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(54) **PROTECTED COMBUSTION DEVICE**

(57) A protected combustion device (10) has a main body (20) including an inner-layer wall (21), an outer-layer wall (22) disposed outside of and spaced from the inner-layer wall, and a hollow (23) disposed therebetween. The inner-layer wall forms a fuel receptacle (211). The outer-layer wall has an open end and the open end defines a hole (24). The hole is in communication with the hollow. The open end of the outer-layer wall forms a bottom side. A protection device (30) is coupled to the main body. The protection device includes a through hole (31) extending therethrough and communicating with the hollow. The protection device includes a slot (32) extending along a periphery of the through hole and the bottom side is disposed in the slot.

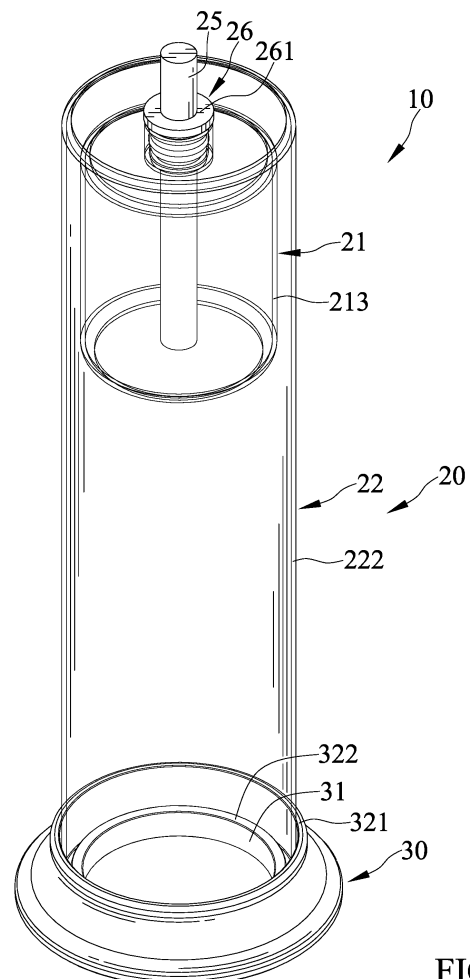


FIG. 1

Description

Background of the Invention

[0001] The present invention relates to a combustion device and, particularly, to a combustion device having.

[0002] TW Pat. No. 1625493 shows a flame-display combination structure, which includes an accommodation device, a burning device, and a fixing device. The accommodation device includes a fuel container, a top a cover, and a heat insulating member. The fuel container defines a receiving portion disposed therein and connected to the top cover. The top cover defines a filler hole and a first positioning groove, which extend therethrough and communicate with the receiving portion. The heat insulating member is connected to an end of the top cover different from that to which the receiving portion is connected. The heat insulating member defines a second positioning groove extending therethrough, i.e., through the top side and the bottom side of the heat insulating member, and communicating with the first positioning groove. The burning device includes a second end inserted into the receiving portion through the second positioning groove and the first positioning groove. The burning device is sandwiched between a first clamping surface and a second clamping surface of the fixing device.

[0003] When the flame-display combination structure is in use for a long time, the upper of the fuel container and a shielding member that is disposed adjacent to the upper of the fuel container are high and higher than other regions of the combination structure, so heat conducts downwards and causes the fuel container to become hot and unsafe to hold.

[0004] US 4 693 681 A describes a candle apparatus for providing a candle-like flame and candle effect and employing a liquid that may be of petroleum product type or non-petroleum product type functioning as a source for the flame in combination with a wick that is soaked in the liquid.

[0005] US 2 001 377 A describes a candle wick comprising a self-consuming fabric wick, a reinforcing strip extending therealong externally thereof, and a fine wire, fusible at the temperature at the base of the flame, openly wrapped about the fabric wick and strip for holding them together.

[0006] US 3 290 907 A describes an apparatus for burning spirit or similar fuel, comprising a fuel container containing a fuel absorptive usually porous mass and a wick in contact with the absorptive mass and adapted to transfer fuel from the absorptive mass to the point of combustion, in which there is disposed within the fuel container a lower fuel absorptive filling layer and superposed thereon a filling layer having relatively large pores, and between the large-pored filling layer and the top wall of the fuel container a second fuel absorptive layer, the said second fuel absorptive layer communicating through a wick with the bottom layer of fuel absorptive material.

[0007] The present invention is, therefore, intended to obviate or at least alleviate the problems encountered in the prior art.

