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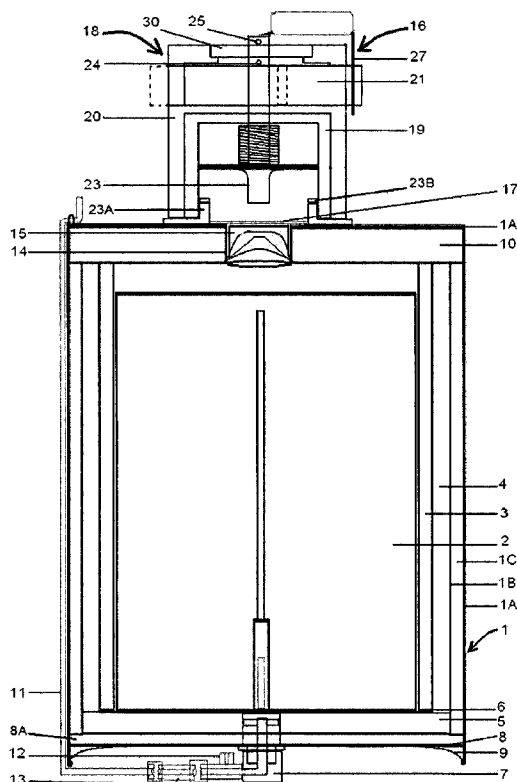
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(54) Title: PORTABLE OXYGEN GENERATOR



(57) Abstract: A portable oxygen generator is disclosed. The portable oxygen generator comprises a multilayered container to accommodate a chemical oxygen candle therein. A filter pack is provided around the chemical oxygen candle so as to filter oxygen generated by decomposition of the chemical candle. An oxygen flow passage is provided around the filter pack such that to allow passage to the oxygen flow there through, a percussion cap adapted to be fired by a percussion cap firing means is provided centrally at top end of the container to ignite the chemical oxygen candle. An oxygen supply pipe is provided at bottom end of the container so as to supply oxygen to an user.



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| — as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) | — of inventorship (Rule 4.17(iv)) |
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PORTABLE OXYGEN GENERATOR

FIELD OF INVENTION

This invention relates to a portable oxygen generator. Particularly this invention relates to a portable chemical oxygen generator for use in case of
5 the domestic and / or medical requirements and in case of any other requirement / emergency.

BACKGROUND OF THE INVENTION

Portable chemical oxygen generator is useful to obtain oxygen in case of an emergency, for example, in case of a serious patient or the like situation
10 arises. The portable chemical oxygen generator is also useful in case of over ground search and rescue operation and underground mining, chemical disasters, at higher altitude by mountaineers and climbers and other places where normal sources of oxygen for a short duration of time is not available for human breath. Also, portable chemical oxygen generators are useful in
15 emergency for human breathing for a short period of time, where normal oxygen in the surrounding area of a person is not available.

Portable chemical oxygen generator unit are known in the art and comprises chemical candles contained in a housing such that to generate oxygen when the unit is activated manually. A filter is provided inside the housing to filter
20 oxygen to make it suitable for human consumption. The chemical decomposition of the candles in the container produces chemical oxygen for human breathing for a limited period of time.

There are disadvantages associated with the prior art. One of the disadvantages is that dual masks are not provided even with the dual pack candle oxygen generator and therefore two people can not use the same portable chemical oxygen generator simultaneously.

- 5 Another disadvantage is that the temperature inside the container is not maintained and therefore the candle is not burnt uniformly and thus oxygen generation is not regular during decomposition of the candle.

Yet another disadvantage is that the dual safety means are not provided so as to avoid inadvertent activation of the portable chemical oxygen generator.

10 OBJECTS OF THE INVENTION

Therefore, an object of the present invention is to provide a portable oxygen generator having visual indication to indicate chemical oxygen generation.

- Another object of the present invention is to provide a portable oxygen generator having single safety pin with dual functions first to free a push
15 button and second to release the firing pin.

Yet another object of the present invention is to provide a portable oxygen generator having dual safety means so as to avoid inadvertent activation of the portable oxygen generator.

- Still another object of the present invention is to provide a portable oxygen
20 generator having dual safety means provided therewith which can be reinstalled in case the portable oxygen generator is used for generating oxygen.

Yet another object of the present invention is to provide a portable oxygen generator having air and water tight sealing around the firing pin release mechanism to provide safe operation life and additional safety to the chemical oxygen generation candle for a longer life.

