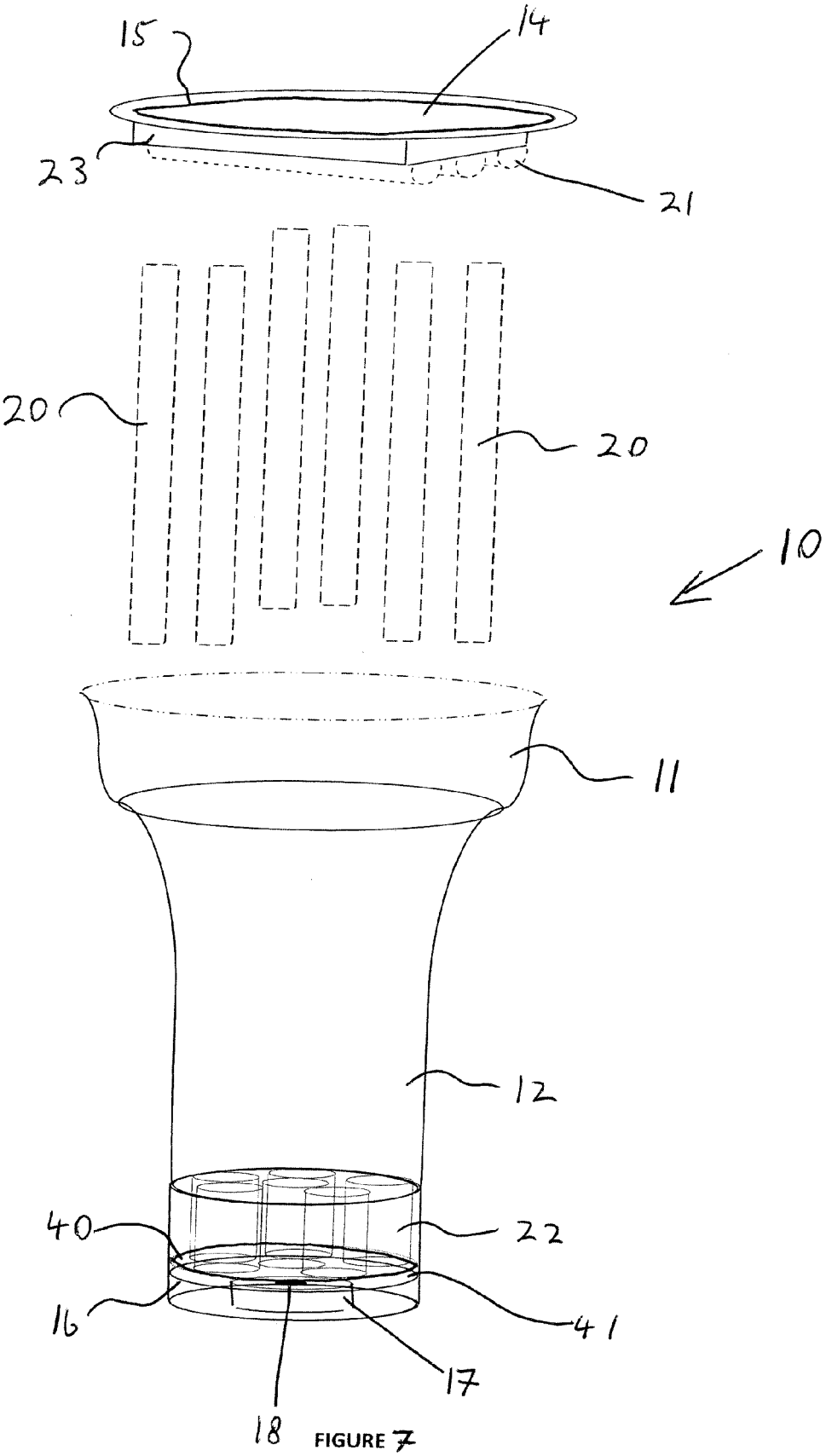


FIGURE 7

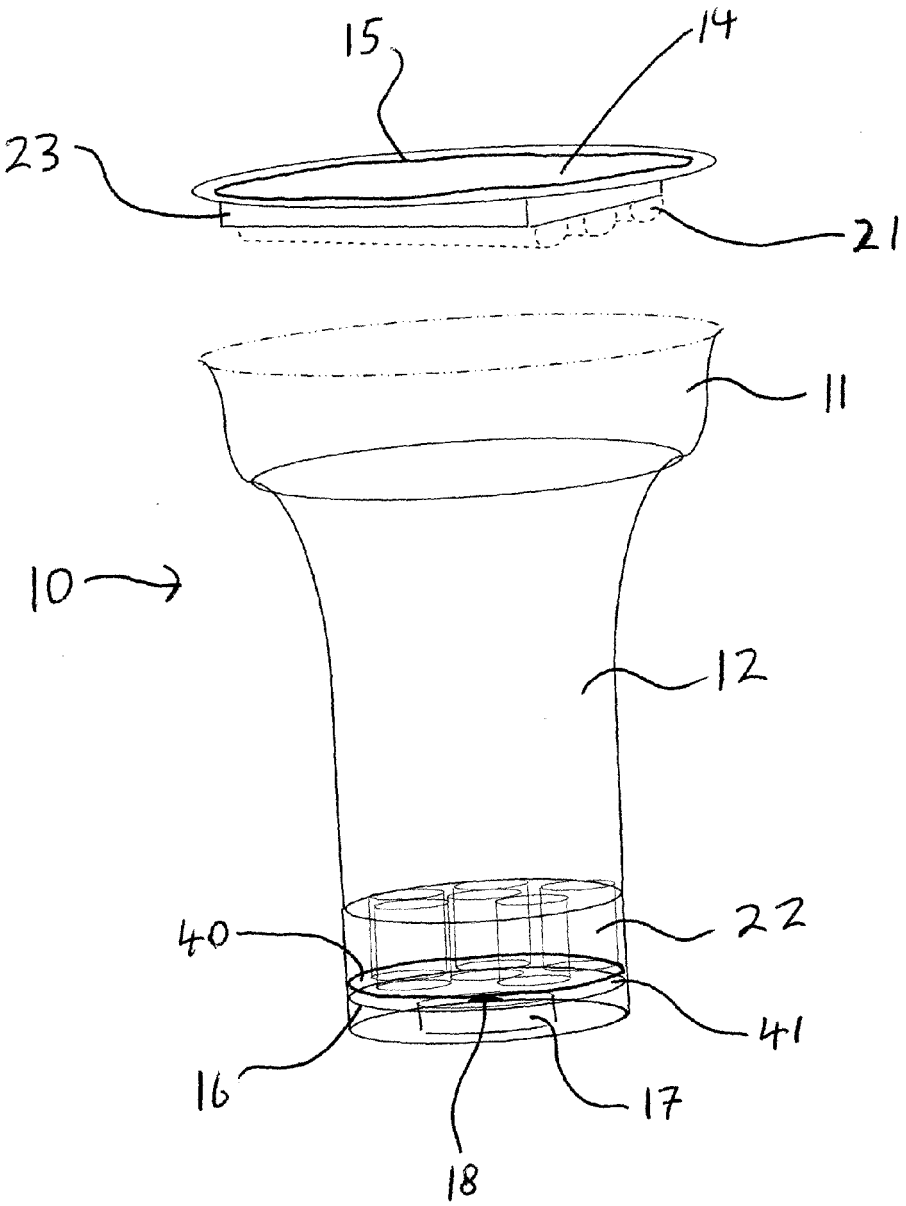


FIGURE 8

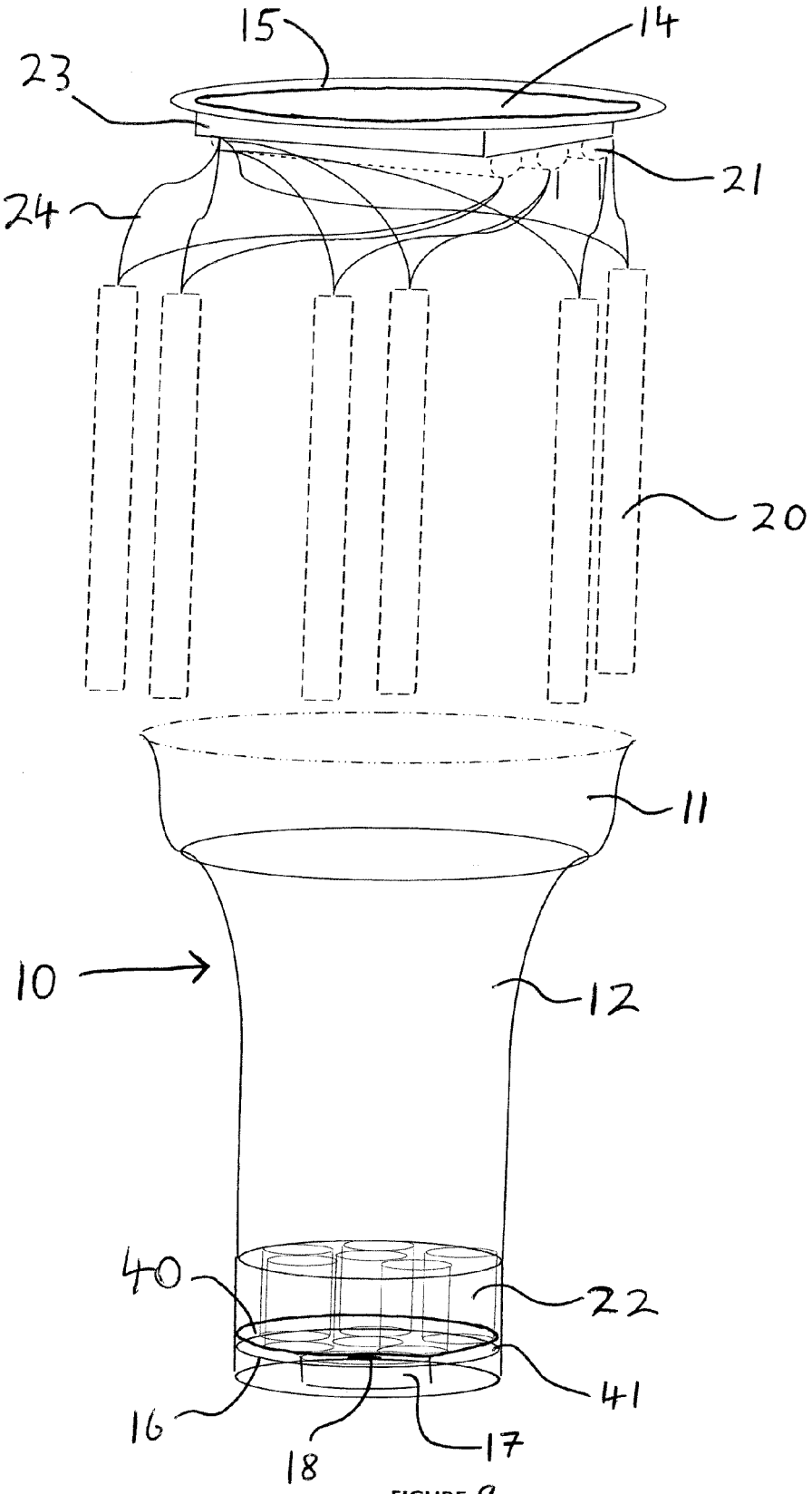


FIGURE 9

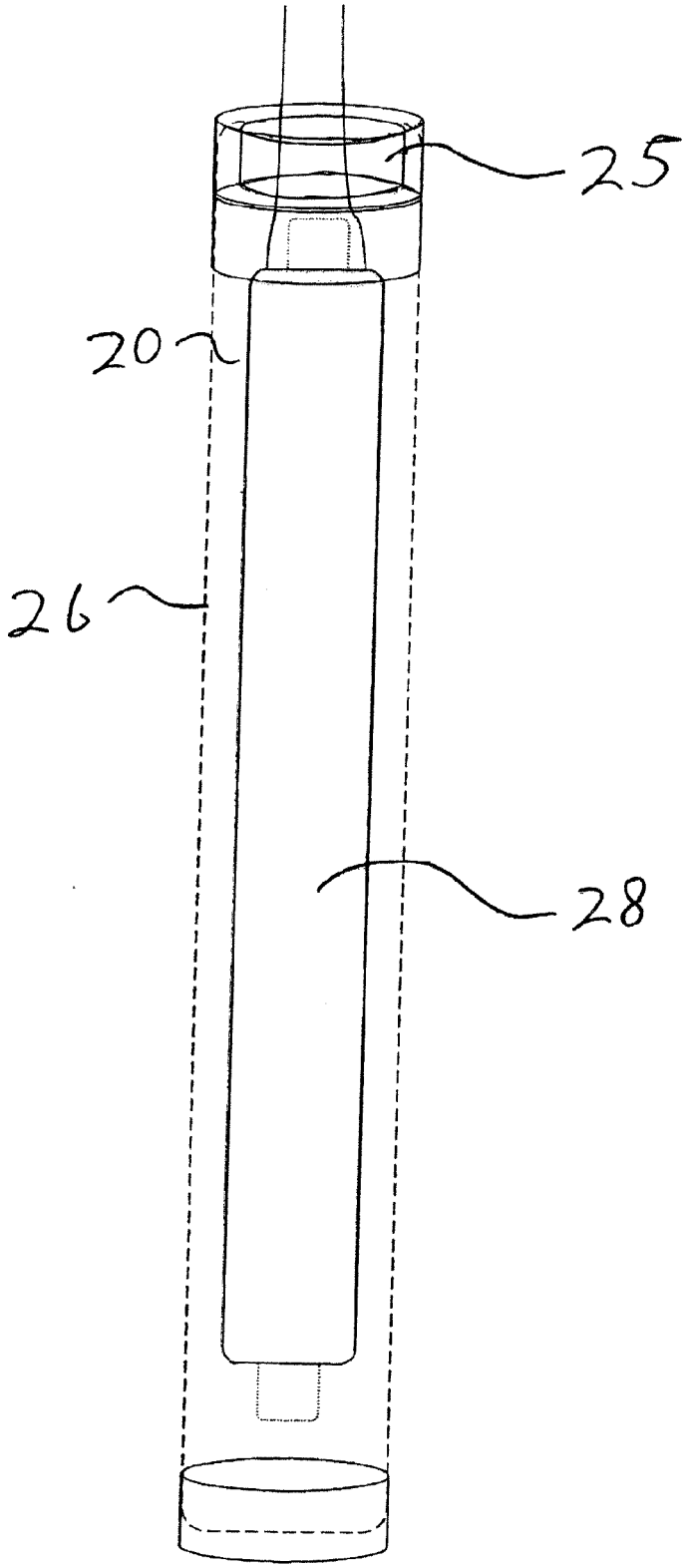


FIGURE 10

