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(54) **NON-COMBUSTION VAPORIZER DEVICE**

VERBRENNUNGSFREIE VERDAMPFERVORRICHTUNG

DISPOSITIF VAPORISATEUR SANS COMBUSTION

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## Description

### Field

**[0001]** The present disclosure relates to the field of smoking device, and in particular to a non-combustion smoking device.

### Background

**[0002]** With the continuous increase of attention to physical health, people have gradually realized the harm on the body from the traditional smoking method, which produces smoke by burning smoke products for inhalation. Therefore, non-combustion smoking devices have been developed.

**[0003]** The existing non-combustion smoking devices typically generate smoke from smoking devices by heating. Such non-combustion smoking devices comprise a heating cavity containing smoke products. By inserting a smoke product into the heating cavity of the non-combustion smoking device and starting the heater to heat the smoking device, the smoke product generates smoke for users.

**[0004]** Documents EP3253234A1, EP2782463A2 and WO2013/098400A1 disclose smoking devices, wherein the airflow channels extend outside or around the extractors.

**[0005]** The prior art shown in Fig. 1 discloses an aerosol-generating device comprising a housing, a heating element, an air inlet 26 and an air flow channel 28. The housing has a proximal end and a distal end and comprises at least one outer surface and one inner surface. The inner surface at the proximal end defines an end-opening cavity, in which an aerosol-forming substrate is housed. The cavity has a longitudinal extending portion between its proximal and distal ends. A heating element is located within the cavity and configured to heat the aerosol-forming substrate contained in the cavity. The airflow channel 28 extends from the air inlet 30 to the distal end of the cavity between the inner surface and the outer surface of the housing.

**[0006]** The applicant discovered that in actual use, since the airflow channel 28 is arranged between the inner surface and the outer surface of the housing, the airflow channel is relatively narrow. After foreign matters such as dust enter during suction, the airflow channel becomes narrowed or even blocked, resulting in poor suction. Moreover, users often cannot easily clean such a narrow airflow channel arranged between the inner surface and the outer surface of the housing. In addition, the housing of the aerosol-generating device not only forms the air flow channel, but houses various components such as battery, control circuit and the like. It is generally difficult for a user to separately remove the housing for cleaning.

## Summary

**[0007]** Therefore, the present disclosure intends to provide a non-combustion smoking device that can resolve one of the above-mentioned issues in the prior art, and more particularly the problem of the cleaning of the airflow channel.

**[0008]** Accordingly the present disclosure provides a non-combustion smoking device as defined in claim 1.

**[0009]** Preferably, the inner peripheral wall of the extractor has a non-circular profile, and a gap between the inner peripheral wall of the non-circular profile and the outer peripheral wall of the smoke product forms the air inlet channel in the form of a groove.

**[0010]** Preferably, the grooves are linear grooves extending straightly from the second end to the first end.

**[0011]** Preferably, the grooves are spiral grooves extending spirally from the second end to the first end.

**[0012]** Preferably, the air inlet channel comprises an air inlet provided at the second end of the extractor, and the air inlet is in fluid communication with a corresponding groove.

**[0013]** Preferably, the first end can comprise a gauze or screen fabric that allow air to flow through.

**[0014]** Preferably, a thermal isolation groove is provided on the outer peripheral wall of the extractor and/or a cavity wall of the heating cavity. In an embodiment, a thermal isolation material can be provided in the thermal isolation groove.

**[0015]** One skilled in the art can understand the features, advantages, and details of the respective embodiments and various other embodiments provided with the following detailed description of the respective embodiments with reference to the drawings listed below. Besides, various features of the drawings discussed below do not necessarily have to be drawn to scale. The various features and dimensions of elements in the drawings can be enlarged or reduced to more clearly illustrate embodiments of the present disclosure.

## Brief Description of the Drawings

**[0016]** The disclosure is further described below with reference to the drawings and embodiments, wherein the same reference numerals refer to similar or identical elements throughout the drawings and the description thereof.

