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CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO,  
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LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,  
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(54) Title: MODULAR CANDLE HOUSING

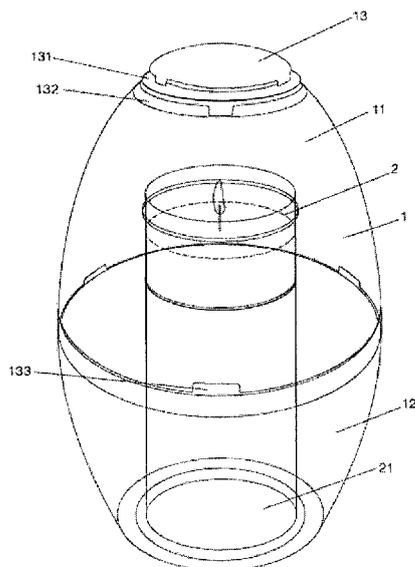


Fig. 1

(57) Abstract: Modular candle housing having a housing (1) comprising an upper (11) and a lower part (12, 14). The lower part (12, 14) is comprised of burning module depending of particular fuel and way of burning while the upper part (11) comprises plurality of air flow opening (131, 132) needed for burning and used for prevention of condensation. The burning module according to this invention is comprised of several types of fuel. There can be paraffin, liquid paraffin, plant product (palm oil, palm wax, soy wax, sunflower oil, rape oil, all of these plant products hereinafter referred to as plant wax), bee wax (natural wax) or different appropriate hydrocarbon or battery/ electronic/ electric lighting system. Preferably paraffin can be in particular insert which is inserted into lower part (12, 14) of the housing (1) regardless of paraffin (or other appropriate hydrocarbon) in solid or liquid (e.g. liquid paraffin) state. The upper part (11) is covered on the top with cover (13) resistant to elevated temperature, said cover (13) of metal or man made material including plastics. Under the cover (13) there are two types of openings (131, 132). The openings (131) right below cover are primarily meant to exit of flue gases, the openings (132) below these openings (131) are primarily meant for entrance of cooling air. In addition to these openings (131, 132) the special embodiment may be further comprised of perimeter openings (133) primarily meant for entry of fresh air, meant for combustion.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of*

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## MODULAR CANDLE HOUSING

### **Subject of Invention**

Candles

### **Technical Problem**

Problem solved by this invention is re-use of candle housing while using different types of fuels.

The additional problem is non-uniform burning-off of candles, condensation on the inner side of the housing, and overheating of cover on the top of the candle.

### **State of the Art**

In the are of candle making there are several solutions.

Patent SI 9400303 shows candle housing for long burning solving a problem of ensuring longevity of burning of the candle regardless of outside weather and temperature conditions with prevention of too early flame self-extinguishing. Therein described housing is made of housing containing fuel for burning amidst of which there is vertically positioned wick, and closed on the upper part with cover with air circulation openings. The housing in positioned

within larger housing in such a manner that between the walls and bottom of the first and the second housing there is spacing for insulation matter, preferably air or vacuum.

On this basis there are candles for prolonged burning, however with a problem of being paraffin based. This patent does not allow for different types of fuel (paraffin, liquid paraffin) or different lighting systems (battery/ electronic element etc.)

### **Description of new invention**

Modular candle housing solves above presented problem in such a way that the housing is comprised of upper and lower part. The lower part is comprised of burning module depending of particular fuel and way of burning while the upper part comprises plurality of air flow opening needed for burning and used for prevention of condensation.

The burning module according to this invention is comprised of several types of fuel There can be paraffin, liquid paraffin, plant product (palm oil, palm wax, soy wax, sunflower oil, rape oil, all of these plant products hereinafter referred to as plant wax), bee wax (natural wax) or different appropriate hydrocarbon or battery/ electronic/ electric lighting system. Preferably paraffin can be in particular insert which is inserted into lower part of the housing, or it can fill wholly or partially lower part of the housing regardless of paraffin (or other appropriate hydrocarbon) in solid or liquid (e.g. liquid paraffin) state.

The upper part is covered on the top with cover resistant to elevated temperature, said cover of metal or man made material including plastics. Under the cover there are two types of openings. The openings right below cover are primarily meant to exit of flue gases, the openings below these openings are primarily meant for entrance of cooling air. In addition to these openings the special embodiment may be further comprised of perimeter openings primarily meant for entry of fresh air, meant for combustion.

Non uniform burning is solved by inserting insert of paraffin or plant or bee wax with core of paraffin or wax with higher melting point (harder core), the surrounding of the core is of paraffin or wax with lower melting point (softer outside), of course there can be several layers. Such candle is appropriate both for lower temperature (essentially uniform melting of solid fuel across whole diameter) and for summer days as wick in the middle remains in essentially upright position as supported by harder core. Despite possibility that during hot summer days the outer rim becomes essentially liquid the middle (harder) part remains solid and supports the wick in essentially upright position. Preferably plastic (but also possible of natural, organic material or glass) housing centrally supports harder, middle part of fuel. This prevents middle part to tilt onto the side and wick along with it. The result of such tilting would be drowning of fire, or burning of housing either partially, or totally.

If conditions for burning are even less friendly (temperatures above 40 degrees C or below 10 degrees C) the user can use liquid fuel or electronic part with combination with already described housing.

In addition that all fuels burn well both at low (winter) and high (summer) temperatures, also in wind and rain, they can burn well in interior. The candle can be used in any condition.