Summary of the Invention

[0008] According to the present invention, a protected combustion device includes a main body, which is double layered, including an inner-layer wall and an outer-layer wall disposed outside of and spaced from the inner-layer wall such that the inner-layer wall and the outer-layer wall include a hollow disposed therebetween. The inner-layer wall forms a fuel receptacle with an opening. The outer-layer wall has an open end and the open end defines a hole. The hole is in communication with the hollow. The open end of the outer-layer wall forms a bottom side. Further, a protection device is coupled to the main body. The protection device includes a through hole extending therethrough and communicating with the hollow. The protection device includes a slot extending along a periphery of the through hole and the bottom side is disposed in the slot.

[0009] Other objectives, advantages, and new features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanied drawings.

Brief Description of the Drawings

[0010]

Fig. 1 is a perspective view of a protected combustion device in accordance with the present invention.

Fig. 2 is an exploded perspective view of the protected combustion device of Fig. 1.

Fig. 3 is a cross-sectional view of the protected combustion device of Fig. 1.

Fig. 4 is a partial, enlarged cross-sectional view of the protected combustion device of Fig. 1.

Detailed Description of the Invention

[0011] Figs. 1 through 3 show a combustion device 10 having a double-layer structure in accordance with a first embodiment of the present invention.

[0012] The combustion device 10 includes a main body 20, which is double layered. The main body 20 has an inner-layer wall 21 and an outer-layer wall 22 disposed outside of and spaced from the inner-layer wall 21 such that the inner-layer wall 21 and the outer-layer wall 22 include a hollow 23 disposed therebetween.

[0013] The inner-layer wall 21 forms a fuel receptacle 211 with an opening 212. The main body 20 has a receiving portion 213 formed by the inner-layer wall 21 and the fuel receptacle 211 is delimited by the receiving portion 213. The inner-layer wall 21 is made from a transparent material. The inner-layer wall 21 is in a form of a

cylinder.

[0014] The main body 20 has an interconnecting portion 214 interconnecting the inner-layer wall 21 and the outer-layer wall 22. The interconnecting portion 214 extends from an outer periphery of the inner-layer wall 21 to the inner periphery of the outer-layer wall 22. The interconnecting portion 214 extends from a transversely extending portion of the outer periphery of the inner-layer wall 21 to a transversely extending portion 223 of the outer-layer wall 22. The interconnecting portion 214 is hollow.

[0015] The outer-layer wall 22 has an end forming an open end and the open end defines a hole 24. The hole 24 is in communication with the hollow 23. The open end of the outer-layer wall 22 forms a bottom side 221. The outer-layer wall 22 includes the bottom side 221 extending radially outwards from its inner periphery to its outer periphery. The outer-layer wall 22 is made from a transparent material. The outer-layer wall 22 is in a form of a cylinder 222. The outer-layer wall 22 has a center disposed coaxially with a center of the inner-layer wall 21.

[0016] The combustion device 10 includes a wick 25 inserted through a hollow of the interconnecting portion 214. The wick 25 is also inserted through the opening 212 into the receiving portion 213. The wick 25 is metallic because it is made from metal. The wick 25 has an end disposed in the fuel receptacle 211 and another end disposed outside of the main body 20. The end of the wick 25 that is disposed in the fuel receptacle 211 is visible because the inner-layer wall 21 and the outer-layer wall 22 are made from a transparent material as set forth.

[0017] The combustion device 10 includes a retaining device 26 configured to keep the wick 25 in place. The retaining device 26 includes an inner periphery in frictional contact with the wick 25 to securely hold the wick 25. The retaining device 26 is disposed in the interconnecting portion 214.

[0018] The retaining device 26 is in a form of a sleeve 261. The retaining device 26 includes at least one gasket 262 mounted thereon. The retaining device 26 has an outer periphery defining at least one groove 263 and the at least one gasket 262 is mounted in the at least one groove 263. The at least one gasket 262 abuts an inner periphery of the interconnecting portion 214.

[0019] The combustion device 10 includes a protection device 30 coupled to the main body 20. The protection device 30 is configured to prevent the main body 20 from being tipped over and to provide a heat insulation effect. The protection device 30 is releasably coupled to the main body 20.

[0020] The protection device 30 includes a through hole 31 extending therethrough and communicating with the hollow 23.

[0021] The protection device 30 includes a slot 32 extending along a periphery of the through hole 31. The bottom side 221 is disposed in the slot 32. The slot 32 and the bottom side 221 are in the same shape.