Fig. 1 shows a schematic diagram illustrating an aerosol-generating device with an air flow channel in the prior art.

Fig. 2 shows a diagram illustrating a partial cross-sectional view of a non-combustion smoking device along an air inlet channel in an embodiment of the present disclosure.

Fig. 3 shows a diagram illustrating a top view of the

non-combustion

## Detailed Description

**[0017]** Various exemplary embodiments of the present disclosure are described below.

**[0018]** As used herein, the terms "aerosol-forming substrate" or "smoke substrate" (which are interchangeable) relate to a substrate capable of releasing volatile compounds that can form an aerosol. Such volatile compounds can be released by heating the aerosol-forming substrate. An aerosol-forming substrate can conveniently be part of an aerosol-generating product or a smoke product. It is known for one skilled in the art that an aerosol is a suspension of solid particles or droplets or both solid particles and droplets in a gas, such as air.

**[0019]** As used herein, the term "aerosol-generating product" or "smoke product" (which are interchangeable) refers to a product that comprises an aerosol-forming substrate or a smoke substrate that is capable of releasing volatile compounds that can form aerosol. The aerosol-generating product or smoke product generates an aerosol that can be directly inhaled into a user's lungs through the user's mouth. Aerosol-generating product or smoke product can typically be disposable. The term "smoke product" is generally used hereinbelow.

**[0020]** Exemplary embodiments of the present disclosure will be explained in detail below.

**[0021]** A non-combustion smoking device provided in an embodiment of the present disclosure is schematically shown with reference to Fig. 2. The non-combustion smoking device comprises a housing 1, a body 2, a heater 21, and an extractor 3. The body 2 comprises a cavity wall 22 for forming a heating cavity. The housing 1 is arranged outside the heating cavity of the body 2. The heater 21 is arranged in the heating cavity. The extractor 3 is provided in the heating cavity of the body 2. A receiving cavity for receiving a smoke product 4 is provided inside the extractor 3.

**[0022]** In this embodiment, the extractor 3 can be in the form of a sleeve, comprising and has a first end and a second end opposite to the first end. The first end has an end wall. The second end is open for inserting a smoke product into the receiving cavity. The end wall of the first end supports or bears against the smoke device 4 during usage. A hole through which the heater 21 passes is provided in the end wall of the first end. The smoke product 4 is inserted into the extractor 3 from the open second end of the extractor 3, and is inserted until it comes into contact with the end wall of the first end. In the present embodiment, the cavity wall 22 is in the form of a generally cylindrical tube with an inner diameter slightly larger than an outer diameter of the extractor 3 so that the extractor 3 can be slidably received in the heating cavity.

**[0023]** As shown in the figure, the smoke product 4 has an elongated cylindrical shape, and comprises an aerosol-forming substrate 41 and a filter tip rod. The aerosol-

forming substrate 41 and the filter tip rod are successively arranged and aligned coaxially. The aerosol-forming substrate 41 and the filter tip rod are wrapped with an external paper wrapper. Here is only a schematic representation of a smoke product, which can comprise other components.

**[0024]** The heater 21 extends through an eyelet in the first end of the extractor 3 and is inserted into the aerosol-forming substrate 41 of the smoke product 4 located in the receiving cavity of the extractor 3.

**[0025]** According to the embodiment of the present disclosure, an air inlet channel extending from the second end to the first end of the extractor 3 is provided on the inner peripheral wall of the extractor 3.

**[0026]** Preferably, the air inlet channel is a groove 31 formed on the inner peripheral wall of the extractor 3. Preferably, as shown in Fig. 3, the air inlet channel is a plurality of grooves 31 formed evenly on the inner peripheral wall of the extractor 3 along the inner periphery of the extractor 3.

**[0027]** In the illustrated embodiment, the groove 31 is a linear groove extending straightly from the second end of the extractor to the first end.

**[0028]** Alternatively and preferably, the groove 31 is a spiral groove (not shown) that extends spirally from the second end of an extractor to the first end. In this case, a spiral airflow as formed can take away more heat emitted from the smoke product. Furthermore, dust or other debris carried by an air flow is more likely to accumulate near the second end of the extractor under a drive of a centrifugal force, which is more convenient for subsequent cleaning.

