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(54) **Oil reservoir for an oil lamp**

(57) The oil reservoir for an oil lamp of the invention comprises a reservoir part (10), a cap (12), at least one wick yarn (13) and a seal element (11). The cap has an inner surface (125) and outer surface (124) and at least one vent opening (121) on the outer surface and an outlet opening for the wick yarn. The reservoir part has a filler opening (14). The seal element is arranged to be placed at least partly against the inner surface of the cap, and the seal element covers the filler opening of the reservoir part, when the cap is arranged to close the filler opening. The seal element comprises material, which is at least oil impermeable and gas permeable.

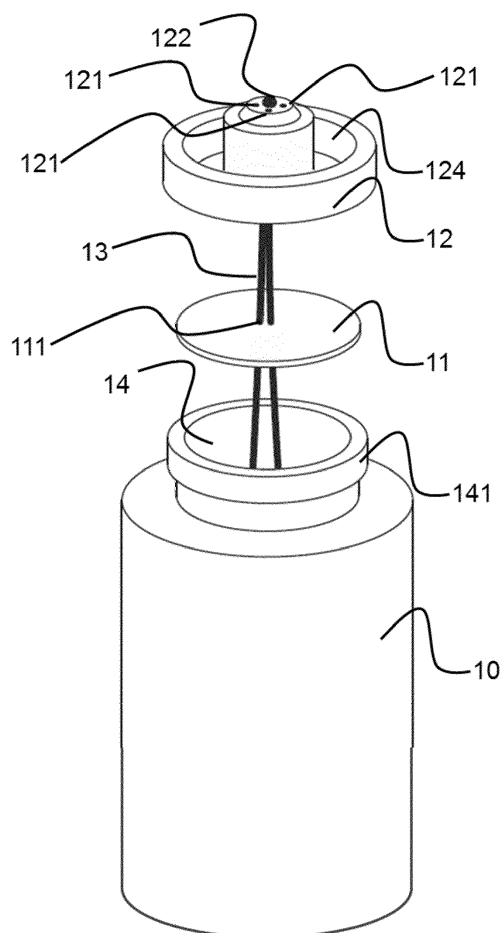


Fig. 1

Description

Field of the invention

[0001] The object of the invention is an oil reservoir for an oil lamp. The invention especially relates to an oil reservoir for an oil lamp, comprising a seal element, which prevents oil from leaking if the oil reservoir is tilted.

Prior art

[0002] Different types of oil lamps are previously known, in which there are combined an oil reservoir for lamp oil, a cap closing the filler opening of the oil reservoir, and a wick which extends to the bottom of the oil reservoir and for which there is provided an outlet opening in the cap. Oil reservoirs can be replaceable and they can be fitted into different bodies or lantern-type frameworks of oil lamps. In known solutions, the cap of the oil reservoir has on its inner surface, for example, a groove against which a nozzle of the filler opening of the oil reservoir can be placed. In known solutions, the cap also has small apertures, so-called vent openings, through which the pressure possibly accumulating into the oil reservoir can be released. The impact of heat generates vapour and gases from the lamp oil, and thus as the lamp burns, overpressure is generated in the oil reservoir, unless gases can leave the oil reservoir through the vent openings. Vent openings are known from different fuel tanks.

[0003] Different kinds of oil lamps are also known, in which the oil reservoir is refillable. Further, there are known light fittings, in which, for example, alcohol-based liquid fuel is used as the liquid fuel instead of lamp oil. Lamp oils used in oil lamps are, for example, crude oil based burning liquids, such as petroleum.

[0004] A problem with the known oil reservoir solutions for oil lamps is that lamp oil can leak out of the oil reservoir even if the oil reservoir were closed with a cap, when the oil lamp is tilted to an angle of 90 degrees or bigger. Lamp oil can leak out both from the connection point between the cap and the nozzle of the filler opening of the oil reservoir and from the vent openings. It has been noted that even a small amount of lamp oil swallowed or just sucking the wick of an oil lamp may cause pulmonary damage that can even be life-threatening.

[0005] Oil lamps intended for decorative use must meet the requirements of the standard EN 14059:2002, published in November 2002. The standard concerns expressly the safety of oil lamps intended for decorative use and their testing. In addition, when assessing the safety of oil lamps in Europe, also the requirements according to Annex XVII of the Regulation of the European Parliament and of the Council (1907/2006), i.e. the so-called REACH regulation are taken into account. According to the regulation, it is not allowed to place on the market decorative oil lamps intended for general consumption, unless they are conformable to the above-mentioned standard.