[0022] The protection device 30 has an outer peripheral

portion 321 and an inner peripheral portion 322 and includes the slot 32 disposed between the outer peripheral portion 321 and the inner peripheral portion 322. The outer peripheral portion 321 includes a side delimiting a first lateral side 323 of the slot 32. The inner peripheral portion 322 includes a side delimiting a second lateral side 324 of the slot 32. The side of the outer peripheral portion 321 extends in a height direction of the protection device 30 higher than the side of the inner peripheral portion 322. The side of the outer peripheral portion 321 extends to an extent that is at a first height H1 with respect to a bottom side 33 of the protection device 30. The side of the inner peripheral portion 322 extending to an extent that is at a second height H2, which is shorter than the first height H1, with respect to the bottom side 33 of the protection device 30. The first and the second heights H1 and H2 are higher than a bottom side of the slot 32. The bottom side 33 of the protection device 30 is adapted to be stably supported by a floor.

[0023] In view of the foregoing, the protection device 30 prevents the main body 20 from being tipped over and provides a heat insulation effect. Further, the inner layer wall 21 and the outer-layer wall 22 include the hollow 23 therebetween, thus, heat emitted from the wick 25 will not render the outer-layer walls 22 too hot to hold.

Claims

1. A protected combustion device (10) having a double-layer structure comprising:

a main body (20), which is double layered, including an inner-layer wall (21) and an outer-layer wall (22) disposed outside of and spaced from the inner-layer wall (21) such that the inner-layer wall (21) and the outer-layer wall (22) include a hollow (23) disposed therebetween, wherein the inner-layer wall (21) forms a fuel receptacle (211) with an opening (212), wherein the outer-layer wall (22) has an open end and the open end defines a hole (24), wherein the hole (24) is in communication with the hollow (23), and wherein the open end of the outer-layer wall (22) forms a bottom side (221); and a protection device (30) coupled to the main body (20), wherein the protection device (30) includes a through hole (31) extending therethrough and communicating with the hollow (23), wherein the protection device (30) includes a slot (32) extending along a periphery of the through hole (31) and the bottom side (221) is disposed in the slot (32).

2. The protected combustion device (10) as claimed in claim 1, wherein the protection device (30) has an outer peripheral portion (321) and an inner peripheral portion (322) and includes the slot (32) disposed be-

tween the outer peripheral portion (321) and the inner peripheral portion (322), wherein the outer peripheral portion (321) includes a side delimiting a first lateral side (323) of the slot (32), wherein the inner peripheral portion (322) includes a side delimiting a second lateral side (324) of the slot (32), and wherein the side of the outer peripheral portion (321) extends in a height direction of the protection device (30) higher than the side of the inner peripheral portion (322), with the side of the outer peripheral portion (321) extending to an extent that is at a first height (H1) with respect to a bottom side of the protection device (30), and with the side of the inner peripheral portion (322) extending to an extent that is at a second height (H2), which is shorter than the first height (H1), with respect to the bottom side of the protection device (30).

3. The protected combustion device (10) as claimed in claim 2, wherein the first (H1) and the second (H2) heights are higher than a bottom side of the slot (32).
4. The protected combustion device (10) as claimed in claim 1, wherein the protection device (30) is releasably coupled to the main body (20).
5. The protected combustion device (10) as claimed in claim 3, wherein the main body (20) has a receiving portion (213) formed by the inner-layer wall (21) and the fuel receptacle (211) is delimited by the receiving portion (213), wherein the main body (20) has an interconnecting portion (214) interconnecting the inner-layer wall (21) and the outer-layer wall (22), wherein the interconnecting portion (214) extends from an outer periphery of the inner-layer wall (21) to the inner periphery of the outer-layer wall (22), and wherein the interconnecting portion (214) is hollow.
6. The protected combustion device (10) as claimed in claim 5 further comprising a wick (25) and a retaining device (26), wherein the wick (25) is inserted through the interconnecting portion (214) and has an end disposed in the fuel receptacle (211) and another end disposed outside of the main body (20), wherein the retaining device (26) includes an inner periphery in frictional contact with the wick (25) to securely hold the wick (25), and wherein the retaining device (26) is disposed in the interconnecting portion (214).
7. The protected combustion device (10) as claimed in claim 6, wherein the retaining device (26) is in a form of a sleeve (261), wherein the retaining device (26) includes at least one gasket (262) mounted thereon, wherein the retaining device (26) has an outer periphery defining at least one groove (263) and the at least one gasket (262) is mounted in the at least one groove (263), and wherein the at least one gasket

(262) abuts an inner periphery of the interconnecting portion (214).