**[0029]** Alternatively, the inner peripheral wall of the extractor 3 in the form of a sleeve can have a non-circular profile (not shown), such as an oval profile, a triangular profile, a polygonal profile and the like. A gap between the inner peripheral wall of the non-circular profile and the outer peripheral wall of the circular profile of the smoke product 4 forms an air inlet channel in the form of a groove. Certainly, in a case where the inner peripheral wall of the extractor 3 has a non-circular profile, the outer peripheral wall of the smoke product 4 can have any profile different from it. As long as a gap can be formed therebetween, such air inlet channel can be formed. For example, the extractor has a pentagonal inner peripheral wall, while the smoking device has a hexagonal outer peripheral wall, and so on. In order to keep a smoke product in an extractor without shaking, a part of the inner peripheral wall of the extractor 3 can be formed with a profile matching the outline of the outer peripheral wall of the smoke product.

**[0030]** The air inlet channel has an air inlet 30 at the second end of the extractor 3. Each air inlet 30 is in fluid communication with a corresponding groove. In the embodiment shown in Fig. 2, the air inlet 30 is actually an end of the corresponding groove 30. The size of the air inlet 30 can be selected by the designer and can be selected to provide a desired suction resistance via the device.

**[0031]** In the embodiment shown in Fig. 2, a through hole 32 is provided by penetrating the end wall of the first end of the extractor 3. Preferably, the number and size of through holes 32 correspond to the number and size of grooves 31. Each through hole 32 can be aligned with a corresponding groove 31. Similarly, the number, position and size of the through holes can be changed according to specific operating parameters. Certainly, a groove (not shown) for guiding an airflow into the aerosol-forming substrate can be formed inside the end wall.

**[0032]** During usage, the user places the smoke product 4 comprising an aerosol-forming substrate 41 in the receiving cavity of the extractor 3. The heater 21 extends through an eyelet in the end wall of the first end of the extractor 3 and is inserted into the aerosol-forming substrate 41 of the smoke product 4. The user activates the heater 21 and the heater 21 heats the aerosol-forming substrate 41 to form an aerosol. At the same time, with the suction of a user on a filter tip rod of the smoke product 4, an air from the external environment flows from the air inlet 30 located at the second end of the extractor 3 (i.e., the upper end in FIG. 2) into a groove 31 between the extractor and the smoke product. Then, the air travels along the groove 31 to the vicinity of the first end of the extractor 3 and enters the aerosol-forming substrate 41 of the smoke product through a gap between the inner wall of the first end of the extractor 3 and the aerosol-forming substrate end of the smoke product 4; and/or enters a gap between the body 2 and the first end of the extractor 3 through the through hole 32, and then enters the aerosol-forming substrate 41 of the smoke product via the eyelet, through which the heater passes, or other eyelets. Subsequently, the air that enters the aerosol-forming substrate 41 travels through the aerosol-forming substrate 41 carrying the aerosol formed by heating the aerosol-forming substrate 41. Finally, the air arrives at the filter tip rod of the smoke product 4 and thereby can be drawn into the user's mouth for smoking.

**[0033]** In the present disclosure, an air inlet is provided at the second end of the extractor, instead of on the housing or the side of the body as typically provided in the prior art. In this position, the possibility of an inadvertent blockage of the air inlet by a user's hand during usage is very small, which ensures smooth suction.

**[0034]** In the present disclosure, an air inlet channel in the form of a groove is located between the inner peripheral wall of the extractor and the outer peripheral surface of the smoke product. An airflow formed during suction takes away the heat emitted from the smoke product. Therefore, the air is preheated before entering the aerosol-forming substrate 41. This preheating of air not only improves the efficiency of the smoking device, but ensures a more uniform temperature distribution within the aerosol-forming substrate. Moreover, compared with an aerosol-generating device disclosed in the prior art, since it is too late to transfer the heat emitted from the smoke product to an extractor, a cavity wall or a housing, which is directly taken away by an airflow, the

temperature of the surface of the housing is effectively reduced during usage of the smoking device, which allows the user to hold the smoking device more comfortably.