[0006] It has been aimed to previously solve the problem relating to leaking liquid fuel, among others, by presenting solutions, in which it has been attempted to prevent the leaking, for example, by a self-locking mechanism. Expansion tanks have also been used in connection with oil lamps, into which lamp oil drains in addition to the other task of the expansion tanks, if the oil lamp is overturned. In addition, a so-called ceramic diffuser has been used in connection with oil lamps, by means of which it is possible to minimise the leaking of lamp oil, among other things.

[0007] A problem with the known solutions is that they are not adapted to be easily used in connection with different oil lamps or to be fitted into the bodies or frameworks of different oil lamps. Thus, there is need for a solution which can be easily fitted for use in different oil lamp bodies or frameworks. In addition, there is need for a solution, which is cost-efficient. A safe solution is needed, in which no oil can leak out of the oil reservoir when the lamp is tilted and vapour and gases forming in the oil reservoir can still be discharged from the oil reservoir.

Summary of the invention

[0008] It is a purpose of the invention to introduce a solution for solving the state-of-the art problems. It is especially a purpose of the invention to introduce a solution, in which no oil can leak out of the oil lamp's oil reservoir when tilting the lamp and vapour and gases forming in the oil reservoir can still be discharged from the oil reservoir.

[0009] It is an advantage of the solution of the invention that it is cost-efficient. Further, it is an advantage of the solution of the invention that it can be fitted to be used at least in a part of bodies or frameworks of oil lamps already previously known. It is also an advantage of the solution of the invention that it does not require significant alterations to be made in the manufacturing process of previously known oil lamps or oil reservoirs of oil lamps.

[0010] Some advantageous embodiments of the invention are presented in the dependent protective claims.

[0011] The basic idea of the invention is the following: The oil reservoir for an oil lamp of the invention (later "oil reservoir") comprises a reservoir part, a cap, at least one wick yarn, and a seal element. The cap is provided with an inner surface and outer surface, the outer surface having at least one vent opening and an outlet opening for at least one wick yarn. The reservoir part has a filler opening. The seal element is arranged to be fitted at least partly against the inner surface of the cap. The seal element covers the filler opening of the reservoir part, when the cap is arranged so that it closes the filler opening. The seal element is made of a material, which is at least oil impermeable and gas permeable.

[0012] In an advantageous embodiment of the invention, there can be at least one groove on the inner surface of the oil reservoir cap, and the filler opening of the reservoir part can comprise an adaptor piece. The at least

one groove of the cap and the adaptor piece of the filler opening have been arranged to be joined together.

[0013] In a second advantageous embodiment of the invention, the seal element of the oil reservoir comprises material, of the composition of which at least 70% is polyamide and 20% polyurethane.

[0014] In a third advantageous embodiment of the invention, the seal element of the oil reservoir comprises material, of the composition of which at least 74% is polyamide and 26% polyurethane. The material is oil impermeable and gas permeable. In this case, the seal element can preferably be fabric material, the square mass of which is 210 g/m². The fabric is a cost-effective choice, taking into consideration the manufacturing costs of the oil lamp.

[0015] In a fourth advantageous embodiment of the invention, the seal element of the oil reservoir can also preferably consist of polyurethane foam. The material of the seal element of the oil reservoir can also preferably be polyurethane foam, which is gas permeable, but not oil permeable.

[0016] In a fifth advantageous embodiment of the invention, the at least one wick yarn of the oil reservoir is arranged to travel through the seal element of the oil reservoir to the outer surface of the cap through the outlet opening. In this case, at least one aperture is arranged to the seal element, its size corresponding at most to the thickness of the at least one wick yarn. Then the at least one aperture of the seal element for the at least one wick yarn remains tight and no oil can leak through the aperture of the seal element into the at least one vent opening in the cap. The at least one wick yarn stays inside the reservoir part, when the cap is arranged to close the filler opening of the reservoir part.

Short description of the figures

[0017] The invention is next explained in detail, referring to the attached drawings, in which

Figure 1 illustrates in an exemplary manner the structure of the oil reservoir for an oil lamp of the invention;

Figure 2a illustrates in an exemplary manner a cap of an oil reservoir for an oil lamp of the invention from one angle of view;

Figure 2b illustrates in an exemplary manner a cap of an oil reservoir for an oil lamp of the invention from a second angle of view.