8. The protected combustion device (10) as claimed in claim 7, wherein the inner-layer wall (21) and the outer-layer wall (22) are made from a transparent material.
9. The protected combustion device (10) as claimed in claim 8, wherein the wick (25) is metallic.
10. The protected combustion device (10) as claimed in claim 1, wherein the bottom side (221) and the slot (32) are in the same shape.
11. The protected combustion device (10) as claimed in claim 1, wherein the outer-layer wall (22) is in a form of a cylinder (222).
12. The protected combustion device (10) as claimed in claim 3, wherein the protection device (30) is releasably coupled to the main body (20).
13. The protected combustion device (10) as claimed in claim 12, wherein the bottom side (221) and the slot (32) are in the same shape.
14. The protected combustion device (10) as claimed in claim 13, wherein the main body (20) has a receiving portion (213) formed by the inner-layer wall (21) and the fuel receptacle (211) is delimited by the receiving portion (213), wherein the main body (20) has an interconnecting portion (214) interconnecting the inner-layer wall (21) and the outer-layer wall (22), wherein the interconnecting portion (214) extends from an outer periphery of the inner-layer wall (21) to the inner periphery of the outer-layer wall (22), and wherein the interconnecting portion (214) is hollow.
15. The protected combustion device (10) as claimed in claim 14 further comprising a wick (30) and a retaining device (26), wherein the wick (30) is inserted through the interconnecting portion (214) and has an end disposed in the fuel receptacle (211) and another end disposed outside of the main body (20), wherein the retaining device (26) includes an inner periphery in frictional contact with the wick (30) to securely hold the wick (30), and wherein the retaining device (26) is disposed in the interconnecting portion (214).

Amended claims in accordance with Rule 137(2) EPC.

1. A protected combustion device (10) having a double-layer structure comprising:

a main body (20), which is double layered, including an inner-layer wall (21) and an outer-layer wall (22) disposed outside of and spaced from the inner-layer wall (21) such that the inner-layer wall (21) and the outer-layer wall (22) include a hollow (23) disposed therebetween, wherein the inner-layer wall (21) forms a fuel receptacle (211) with an opening (212), wherein the outer-layer wall (22) has an open end and the open end defines a hole (24), wherein the hole (24) is in communication with the hollow (23), and wherein the open end of the outer-layer wall (22) forms a bottom side (221); and a protection device (30) coupled to the main body (20), wherein the protection device (30) includes a through hole (31) extending there-through

characterized in that

the through hole (31) communicates with the hollow (23), and wherein the protection device (30) includes a slot (32) extending along a periphery of the through hole (31) and the bottom side (221) is disposed in the slot (32).

2. The protected combustion device (10) as claimed in claim 1, wherein the protection device (30) has an outer peripheral portion (321) and an inner peripheral portion (322) and includes the slot (32) disposed between the outer peripheral portion (321) and the inner peripheral portion (322), wherein the outer peripheral portion (321) includes a side delimiting a first lateral side (323) of the slot (32), wherein the inner peripheral portion (322) includes a side delimiting a second lateral side (324) of the slot (32), and wherein the side of the outer peripheral portion (321) extends in a height direction of the protection device (30) higher than the side of the inner peripheral portion (322), with the side of the outer peripheral portion (321) extending to an extent that is at a first height (H1) with respect to a bottom side of the protection device (30), and with the side of the inner peripheral portion (322) extending to an extent that is at a second height (H2), which is shorter than the first height (H1), with respect to the bottom side of the protection device (30).
3. The protected combustion device (10) as claimed in claim 2, wherein the first (H1) and the second (H2) heights are higher than a bottom side of the slot (32).
4. The protected combustion device (10) as claimed in claim 1, wherein the protection device (30) is releasably coupled to the main body (20).
5. The protected combustion device (10) as claimed in claim 3, wherein the main body (20) has a receiving portion (213) formed by the inner-layer wall (21) and

the fuel receptacle (211) is delimited by the receiving portion (213), wherein the main body (20) has an interconnecting portion (214) interconnecting the inner-layer wall (21) and the outer-layer wall (22), wherein the interconnecting portion (214) extends from an outer periphery of the inner-layer wall (21) to the inner periphery of the outer-layer wall (22), and wherein the interconnecting portion (214) is hollow.