**[0035]** In particular, when dust or other foreign matters accumulates in the air inlet channel and causes suction failure or even blockage over time, since the air inlet channel in the form of a groove is provided on the inner peripheral wall of the extractor, a receiving cavity of the extractor is relatively large, which allows the user to easily reach the groove for simple cleaning. Furthermore, since an extractor is a separate component, a user can easily dismantle the extractor and fully clean its internal surface by various means, e.g. by chemical immersion or using tools.

**[0036]** Preferably, in order to further reduce the heat transferred from a heater 21 to the housing 1 and prevent a non-combustion smoking device from becoming hot, a thermal isolation groove can be provided on the outer peripheral wall of the extractor 3, the cavity wall 22 and/or the inner peripheral wall of the housing 1. For example, by digging out a part of the inner peripheral wall of the housing 1, a thin layer is left and a recess formed is a thermal isolation groove. Since the thermal isolation groove forms a thermal isolation space, the heat emitted from a heater during a heating process reaches the thermal isolation groove and is blocked by air in the thermal isolation space, thereby reducing the heat transferred to the housing 1. In some embodiments, a thermal isolation material can be placed in the thermal isolation groove.

**[0037]** Features described in relation to one aspect or embodiment of the present disclosure can also be applied to other aspects or embodiments of the present disclosure.

**[0038]** In an embodiment of the present disclosure, preferably, a smoke product is a heating-type smoke product that comprises an aerosol-forming substrate, which is intended to be heated rather than burned in order to release volatile compounds that can form an aerosol. An aerosol formed by heating an aerosol-forming substrate can contain less known harmful components than those that can be generated by combustion or thermal degradation of the aerosol-forming substrate. A smoke product can be a tobacco rod, or can comprise a tobacco rod.

**[0039]** In various embodiments of the present disclosure, a heater comprises one or more heating elements. A heating element can comprise a resistance material. Alternatively, a heating element can be an infrared heating element, a photon source, or an induction heating element. A heating element can be in any suitable form. For example, a heating element can be the form of a heating blade. Alternatively, a heating element can be the form of a housing or a substrate with different conductive parts, or a resistive metal tube. Alternatively, a heating element can be one or more heating needles or rods that extend through the interior of the aerosol-forming sub-

strate. Other alternative examples comprise heating wires or filaments, such as Ni-Cr (nickel-chromium), platinum, tungsten, or alloy wires or heating plates. Alternatively, a heating element can be deposited in or on a rigid support material.

**[0040]** In various embodiments of the present disclosure, one or more eyelets can be provided in the first end of the extractor. The number of eyelets can be more than the number of the heating elements of the heater and can also be equal to the number of the heating elements of the heater. Eyelets should be sized to allow a heater to pass freely. Eyelets can have any suitable shape. For example, eyelets can be rectangular or circular. The shape of eyelets can be the same as the cross-sectional shape of the one or more heating elements. Alternatively, the first end can comprise a gauze or screen fabric that can allow air to flow through.

**[0041]** An aerosol-forming substrate can be a solid aerosol-forming substrate. Alternatively, an aerosol-forming substrate can comprise both solid and liquid components. The aerosol-forming substrate can comprise a tobacco-containing material that comprises volatile tobacco flavoring compounds released from the substrate upon heating. Alternatively, an aerosol-forming substrate can comprise a tobacco-free material. An aerosol-forming substrate can further comprise an aerosol-forming agent. Examples of suitable aerosol-forming agents are glycerol and propylene glycol.