[0018] In the next specification, the presented embodiments of the invention are only exemplary, and one skilled in the art can execute the basic idea of the invention also in some other way than what has been described in the specification. Although an embodiment or embodiments can be referred to in several places in the specification, this does not mean that the reference would only

concern one described embodiment or that the described feature would only be usable in one described embodiment. Individual features of two or several embodiments can be combined and thus achieve new embodiments of the invention.

Detailed specification of the invention

[0019] In Figure 1, there is illustrated in an exemplary manner the structure of an oil reservoir for an oil lamp of the invention. The oil reservoir comprises the reservoir part 10, cap 12, at least one wick yarn 13 and seal element 11. The cap 12 has the inner surface 125 (Figure 2a) and outer surface 124, and at least one vent opening 121 on the outer surface 124 and an outlet opening 122 for the wick yarn 13. The reservoir part 10 has the filler opening 14. The filler opening 14 can have an adaptor piece 141, by means of which the cap 12 and filler opening 14 can be fitted together.

[0020] The seal element 11 is arranged to be fitted at least partly against the inner surface 125 of the cap 12. The seal element 11 is arranged to set at least partly against the inner surface 125 of the cap 12 and the seal element 11 covers the filler opening 14 of the reservoir part, when the cap 12 is arranged to close the filler opening 14. In this case, the seal element is placed at least partly against the filler opening 14 so that as the cap 12 is arranged to close the filler opening 14, no oil can leak from the seam between the cap 12 and the filler opening 14, even if the reservoir were to overturn or it were tilted so that oil would leak into the filler opening 14.

[0021] Further, the inner surface 125 of the cap 12 can comprise at least one groove (123 in Figure 2a), and the filler opening 14 of the reservoir part 10 can comprise the adaptor piece 141. The at least one groove 123 of the cap 12 and the adaptor piece 141 of the filler opening 14 are arranged to be joined together. The at least one groove 123 of the cap 12 and the adaptor piece 141 of the filler opening 14 are arranged to be joined together so that the adaptor piece 141 can be fitted into the at least one groove 123 of the cap 12. In this case, the seal element 11, which is arranged to be fitted at least partly against the inner surface 125 of the cap 12, covers the filler opening 14 of the reservoir part, when the cap 12 is arranged to close the filler opening 14.

[0022] The seal element 11 comprises preferably material, which is at least oil impermeable and gas permeable. The seal element 11 can preferably comprise material, of the composition of which at least 70% is polyamide and 20% polyurethane. The seal element can especially preferably comprise material, of the composition of which at least 74% is polyamide and 26% polyurethane. Especially preferably the seal element material is fabric, the square mass of which is 210 g/m². The material of the seal element can also be polyurethane foam. The material of the seal element can also be polyurethane foam, such as expanded plastic, which permeates gas but does not permeate oil.

[0023] When the seal element 11 preferably comprises material, which is at least oil impermeable and gas permeable, the overpressure building into the reservoir part 10 can be released by the impact of vapour and gases generated from the oil as the oil heats up. When the seal element 11 preferably comprises material, which is at least oil impermeable and gas permeable, the overpressure building into the reservoir part 10 can be released by the impact of vapour and gases from the oil as the oil heats up, because the seal element 11 permeates gases and the gases are discharged through the at least one vent opening 121 on the outer surface 124 of the cap 12.

[0024] At least one wick yarn 13 is arranged to travel through the seal element 11 to the outer surface 124 of the cap 12 through the outlet opening 122 so that at least one aperture 111 is arranged into the seal element 11, its size corresponding at most to the thickness of the wick yarn 13. The wick yarn 13 travels then through the seal element 11 so that also the at least one aperture 111 of the seal element 11 is as tight as possible and does not let oil leak through the aperture 111 to the cap 12 and further out through the at least one vent opening 121. The at least one wick yarn 13 remains inside the reservoir part 10, when the cap 12 is arranged to close the filler opening 14.

[0025] In Figures 2a and 2b there is illustrated in an exemplary manner the cap 12 of an oil reservoir 10 for an oil lamp of the invention. When needed, reference is made further to Figure 1. The cap 12 has the inner surface 125 and outer surface 124 and at least one vent opening 121 on the outer surface 124 and the outlet opening 122 for the at least one wick yarn 13.