6. The protected combustion device (10) as claimed in claim 5 further comprising a wick (25) and a retaining device (26), wherein the wick (25) is inserted through the interconnecting portion (214) and has an end disposed in the fuel receptacle (211) and another end disposed outside of the main body (20), wherein the retaining device (26) includes an inner periphery in frictional contact with the wick (25) to securely hold the wick (25), and wherein the retaining device (26) is disposed in the interconnecting portion (214).
7. The protected combustion device (10) as claimed in claim 6, wherein the retaining device (26) is in a form of a sleeve (261), wherein the retaining device (26) includes at least one gasket (262) mounted thereon, wherein the retaining device (26) has an outer periphery defining at least one groove (263) and the at least one gasket (262) is mounted in the at least one groove (263), and wherein the at least one gasket (262) abuts an inner periphery of the interconnecting portion (214).
8. The protected combustion device (10) as claimed in claim 7, wherein the inner-layer wall (21) and the outer-layer wall (22) are made from a transparent material.
9. The protected combustion device (10) as claimed in claim 8, wherein the wick (25) is metallic.
10. The protected combustion device (10) as claimed in claim 1, wherein the bottom side (221) and the slot (32) are in the same shape.
11. The protected combustion device (10) as claimed in claim 1, wherein the outer-layer wall (22) is in a form of a cylinder (222).
12. The protected combustion device (10) as claimed in claim 3, wherein the protection device (30) is releasably coupled to the main body (20).
13. The protected combustion device (10) as claimed in claim 12, wherein the bottom side (221) and the slot (32) are in the same shape.
14. The protected combustion device (10) as claimed in claim 13, wherein the main body (20) has a receiving

portion (213) formed by the inner-layer wall (21) and the fuel receptacle (211) is delimited by the receiving portion (213), wherein the main body (20) has an interconnecting portion (214) interconnecting the inner-layer wall (21) and the outer-layer wall (22), wherein the interconnecting portion (214) extends from an outer periphery of the inner-layer wall (21) to the inner periphery of the outer-layer wall (22), and wherein the interconnecting portion (214) is hollow.

15. The protected combustion device (10) as claimed in claim 14 further comprising a wick (30) and a retaining device (26), wherein the wick (30) is inserted through the interconnecting portion (214) and has an end disposed in the fuel receptacle (211) and another end disposed outside of the main body (20), wherein the retaining device (26) includes an inner periphery in frictional contact with the wick (30) to securely hold the wick (30), and wherein the retaining device (26) is disposed in the interconnecting portion (214).

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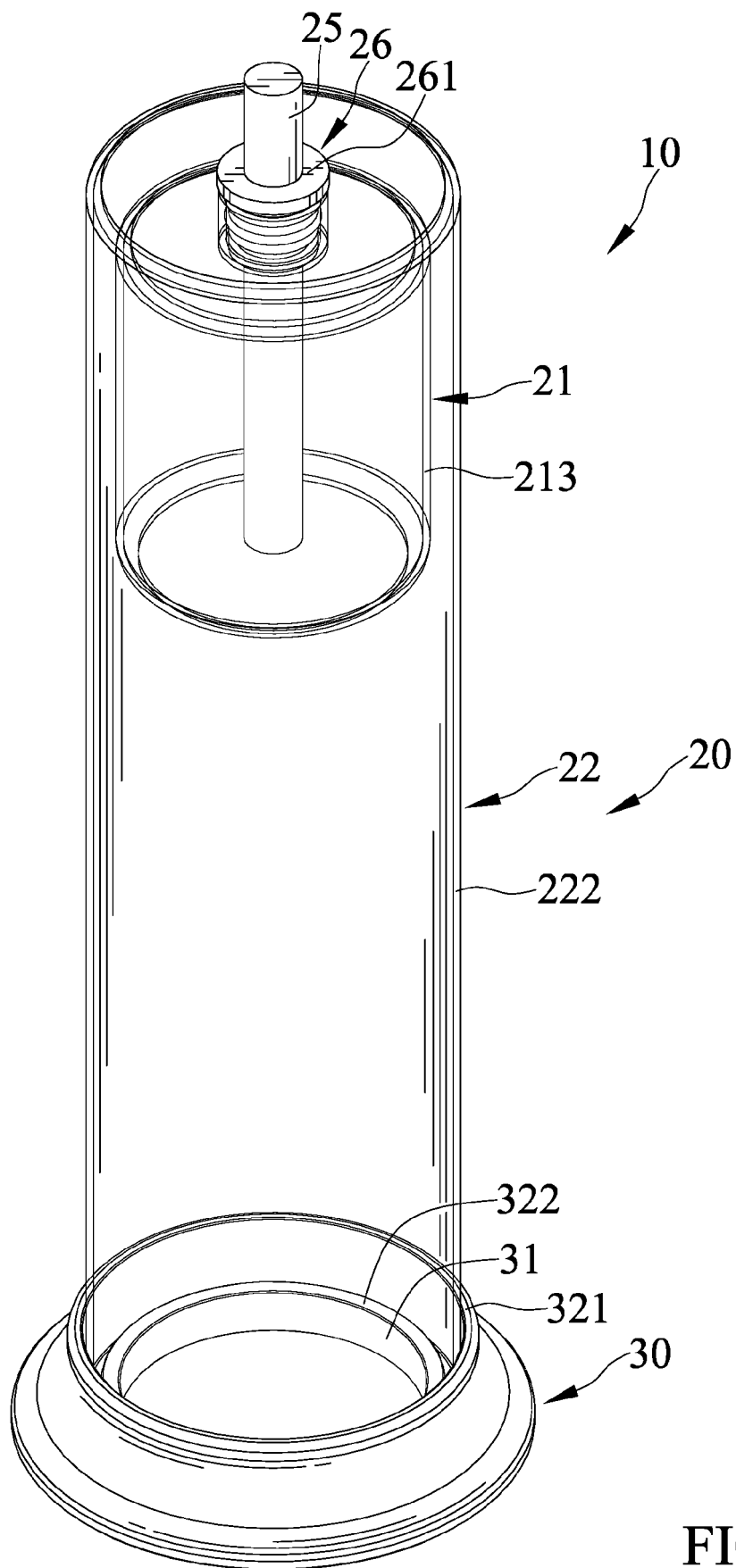