**[0042]** Accordingly, the protection sought in this disclosure is given by the appended claims

## Claims

### 1. A non-combustion smoking device, comprising

a body 1 forming a heating cavity;  
a heater 21 for heating an aerosol-forming substrate 41 of a smoke product 4; and  
an extractor 3 which receives the aerosol-forming substrate 41 of the smoke product 4, is arranged in the heating cavity of the body 1, and comprises a first end and a second end opposite to the first end,

**characterized in that** an air inlet channel in the form of a groove 31 is provided on an inner peripheral wall of the extractor 3, and the air inlet channel extends from the second end of the extractor to the first end of the extractor 3, and during usage, the air inlet channel in the form of a groove 31 is provided between the inner peripheral wall of the extractor 3 and an outer peripheral surface of the smoke product 4, wherein the air inlet channel comprises a plurality of grooves 31 formed evenly on the inner peripheral wall of the extractor 3 along the inner periphery of the extractor;  
a through hole 32 is provided by penetrating an

end wall of the first end of the extractor 3;  
a plurality of through holes 32 are provided and each of the through holes 32 is aligned with a corresponding groove 31.

2. The non-combustion smoking device of claim 1, wherein the inner peripheral wall of the extractor 3 has a non-circular profile, and a gap between the inner peripheral wall of the non-circular profile and the outer peripheral wall of the smoke product 4 forms the air inlet channel in the form of a groove 31.
3. The non-combustion smoking device of claim 2, wherein the grooves 31 are linear grooves extending straightly from the second end to the first end.
4. The non-combustion smoking device of claim 3, wherein the grooves 31 are spiral grooves extending spirally from the second end to the first end.
5. The non-combustion smoking device of claim 3, wherein the air inlet channel comprises an air inlet provided at the second end of the extractor 3, and the air inlet is in fluid communication with a corresponding groove 31.
6. The non-combustion smoking device of claim 2, wherein the first end comprises a gauze or a screen fabric that allow air to flow through.
7. The non-combustion smoking device of claim 1 or 2, wherein a thermal isolation groove is provided on the outer peripheral wall of the extractor 3 and/or a cavity wall of the heating cavity.

## Patentansprüche

### 1. Verbrennungsfreie Rauchvorrichtung, die Folgendes umfasst

einen Körper 1, der einen Erhitzungshohlraum bildet;  
eine Heizung 21 zum Erhitzen eines aerosolbildenden Substrats 41 eines Rauchprodukts 4; und  
einen Extrahierer 3, der das aerosolbildende Substrat 41 des Rauchprodukts 4 empfängt, im Erhitzungshohlraum des Körpers 1 angeordnet ist und ein erstes Ende und ein zweites Ende gegenüber dem ersten Ende umfasst,  
**dadurch gekennzeichnet, dass** ein Lufteinlasskanal in Form einer Nut 31 an einer Innenumfangswand des Extrahierers 3 bereitgestellt ist, und der Lufteinlasskanal sich vom zweiten Ende des Extrahierers zum ersten Ende des Extrahierers 3 erstreckt, und der Lufteinlasskanal in der Form einer Nut 31 während des Ge-

- brauchs zwischen der Innenumfangswand des Extrahierers 3 und einer Außenumfangsfläche des Rauchprodukts 4 bereitgestellt ist, wobei der Lufteinlasskanal eine Vielzahl von Nuten 31 umfasst, die auf der Innenumfangswand des Extrahierers 3 entlang des Innenumfangs des Extrahierers gleichmäßig gebildet sind; durch Durchdringen einer Endwand des ersten Endes des Extrahierers 3 ist ein Durchgangsloch 32 bereitgestellt; eine Vielzahl von Durchgangslöchern 32 sind bereitgestellt und jedes der Durchgangslöcher 32 ist auf eine entsprechende Nut 31 ausgerichtet.
2. Verbrennungsfreie Rauchvorrichtung nach Anspruch 1, wobei die Innenumfangswand des Extrahierers 3 ein nicht kreisförmiges Profil aufweist, und ein Spalt zwischen der Innenumfangswand des nicht kreisförmigen Profils und der Außenumfangswand des Rauchprodukts 4 den Lufteinlasskanal in der Form einer Nut 31 bildet.
3. Verbrennungsfreie Rauchvorrichtung nach Anspruch 2, wobei die Nuten 31 lineare Nuten sind, die sich gerade vom zweiten Ende zum ersten Ende erstrecken.
4. Verbrennungsfreie Rauchvorrichtung nach Anspruch 3, wobei die Nuten 31 Spiralnuten sind, die sich spiralförmig vom zweiten Ende zum ersten Ende erstrecken.
5. Verbrennungsfreie Rauchvorrichtung nach Anspruch 3, wobei der Lufteinlasskanal einen Lufteinlass umfasst, der am zweiten Ende des Extrahierers 3 bereitgestellt ist, und der Lufteinlass mit einer entsprechenden Nut 31 in Fluidkommunikation steht.
6. Verbrennungsfreie Rauchvorrichtung nach Anspruch 2, wobei das erste Ende ein Gaze- oder ein Siebgewebe umfasst, die ein Durchströmen von Luft erlauben.
7. Verbrennungsfreie Rauchvorrichtung nach Anspruch 1 oder 2, wobei an der Außenumfangswand des Extrahierers 3 und/oder einer Hohlraumwand des Erhitzungshohlraums eine Wärmeisolierungsnut bereitgestellt ist.