- 5 Still another object of the present invention is to provide a portable oxygen generator which is light in weight and can be carried by the user as personal items during travel, sports activity, etc. and also can be kept in the houses for emergency use to provided oxygen during critical condition of a person.

- A further object of the present invention is to provide a portable oxygen
10 generator which provides oxygen supply only when the firing pin is released after removing the safety cap from the top of the firing pin release mechanism.

Another object of the present invention is to provide a portable oxygen generator having single oxygen generation candle with single oxygen supply mask.

- 15 Yet another object of the present invention is to provide a portable oxygen generator having dual oxygen generation candles provided separately in a single container with respective oxygen supply masks.

- Still another object of the present invention is to provide a portable oxygen generator which can be used by a user for self and for a rescued person or
20 any other person who is in need of oxygen at the same time as that of the user himself.

STATEMENT OF THE INVENTION

According to this invention there is provided a portable oxygen generator comprising a multilayered container to accommodate a chemical oxygen
5 candle therein, a filter pack being provided around the chemical oxygen candle so as to filter oxygen generated by decomposition of the chemical candle, an oxygen flow passage being provided around the filter pack such that to allow passage to the oxygen flow there through, a percussion cap adapted to be fired by percussion cap firing pin being provided centrally at top
10 end of the container to ignite the chemical oxygen candle, an oxygen supply pipe being provided at bottom end of the container so as to supply oxygen to an user.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

Portable chemical oxygen generator according to a preferred embodiment is
15 herein described and illustrated in the accompanying drawings, wherein:

Fig. 1 illustrates a sectional view of the portable oxygen generator,

Fig. 2A and 2B illustrate plan view of percussion cap firing means in ready
and fired position,

Fig. 3 illustrates a sectional view of the portable oxygen generator according
20 to an embodiment,

Fig. 4A and 4B illustrate plan view of percussion cap firing means in ready
and fired position according to another embodiment,

Fig. 5 illustrates perspective view of safety pin,

Fig. 6 illustrates perspective view of tearable cap,

Fig. 7 illustrates perspective view of single container,

Fig. 8 illustrates perspective view of double container,

DETAILED DESCRIPTION

Portable chemical oxygen generator is herein described with numerous
5 specific details so as to provide a complete understanding of the invention.
However these specific details are exemplary details and should not be
treated as the limitation to the scope of the invention. Throughout this
specification the word "comprise" or variations such as "comprises or
comprising", will be understood to imply the inclusions of a stated element,
10 integer or step, or group of elements, integers or steps, but not the exclusions
of any other element, integer or step or group of elements, integers or steps.

Referring to the drawings, figure 1 shows a sectional view of a portable
oxygen generator. The portable oxygen generator comprises a multilayered
container 1 such that to accommodate an oxygen generation candle 2 therein
15 secured at the bottom end thereof. A filter pack 3 is provided around the
candle 2 such that to filter the oxygen generated during the decomposition of
the chemical oxygen candle 2. An oxygen flow passage 4 is provided around
the filter pack 3 for facilitating flow of oxygen. The multilayer cylindrical
container 1 comprises a metallic outer layer 1A and a metallic inner layer 1B
20 having non-conducting material layer 1C, for example, mica, glass wool and
ceramic, provided there between. A filter assembly 5 having a metallic sheet 6
provided thereon is provided at the bottom end of the container 1 such that to
hold the candle 2 so as to filter and supply filtered oxygen to an outlet 7
secured at the center of the bottom end of the container 1. A metallic disc 8

having a layer of mica 8A provided thereon is provided at the lower end of the container 1 so as to close the lower end of the container 1. A support disc 9 is provided below the disc 8 so as to prevent bulging of the bottom end due to heat and pressure generated during the oxygen generation. A mica disc 10 is provided at the top of the container 1 below the outer layer 1A so to provide insulation.

A supply pipe 11, having a pressure release valve 12 and a one way valve 13 secured at one end thereof, is secured with the outlet 7 such that to supply oxygen to the oxygen supply mask provided at the other end of the supply pipe 11 in order to supply oxygen to the user.

In one embodiment, the chemical oxygen generating candle 2 is secured with the metallic sheet 6 by means of threads provided in the metallic sheet 6 or any other type of holder, for example, a pin type or slot type holder secured with the metallic sheet 6. The chemical candle 2 is secured in such a way that the candle is secured firmly and does not move in any direction inside the filter pack 3.