FIG. 1

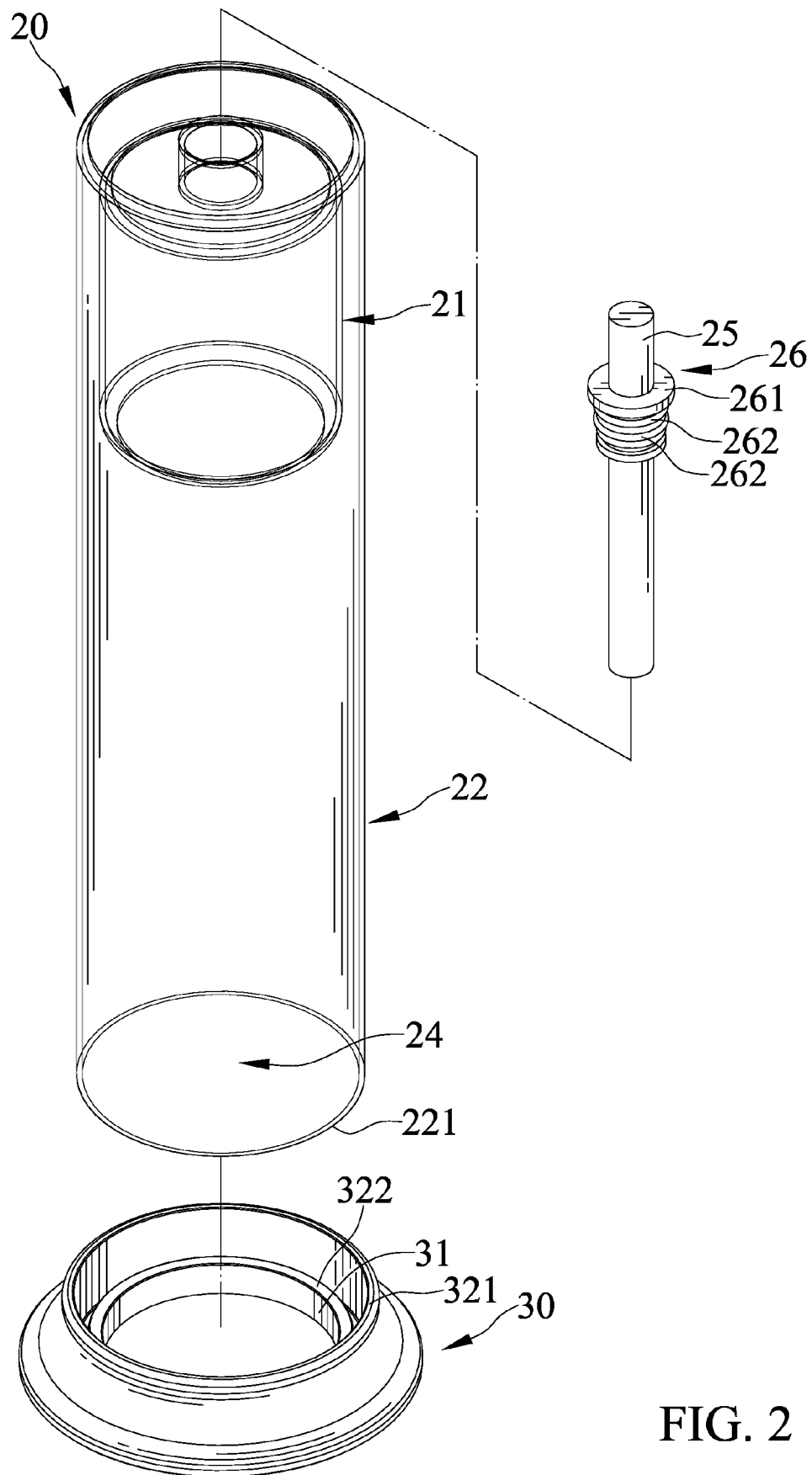