[0026] The at least one wick yarn 13 is arranged to travel through the seal element 11 to the outer surface 124 of the cap 12 through the outlet opening 122 so that the aperture 111 is arranged into the seal element 11, its size corresponding at most with the thickness of the wick yarn 13. In this case the at least one wick yarn 13 travels through the seal element 11 so that also the aperture 111 of the seal element 11 is as tight as possible and does not let oil leak through the aperture 111 to the cap and further out through the at least one vent opening 121. The at least one wick yarn 13 remains inside the reservoir part 10, when the cap 12 is arranged to close the filler opening 14. The at least one wick yarn 13 is preferably 16 ply cotton yarn. The at least one wick yarn 13 is preferably 16 ply cotton yarn, which has been doubled. The at least one wick yarn 13 extends up to the bottom of the reservoir part 10.

[0027] The inner surface 125 of the cap 12 can comprise at least one groove 123. The at least one groove 123 of the cap 12 and the adaptor piece 141 of the filler opening 14 are arranged to be joined together. The at least one groove 123 of the cap 12 and the adaptor piece 141 of the filler opening 14 are arranged to be joined together so that the adaptor piece 141 can be fitted into the at least one groove 125 of the cap 12. In this case the seal element 11, which is arranged to be fitted at least

partly against the inner surface 125 of the cap 12, covers the filler opening 14 of the reservoir part, when the cap 12 is arranged to close the filler opening 14.

[0028] The task of the at least one vent opening 123 is to balance the overpressure generating in the reservoir part 10. When the seal element 11 preferably comprises material, which is at least oil impermeable and gas permeable, the overpressure building in the reservoir part 10 by the impact of vapour and gases as the oil heats can be discharged. When the seal element 11 preferably comprises material, which is at least oil impermeable and gas permeable, the overpressure building in the reservoir part 10 by the impact of vapour and gases as the oil heats can be discharged, because the seal element 11 permeates gases and the gases are discharged through the at least one vent opening 121 on the outer surface 124 of the cap 12.

[0029] Some advantageous embodiments of the arrangement of the invention have been described above. The invention is not limited to the embodiments shown, but the inventional idea can be applied in numerous ways within the limits set by the patent claims.

25 Claims

1. Oil reservoir for an oil lamp, the oil reservoir comprising a reservoir part (10), cap (12), at least one wick yarn (13) and a seal element (11), the cap (12) having an inner surface (125), an outer surface (124), at least one vent opening (121) and an outlet opening (122) for the at least one wick yarn (13), and the reservoir part (10) having a filler opening (14), **characterized in that** the seal element (11) is arranged to be fitted at least partly against the inner surface (125) of the cap (12) and the seal element (11) covers the filler opening (14) of the reservoir part (10), when the cap (12) is arranged to close the filler opening (14), and the seal element (11) comprises material, which is at least oil impermeable and gas permeable.
2. Oil reservoir for an oil lamp according to claim 1, **characterized in that** the inner surface (125) of the cap (12) comprises at least one groove (123) and the filler opening (14) of the reservoir part (10) comprises an adaptor piece (141), the at least one groove (123) and adaptor piece (141) being arranged to be joined together.
3. Oil reservoir for an oil lamp according to claim 1 or 2, **characterized in that** the seal element (11) comprises material, of the composition of which at least 70% is polyamide and 20% polyurethane.
4. Oil reservoir for an oil lamp according to claim 1 or 2, **characterized in that** the seal element (11) comprises material, of the composition of which at least

74% is polyamide and 26% polyurethane.