## Revendications

1. Dispositif à fumer sans combustion comprenant :

un corps (1) formant une cavité de chauffage ;  
un dispositif de chauffage (21) pour chauffer un substrat de formation d'aérosol (41) d'un produit de fumée (4) ; et  
un extracteur (3) qui reçoit le substrat de formation d'aérosol (41) du produit de fumée (4), est agencé dans la cavité de chauffage du corps (1) et comprend une première extrémité et une seconde extrémité opposée à la première extrémité,  
**caractérisé en ce qu'un** canal d'entrée d'air se présentant sous la forme d'une gorge (31) est prévu sur une paroi périphérique interne de l'extracteur (3) et le canal d'entrée d'air s'étend à partir de la seconde extrémité de l'extracteur vers la première extrémité de l'extracteur (3), et durant l'utilisation, le canal d'entrée d'air se présentant sous la forme d'une gorge (31) est prévu entre la paroi périphérique interne de l'extracteur (3) et une surface périphérique externe du produit de fumée (4), dans lequel le canal d'entrée d'air comprend une pluralité de gorges (31) formées régulièrement sur la paroi périphérique interne de l'extracteur (3) le long de la périphérie interne de l'extracteur ;  
un trou débouchant (32) est prévu en pénétrant dans une paroi d'extrémité de la première extrémité de l'extracteur (3) ;  
une pluralité de trous débouchants (32) est prévue et chacun des trous débouchants (32) est aligné avec une gorge (31) correspondante.

2. Dispositif à fumer sans combustion selon la revendication 1, dans lequel la paroi périphérique interne de l'extracteur (3) a un profil non circulaire, et un interstice entre la paroi périphérique interne du profil non circulaire et la paroi périphérique externe du produit de fumée (4) forme le canal d'entrée d'air se présentant sous la forme d'une gorge (31) .
3. Dispositif à fumer sans combustion selon la revendication 2, dans lequel les gorges (31) sont des gorges linéaires s'étendant tout droit à partir de la seconde extrémité jusqu'à la première extrémité.
4. Dispositif à fumer sans combustion selon la revendication 3, dans lequel les gorges (31) sont des gorges en spirale s'étendant en spirale à partir de la seconde extrémité jusqu'à la première extrémité.
5. Dispositif à fumer sans combustion selon la revendication 3, dans lequel le canal d'entrée d'air comprend une entrée d'air prévue au niveau de la seconde extrémité de l'extracteur (3) et l'entrée d'air est en communication de fluide avec une gorge (31) correspondante.

6. Dispositif à fumer sans combustion selon la revendication 2, dans lequel la première extrémité comprend une gaze ou un tissu écran qui permet à l'air de s'écouler à travers ce dernier.

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7. Dispositif à fumer sans combustion selon la revendication 1 ou 2, dans lequel une gorge d'isolation thermique est prévue sur la paroi périphérique externe de l'extracteur (3) et/ou une paroi de cavité de la cavité de chauffage.