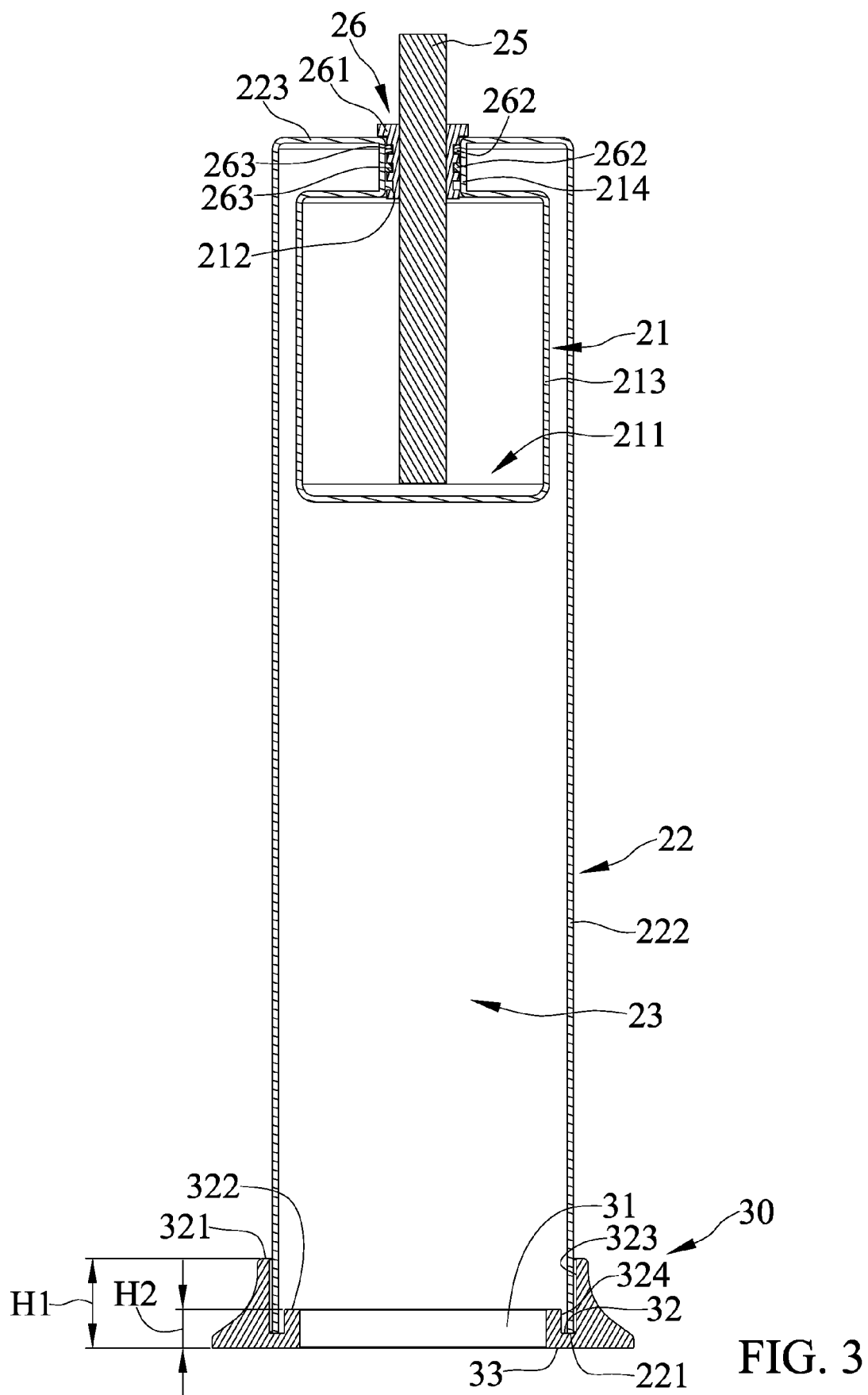