5. Oil reservoir for an oil lamp according to claim 4,
characterized in that the material of the seal element (11) is fabric, the square mass of which is 210 g/m². 5
6. Oil reservoir for an oil lamp according to claim 1,
characterized in that the material of the seal element (11) is polyurethane foam. 10
7. Oil reservoir for an oil lamp according to claim 1,
characterized in that at least one wick yarn (13) is arranged to travel through the seal element (11) to the outer surface (124) of the cap (12) through the outlet opening (122) so that at least one aperture (111) is arranged into the seal element (11), its size corresponding at most to the thickness of the at least one wick yarn (13), and the at least one wick yarn (13) remains inside the reservoir part (10), when the cap (12) is arranged to close the filler opening (14). 15
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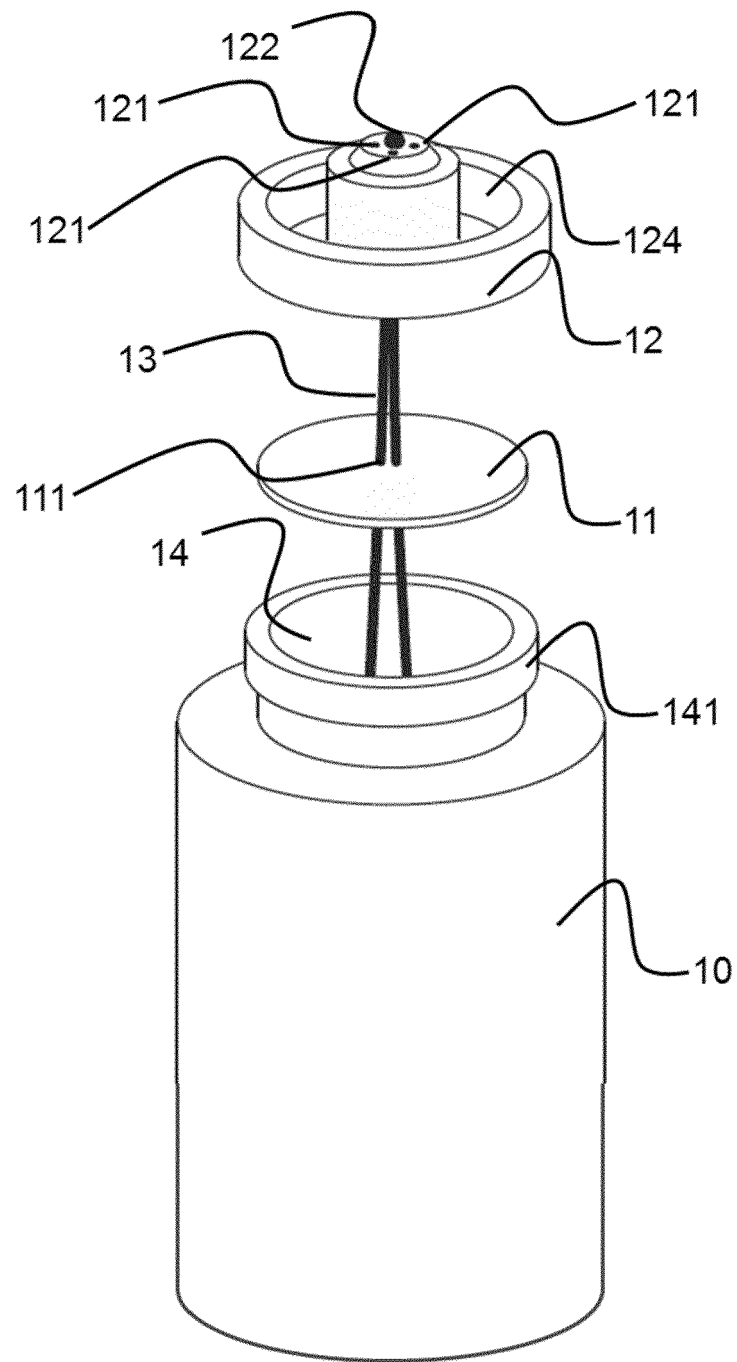