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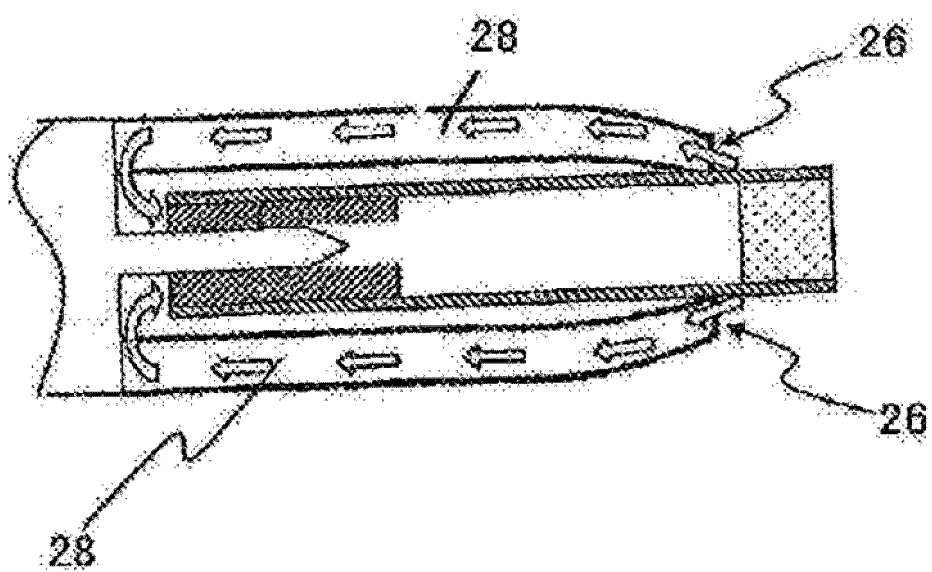