The filter pack 3, according to an embodiment, comprises a wire mesh (not shown) having a layer of porous material, for example, ceramic fiber porous material, glass fiber porous material, ceramic porous material, provided therewith. The filter pack 3 is provided to remove impurities, if any, from the chemical oxygen before supply to the user of the portable oxygen generator.

A central hole 14 is provided at the top end of the container 1 such that to accommodate a percussion cap 15 provided to ignite the candle 2 by

percussion cap firing means 16 mounted on the top closed end of the container 1. In one embodiment a non-conducting layer 17 of, for example, mica is provided to cover the percussion cap 12.

The percussion cap firing means 16 comprises a firing pin holding and releasing structure 18. The structure 18 comprises a metallic inner structure 19 and non-metallic outer structure 20. A firing pin holding and releasing plate 21 having a firing pin holding and releasing Jesus cross shaped slot 22 is mounted, slidably, on the top end of the structure 18 to hold a spring loaded firing pin 23. A firing pin holder 24 is provided to hold the firing pin 13 with the firing pin holding plate 21. A safety pin holding hole 25 is provided to accommodate upper end 26 of a flexible safety pin 27 (see figure 5) to lock the spring loaded firing pin 23. The lower end 28 is adapted to be accommodated in a hole 29 provided at one end of the holding and releasing plate 21 so as to lock the plate 21. A cover 30 is provided to cover the pin holder 24 such that to make it temper proof. A visual indicator, for example, colour coating (red and green) is provided on top visible surfaces of the firing pin holding and releasing plate 21 such that to indication ready or fired position of the portable oxygen generator.

Referring to figure 2A and 2B, firing pin holding and releasing plate 21 is shown in a ready and fired position. The flexible safety pin 27 is rotated to free the firing pin holding and releasing plate 21 and then the flexible safety pin 27 is pulled out to unlock top end of the firing pin 23 to free it and put the firing pin holding and releasing plate 21 into ready position. The firing pin holding

and releasing plate 21 is then pushed inside so as to release the firing pin 23 to strike the percussion cap 15 and ignite the chemical oxygen candle 2.

Referring to figure 3, percussion cap firing means 16, according to an embodiment are shown. The percussion cap firing means 16 comprises the same components as herein above described in the description relating to figure 1, except the firing pin holding and releasing plate 21. The firing pin holding and releasing plate as shown in the figure 3 comprises a firing pin holding and releasing circular cap 31 having a rectangular slot 32 and is mounted, rotatably, on the top end of the structure 18 such that to hold and release the spring loaded firing pin 23 in position. A collar 23A of mounting means is provided with a sealing ring 23B such that to seal exit of the oxygen and smoke from the container 1. A plurality of teethes 33 or the like are provided at the outer surface of the periphery of the circular cap 31 for facilitating gripping on the circular cap 31 so as to rotate the cap 31 in order to release the firing pin 23 as and when desired. A cover 30 is provided with the circular cap 31 to cover the pin holder 24 such that to make it tamper proof.

Referring to figure 4A and 4B, firing pin holding and releasing circular cap 31 is shown in a ready position and fired position. A safety pin 27 is first rotated and then pulled to free the firing pin holding and releasing circular cap 31 so as to make the portable oxygen generator into the ready position. Now the firing pin holding and releasing circular cap 31 is rotated in clockwise or anticlockwise direction such that to release the firing pin 23 to strike the percussion cap 15 in order to ignite the chemical oxygen candle 2. A visual indicator 32A is provided with the circular cap 31 such that to move away,

upon rotation, for example at 90 degree, from the locked or secured position to indicate fired position of the portable oxygen generator.

Referring to figure 5, a safety pin 27 is shown. The safety pin 27 comprises an inverted U shaped structure adapted to be mounted over the firing pin holding and releasing plate 21 or circular cap 31 such to lock the firing pin holding and releasing. A tearable protective cover 34 (see figure 6) is provided to cover the percussion cap firing means 16.

In one embodiment single container 1 or double containers 1 (see figure 7 and 8) are accommodated in a single insulated portable container for facilitating carrying the portable oxygen generator for use by the user.