Fig. 1

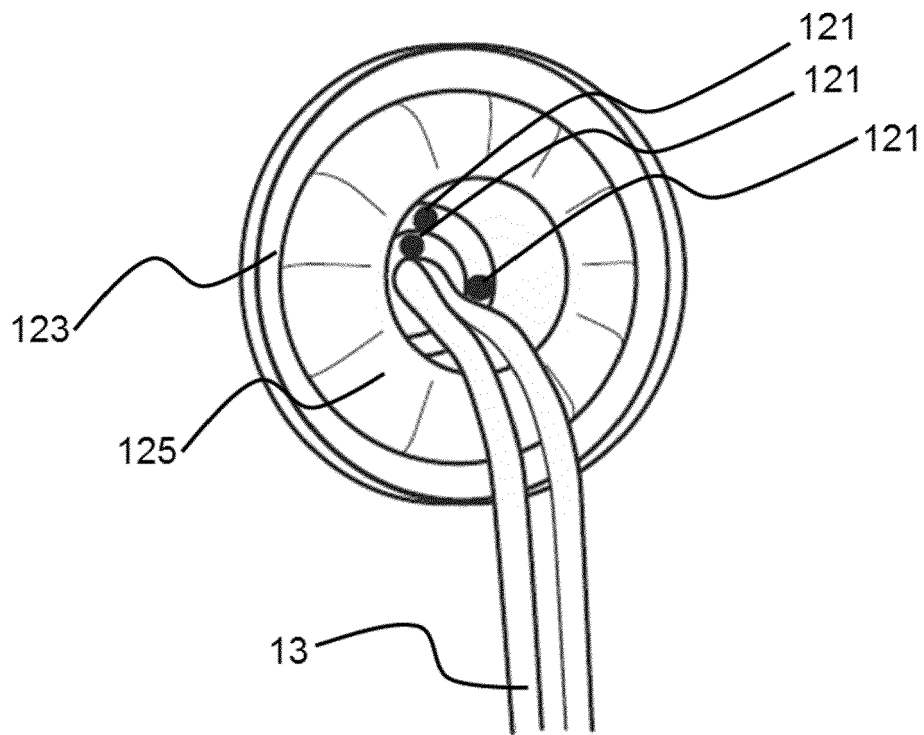


Fig. 2a

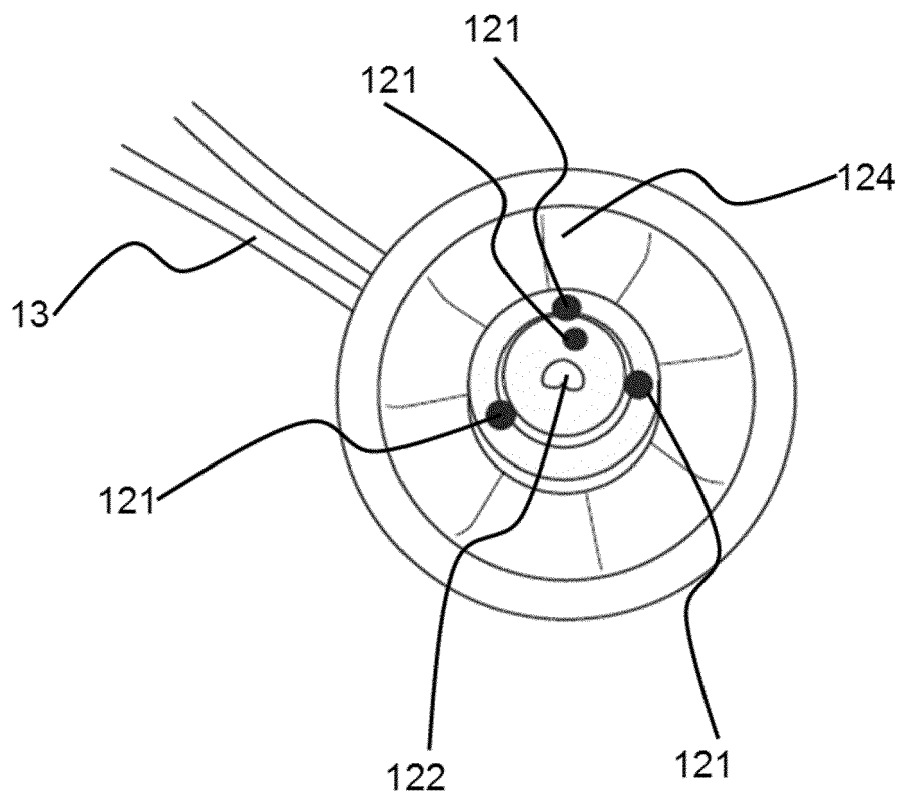


Fig. 2b



EUROPEAN SEARCH REPORT

Application Number
EP 17 18 8248

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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	DE 86 00 523 U1 (BIRMELIN HERMANN JR.) 19 June 1986 (1986-06-19) * page 6, paragraphs 2, 4 * * page 10 * * figures 3, 4 *	1	INV. F23D3/18 F21V37/00 F23D3/26 F21S13/12 F21V25/00
A	US 2016/221434 A1 (GEORIS PHILIPPE [FR] ET AL) 4 August 2016 (2016-08-04) * paragraphs [0008], [0010], [0014] - [0018]; figure 1 *	1	
A	US 2011/097676 A1 (MASTERSON DANIEL [US] ET AL) 28 April 2011 (2011-04-28) * paragraph [0041]; figure 6 *	1,6,7	
A	US 2001/016305 A1 (CHEN SHI-CHIN [TW]) 23 August 2001 (2001-08-23) * paragraph [0019]; claim 1; figure 1 *	1,7	
A	US 2014/126181 A1 (HSIAO MING JEN [TW]) 8 May 2014 (2014-05-08) * paragraph [0019]; figure 3 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			F23D F21V F21S B60K
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 15 May 2018	Examiner Nicolas, Pascal
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 17 18 8248

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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