Fig. 1

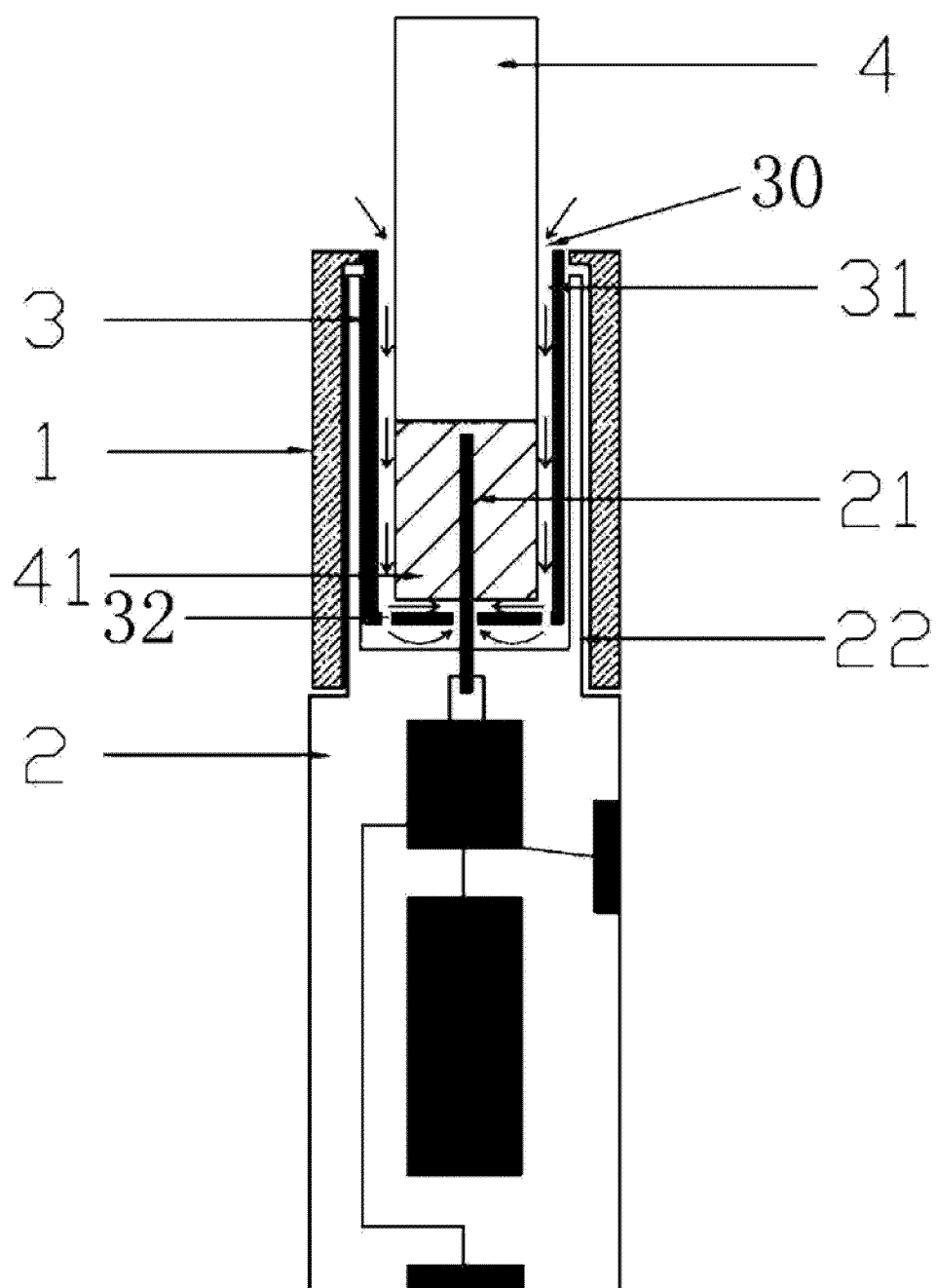


Fig. 2

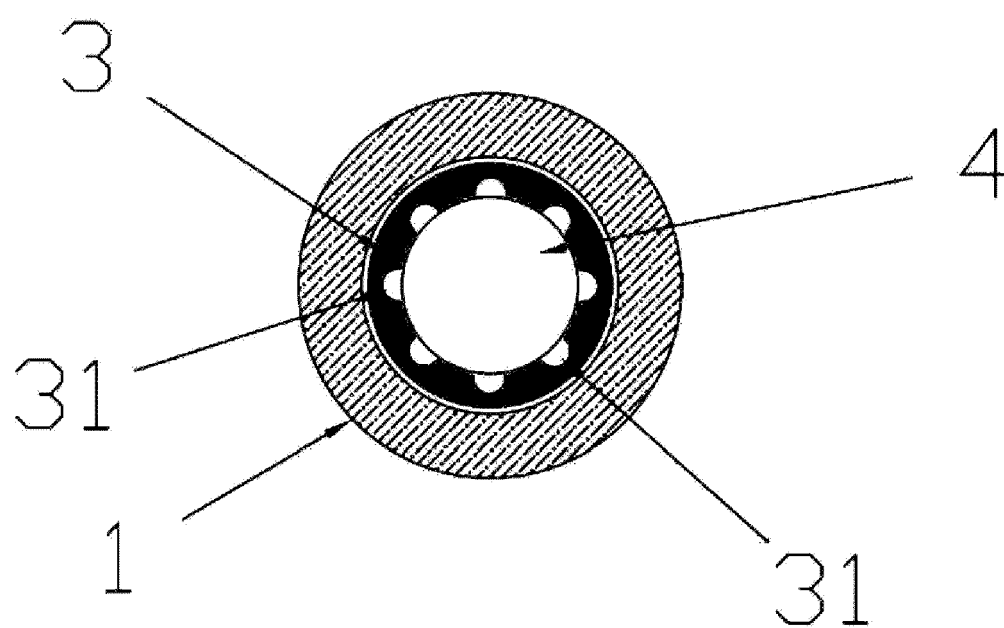


Fig. 3

**REFERENCES CITED IN THE DESCRIPTION**

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