During operation of the portable oxygen generator the safety pin 27 is removed by rotating and pulling the same from the firing pin holding and releasing plate 21 or circular cap 31 to free the firing pin holding plate or circular cap which in turn releases the firing pin 23 which strikes the percussion cap 15 provided to ignite the chemical candle 2 to generate oxygen upon decomposition thereof. The oxygen so generated is exited through the supply pipe 11 secured with the outlet 7. The oxygen so generated is filtered by the filter pack 3 provided in the oxygen generator.

The safety pin 27 is provided to free the firing pin holding and releasing plate 21 or circular cap 31, but it can be replaced in case ignition or decomposition of the chemical oxygen candle 2 is not needed and to make the portable oxygen generator safe again.

The portable oxygen generator is used only once and no component is reusable. Also the firing means can be shipped separately.

Certain features of the invention have been described with reference to the example embodiments. However, the description is not intended to be
5 construed in a limiting sense. Various modifications of the example embodiments as well as other embodiments of the invention, which are apparent to the persons skilled in the art to which the invention pertains, are deemed to lie within the spirit and scope of the invention.

I CLAIM:

1. A portable oxygen generator comprising a multilayered container to accommodate a chemical oxygen candle therein, a filter pack being provided around the chemical oxygen candle so as to filter oxygen generated by decomposition of the chemical candle, an oxygen flow passage being provided around the filter pack such that to allow passage to the oxygen flow there through, a percussion cap adapted to be fired by a percussion cap firing means being provided centrally at top end of the container to ignite the chemical oxygen candle, an oxygen supply pipe being provided at bottom end of the container so as to supply oxygen to an user.
2. The portable oxygen generator as claimed in claim 1, wherein the multilayered container comprises a metallic outer layer and a perforated metallic inner layer having a layer of non-conducting material provided there between.
3. The portable oxygen generator as claimed in claim 1, wherein the multilayered container has a disc, made of for example mica, provided at the top of the container below the metallic outer layer to provide insulation.
4. The portable oxygen generator as claimed in claim 1, wherein the multilayered container has a metallic disc having a layer of mica provided thereon being provided at the lower end of the container to provide insulation.

5. The portable oxygen generator as claimed in claim 2, wherein the non-conducting material consist of, for example, mica, glass wool and / or ceramic.
6. The portable oxygen generator as claimed in claim 1, wherein the filter
5 pack comprises a wire mesh having a layer of porous material, for example, ceramic fiber porous material, glass fiber porous material, ceramic porous material, provided with the wire mesh.
7. The portable oxygen generator as claimed in claim 1, wherein
10 percussion cap firing means comprises a firing pin holding and locking structure to support a spring loaded firing pin and a firing pin holding and releasing means provided to hold and release the spring loaded firing pin, a safety pin being provided to lock the holding plate with the firing pin holding plate.
8. The portable oxygen generator as claimed in claim 7, wherein collar of
15 a mounting means is provided with a sealing ring such that to seal exit of the oxygen and smoke from the container.
9. The portable oxygen generator as claimed in claim 1, wherein a tearable protective cover being provided to cover the percussion cap firing means.
- 20 10. The portable oxygen generator as claimed in claim 1, wherein firing pin holding and releasing means comprises a plate having a Jesus cross shaped slot being mounted, slidably, on the top end of the structure such that to be pushed so as to release the firing pin.
11. The portable oxygen generator as claimed in claim 1, wherein firing pin
25 holding and releasing means comprises a circular cap having a

rectangular shaped slot provided therewith such that to release the firing pin upon rotation thereof in a clockwise or anticlockwise direction.

12. The portable oxygen generator as claimed in claim 11, wherein a visual indicator is provided with the circular cap such that to move away from the locked or secured position to indicate fired position of the portable oxygen generator.

13. The portable oxygen generator as claimed in claim 11, wherein the circular cap has a plurality of teethes provided a outer surface of the periphery so as to provide gripping on the circular cap.

14. The portable oxygen generator as claimed in claim 1, wherein the supply pipe having a pressure release valve and a one way valve secured at one end thereof being provided to supply oxygen to a mask provided at the other end of the supply pipe so as to supply oxygen to the user.