FIG. 2



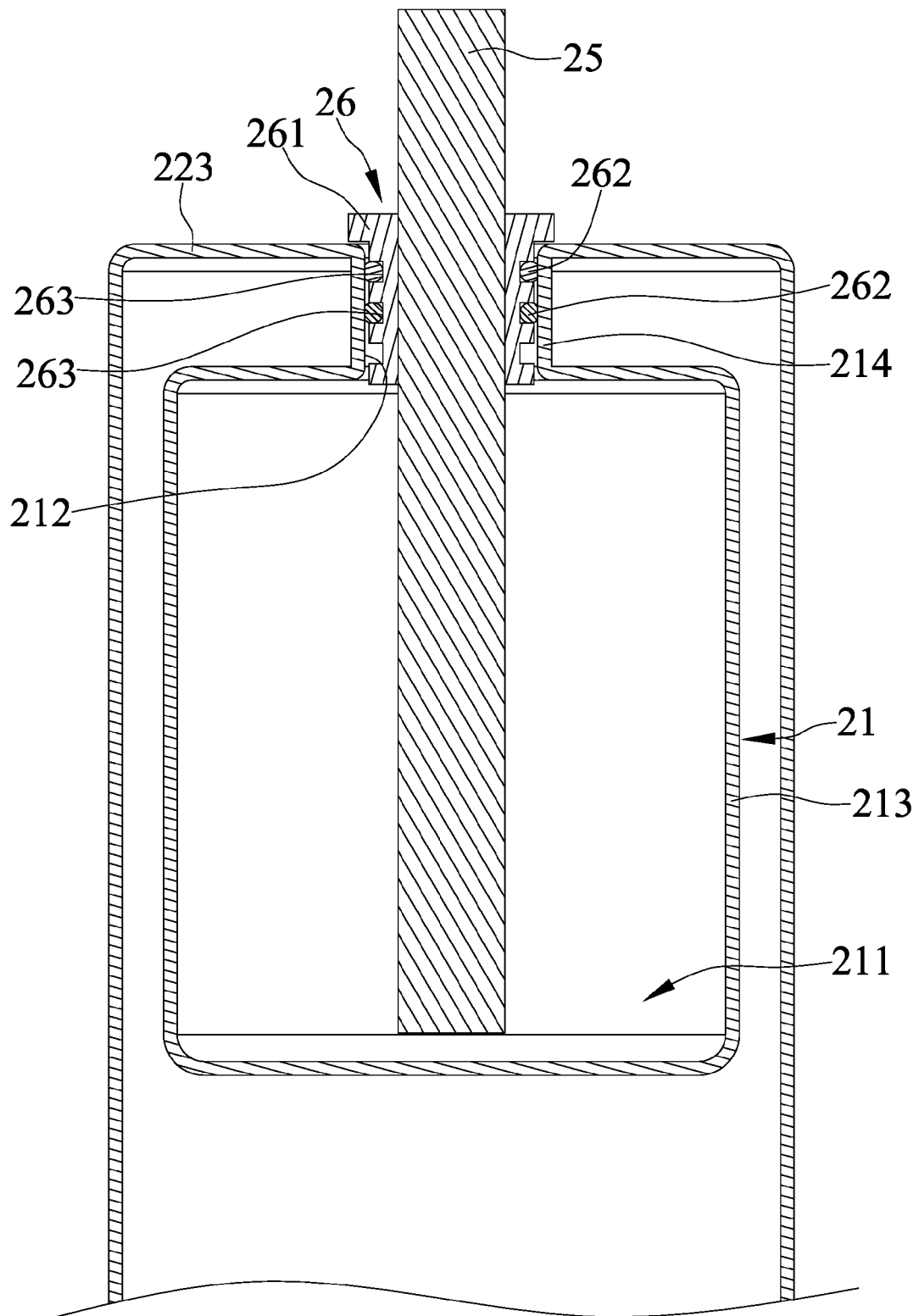


FIG. 4



EUROPEAN SEARCH REPORT

Application Number
EP 19 19 1907

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 4 693 681 A (COMSTOCK TODD M [US]) 15 September 1987 (1987-09-15) * column 2, line 14 - column 3, line 27; figures 1,2 *	1	INV. F23D3/18 F21V37/00
A	US 2 001 377 A (CANDY JR ALBERT T) 14 May 1935 (1935-05-14) * figures 1,6 *	1	
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			TECHNICAL FIELDS SEARCHED (IPC)
			F23D F21V
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 4 February 2020	Examiner Theis, Gilbert
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 03/02 (P04C01)

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

EP 19 19 1907

5 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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04-02-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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REFERENCES CITED IN THE DESCRIPTION

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