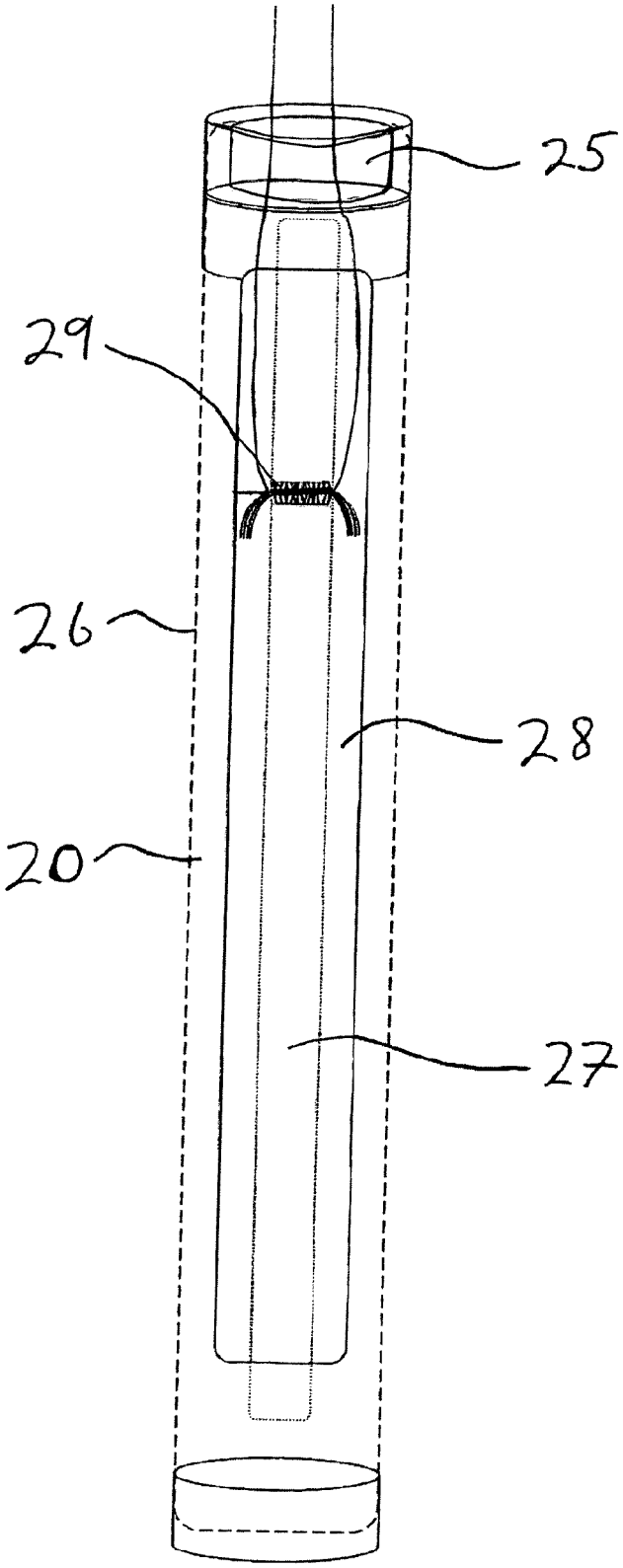


FIGURE 11

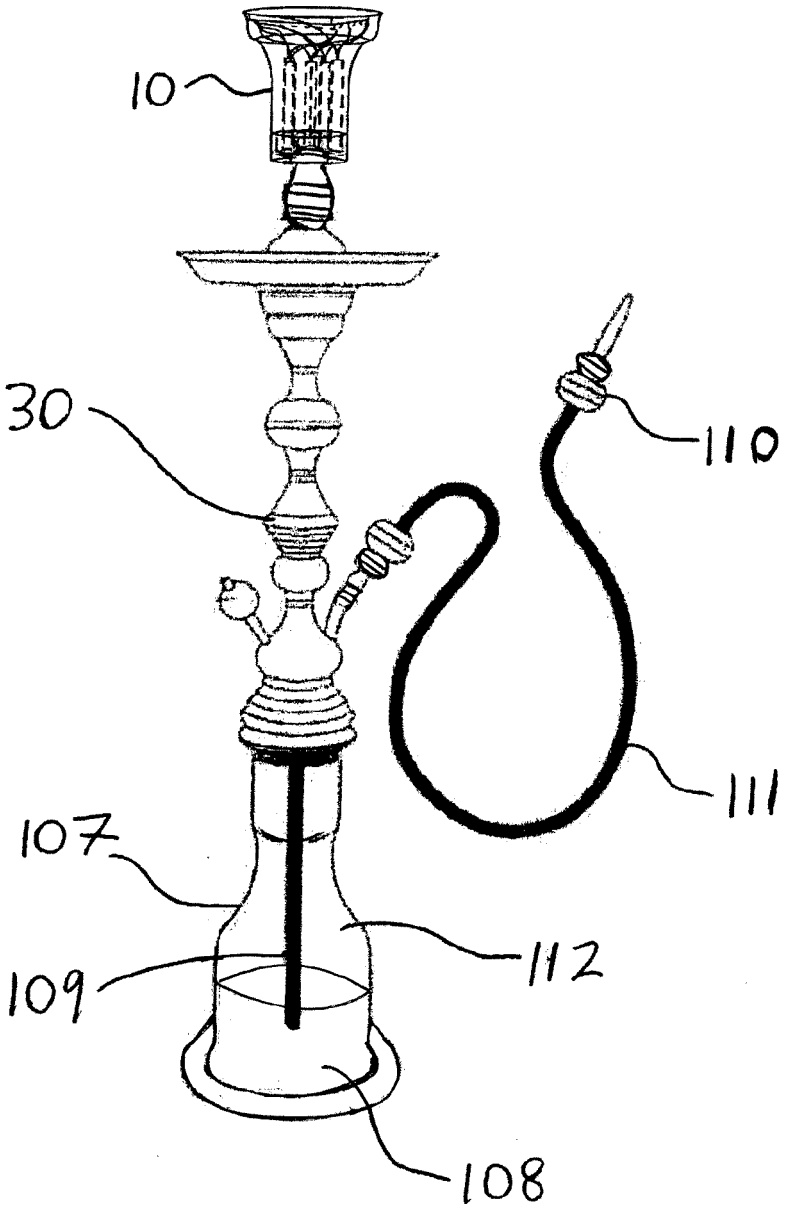


FIGURE 12

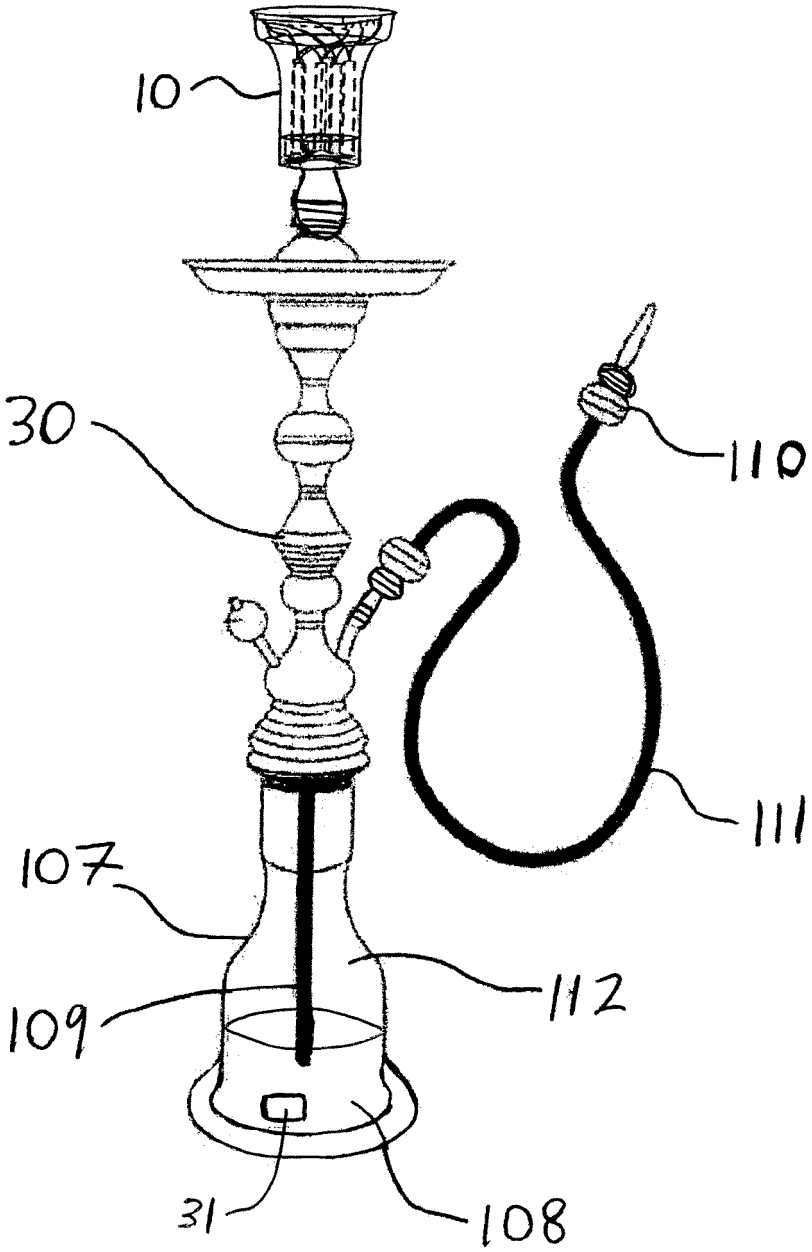


FIGURE 13

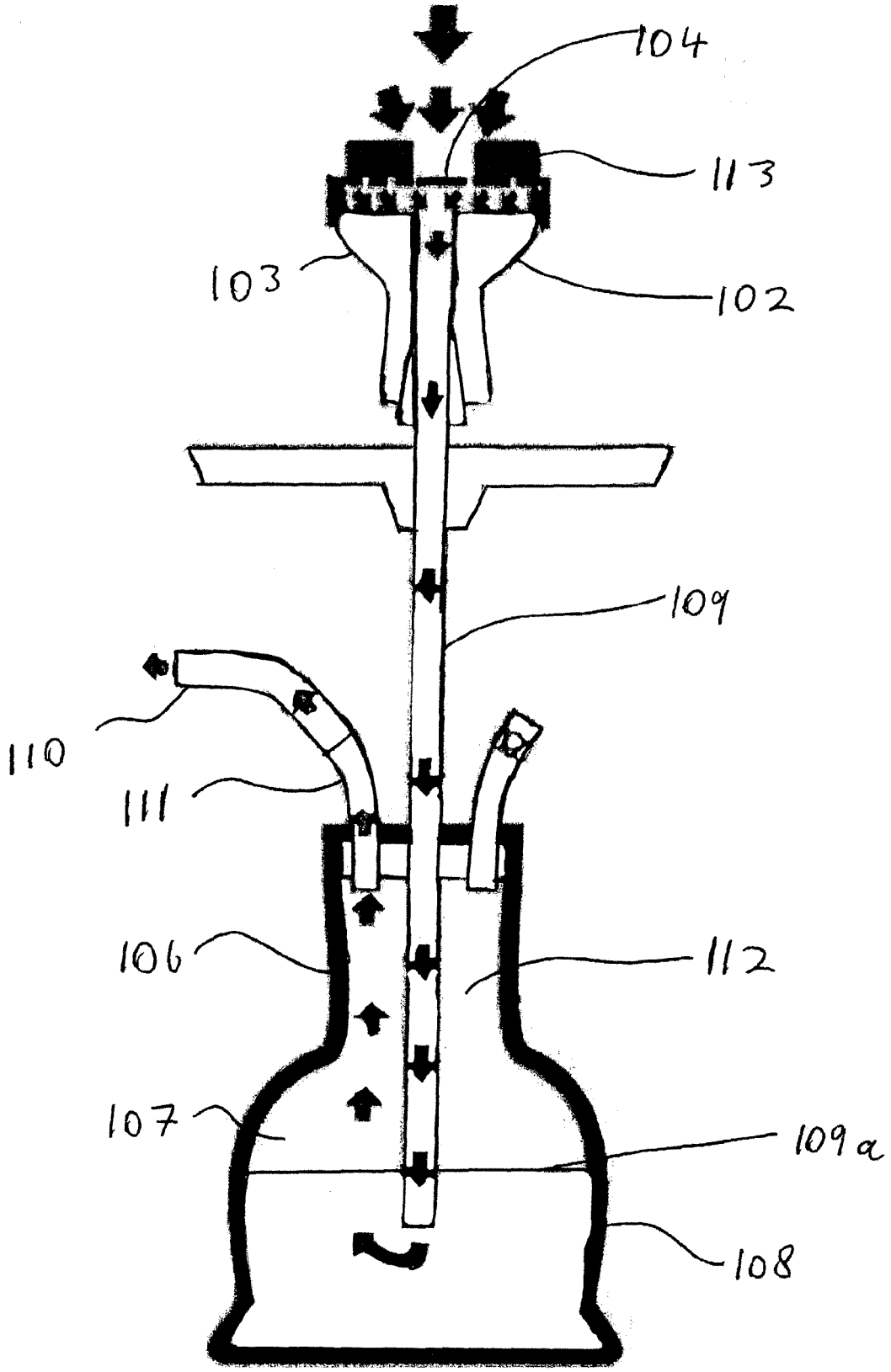


FIGURE 14

Europäisches Patentamt
European Patent Office
Office européen des brevets

# EUROPEAN SEARCH REPORT

Application Number
EP 14 25 0100

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| X | US 2012/042884 A1 (MUKADDAM NIZAR [LB]) 23 February 2012 (2012-02-23)<br><br>* the whole document * | 1-4, 8-10,12, 13 | INV. A24F1/30 A24F47/00 |
| A | DE 20 2005 015795 U1 (LIU CHUN LIANG [TW]) 8 December 2005 (2005-12-08)<br>* the whole document * | 1-15 | |

TECHNICAL FIELDS SEARCHED (IPC)

A24F

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 29 January 2015 | MacCormick, Duncan |

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)

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 25 0100

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.

29-01-2015

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US 2012042884 A1 | 23-02-2012 | NONE | |
| DE 202005015795 U1 | 08-12-2005 | DE 202005015795 U1 | 08-12-2005 |
| | | TW M264870 U | 21-05-2005 |
| | | US 2006086365 A1 | 27-04-2006 |

EPO FORM P0459

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