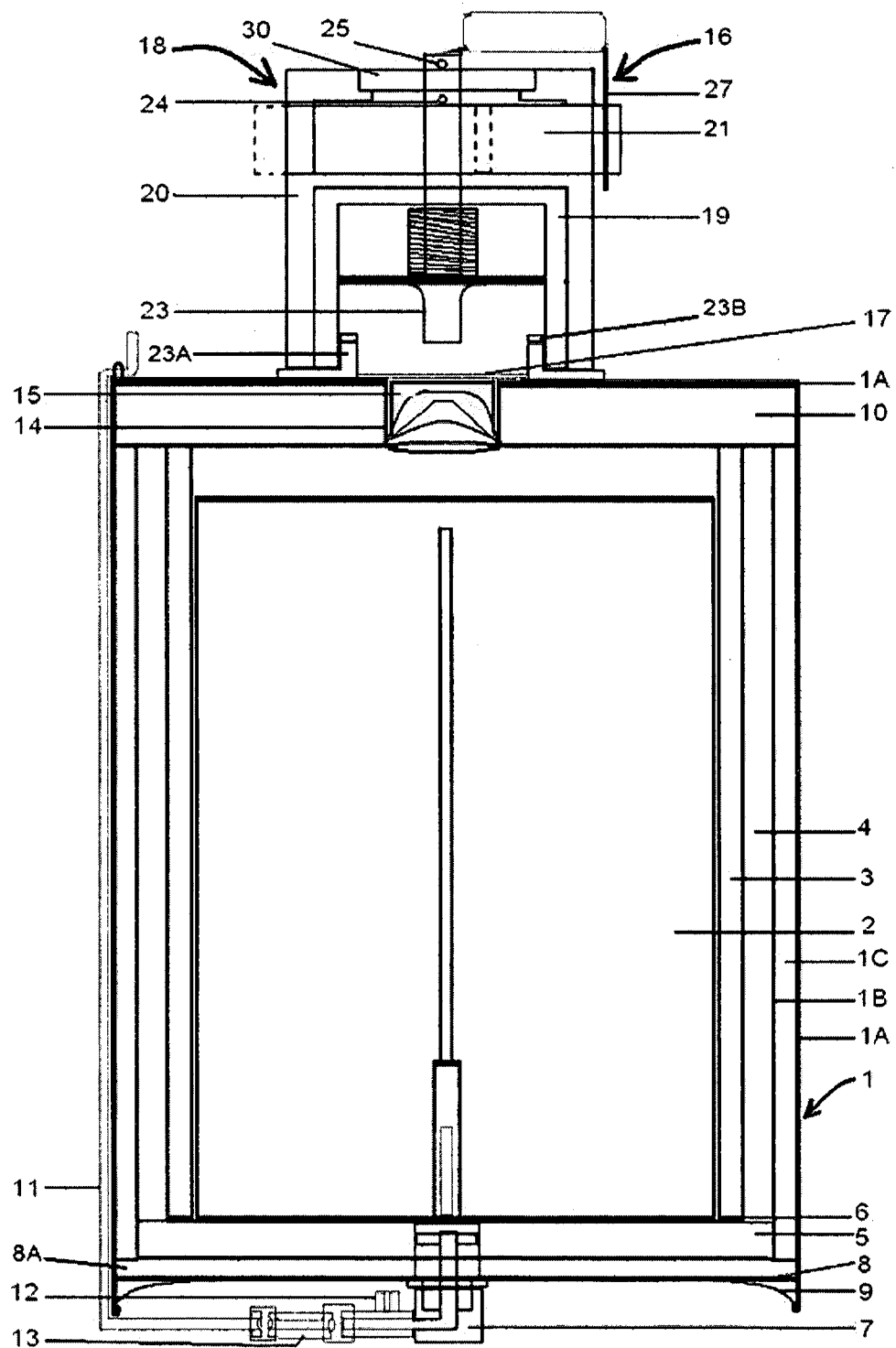


FIG. - 1

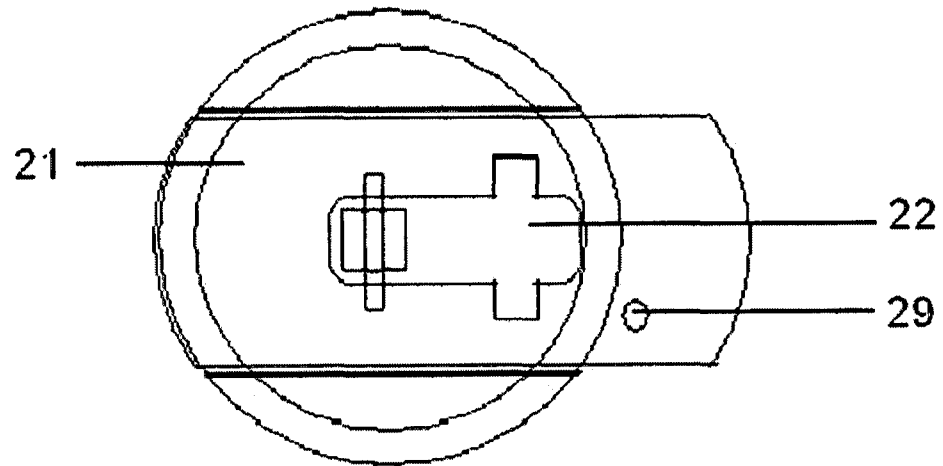


FIG. - 2A

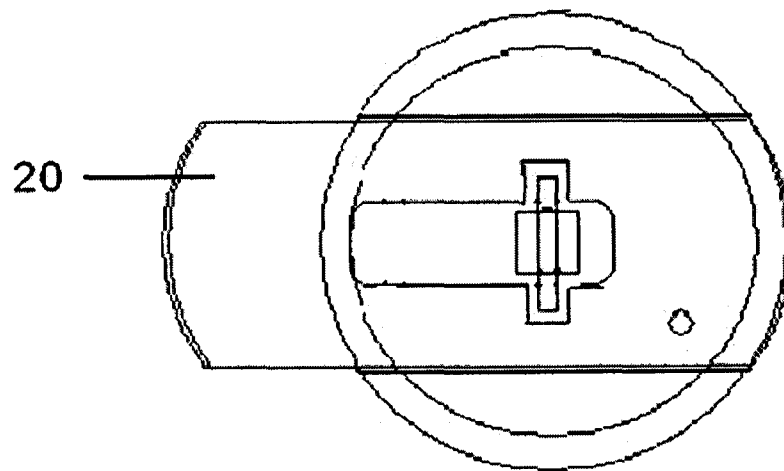


FIG. - 2B

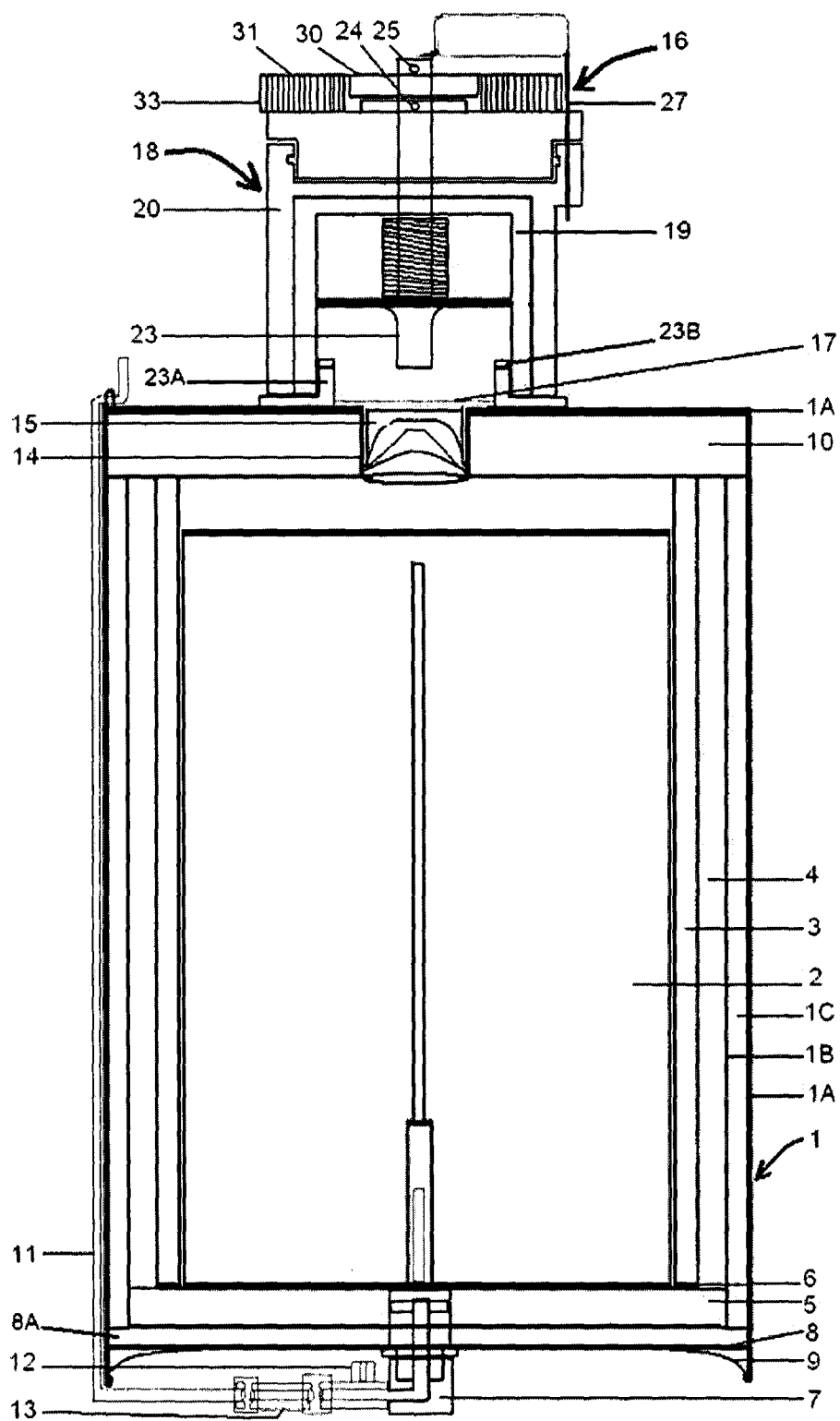


FIG. - 3

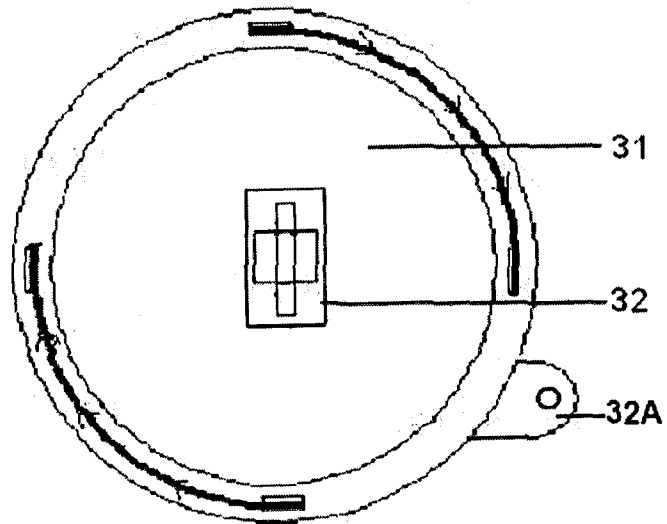


FIG. - 4A

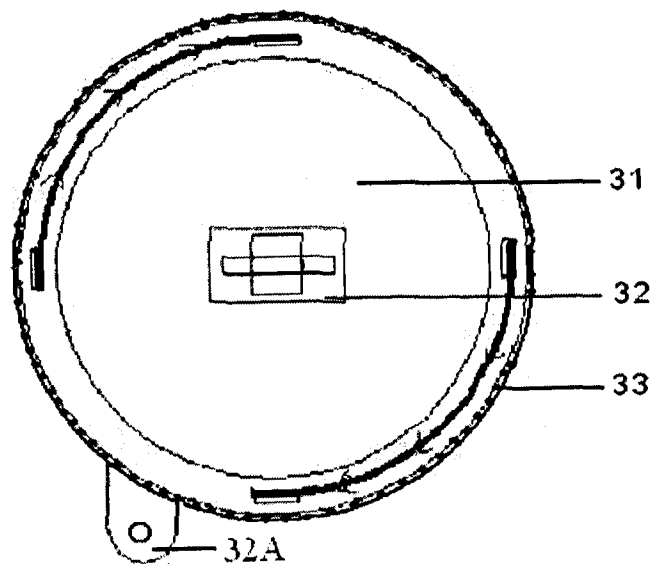


FIG. - 4B

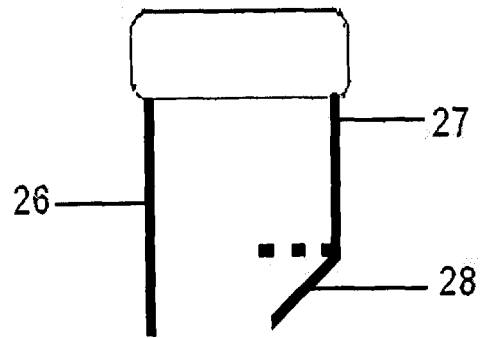


FIG. - 5

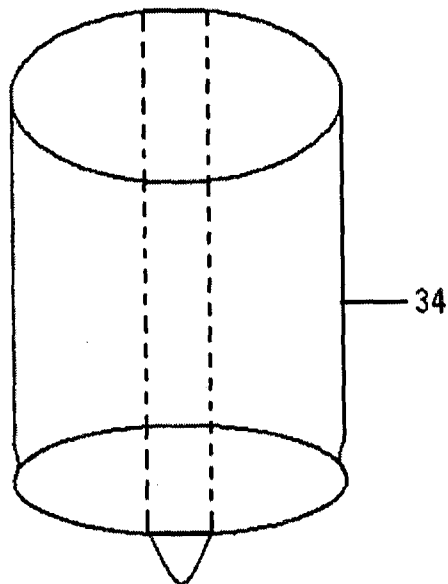


FIG. - 6

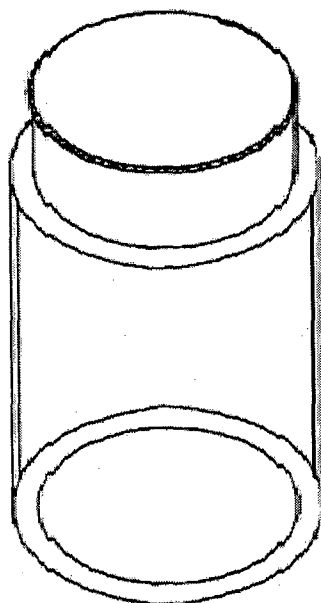


FIG. - 7

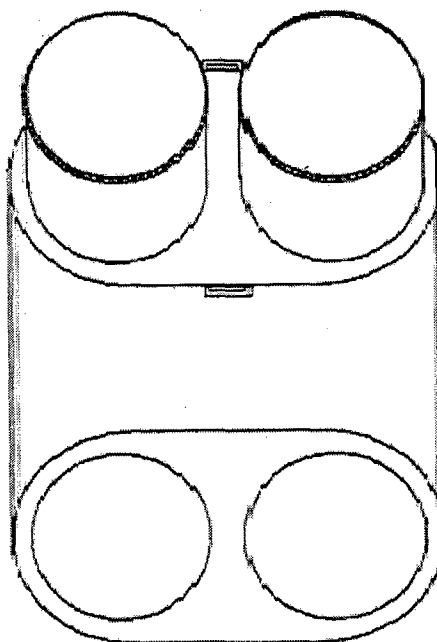


FIG. - 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IN2013/000644

A. CLASSIFICATION OF SUBJECT MATTER
B01D1/00 Version=2014.01

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B01D1/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO, ORBIT, USPTO, GOOGLE PATENT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1392401 B1 [David Jones (US)] 2006.10.04 & DE 60215154 D1 & US 7371350 & US 2004-0151639 & WO 2002-098512 A1 CLAIM 3, CLAIM 11, PARAGRAPH 0103-0104	1, 2, 5, 14
Y	WO 2009030921 A2 [Crudace (GB)] 2009.03.12 [page 4, line 12], CLAIM 1, CLAIM 16	3, 4, 6, 8
Y	CN 203067019 U [(CN)] 2013.07.17 CLAIM 4, FIGURE 1	14
A	EP 2151264 A1 [Bouaza Mesli (FR)] 2010.02.10 & DE 602009000562 D1 PARAGRAPH 15-16	9
A	US 3027035 A [Farago Jacquelyn (US)] 1962.03.27 FIGURE 1	13
A	US 2764027 A [Walter Otto (US)] 1956.09.25 CLAIM 11, CLAIM 12	12



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

02-04-2014

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IN2013/000644

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4658529 A [WILLIAM BERTOLINI (US)] 1984.08.15 CLAIM 1	7, 10
A	EP 0186703 B1 [BATTERMAN (US)] 1984.07.25 & DE 3580259 D1 & US 4575963 & WO 1986-000398A PARAGRAPH 0007-0008	11
A	US 4985879 A [Connie S. Owens] Jan 15, 1991 FIGURE 3, 5	12
A	US 6112619 A [Terry A. Campbell] Sep 5, 2000 CLAIM 1, 7; FIG. 12	11, 12