Above referenced combinations of candles can burn for several days, weeks or months (electronic) and not only few hours as most interior candles. Particular embodiment is so called "eternal light" (where liquid fuel can be poured into the lower part of the housing, and wick is positioned in the middle of fuel extending above it, said wick not combustible). There is particularity that such candle (light) can burn for several weeks. During burning of the flame the fuel can be added by pouring liquid fuel and extending burning time – during pouring the flame is not extinguished.

Below the essence of invention is described with help of figures whereas the figures form part of the description, as follows:

Figure 1 shows housing 1 comprised by upper part 11, lower part 12, cover 13, openings for predominantly exit of flue gases 131, opening for predominantly entering of cooling air 132, openings for predominantly entering of fresh air 133, fuel insert 2, fuel 21, preferably paraffin in solid state.

Figure 2 shows streaklines of air and flue gases, namely streaklines of flue gases and hot air 31, streaklines of cooling air 32, streaklines of fresh air 33.

Figure 3 shows different fuels namely paraffin or natural wax 21, battery 4, liquid paraffin 4.

Figure 4 shows one of forms of lower part namely lower part for insert of fuel insert 12.

Figure 5 shows one of forms of lower part namely lower part for filling with fuel without insert 14.

Figure 6 shows view from above onto fuel insert 2 with paraffin in which layer of paraffin with lower melting point 211 is seen as well as layer of paraffin with higher melting point 212, and wick 23.

According to embodiment the subject of invention is made of housing 1 comprising upper part of housing 11 and lower part of housing 12, 14. The upper part 11 is closed with cover 13. Due to rising of flue gases the cover 13 would heat up and as a result melt the housing preferably made of plastics so the openings for predominantly entering of cooling air 132 are built into the housing. The flue gases exit through openings predominantly for exiting of flue gases 131. The air needed for combustion can in first embodiment enter through openings predominantly for entering of cooling air 132, in the second embodiment air enters through the openings for predominantly entering of fresh air 133, preferably around the perimeter in lower part of upper part 11 of the housing.

The flue gas and/or hot air streaklines 31 are shown rising from the point of combustion and exiting through openings predominantly for exit of flue gases 131. The streaklines of predominantly cooling air 32 are also shown, said air entering through openings for predominantly entering of cooling air 132, mixing with the flue gases and hot air and thereby cooling the openings predominantly for exiting of flue gases 131 so there is low degree of softening and/or deformation of housing material 1 or lower part of the cover which can be made of metal or of plastic. The fresh air streaklines 33 are also shown, this air entering from openings predominantly for entering of fresh air 133. Of course the air will mix and swirl in the upper part of the housing 11 so these streaklines are only approximate show of air flow, however, they explain unexpected technical result, namely prevention of condensation in cases where there would be condensation due to temperature difference inside housing and outside housing of candle, and furthermore, due to moisture of air there would be condensation. Air close by wall has due to mixing and swirling lower relative humidity and higher temperature this preventing or limiting the condensation.

The lower 12 part of the housing can be made as lower housing for inserting of fuel insert 2. Fuel insert 2 can comprise either solid fuel preferably paraffin or natural wax 21, preferably comprising core of paraffin or natural wax 21, preferably comprising core of paraffin or natural wax with higher melting point 212 surrounded with paraffin or natural wax with lower melting point 211, or of liquid fuel, preferably liquid paraffin 5 or battery/electric insert 4 with lamp simulating burning of candle.

The lower 12 part of the housing can be made of lower 12 housing for filling with fuel without insert 14. In this case the lower housing is filled either with solid fuel or with liquid fuel, and wick is inserted into the fuel.

The surprising technical effect of this invention is in essentially uniform of combustion during lower temperatures where lower part of housing with fuel insert 12 is used. The air between fuel insert 12 and wall of the housing serves namely as an insulator.

In particular embodiment the solid fuel insert, preferably paraffin or plant wax 2 is made of multi layers. In one of particular embodiments the wick 23 is surrounded by paraffin or plant wax of higher melting point 212, and this surrounded with paraffin or plant wax with lower melting point 211. There can be several more multilayers. During combustion the fuel is melting in more uniform fashion across whole of insert 2 with solid fuel as the temperature closer to wick is higher than temperature of paraffin which is further away from the wick. Normal candles first melt paraffin close to the wick forming a cavity resulting in uneven (non-uniform) use of paraffin and can cause quick extinguishing of flame and uneven use of fuel. The proposed particular embodiment enables that paraffin (or natural wax) close to wick 23 with higher melting point 212 and paraffin (or natural wax) further away from wick with lower melting point 211 melt at the same time resulting in more uniform (more even) use of paraffin or natural wax, and this is additional unexpected technical result of this invention.

## PATENT CLAIMS

1. Modular candle housing comprising housing (1) comprising upper (11) and lower (12, 14) part, whereas the upper part (11) of housing is closed with a cover (13), **characterized in that** in the lower (12, 14) part the fuel insert or electric lamp, or fuel without insert can be inserted.
2. Modular housing according to claim 1, **characterized in that** the upper (11) part of the housing comprise the openings predominantly for exit of flue gases (131) and openings predominantly for entering of cooling air (132).
3. Modular housing according to any of previous claims, **characterized in that** it further comprises openings predominantly for entering of fresh air (133) preferably along the circumference in lower part of upper (11) part of the housing.
4. Modular housing according to any of previous claims, **characterized in that** the fuel insert (2) comprises either solid fuel preferably paraffin or natural wax (21) or liquid fuel preferably liquid paraffin (5), or battery/electric insert (4) with lamp simulating burning of the candle.
5. Modular housing according to any of previous claims, **characterized in that** the lower part of the housing (14) is made for filling with fuel without insert whereas the lower housing (14) is filled either with solid fuel or with liquid fuel, and wick is inserted inside the fuel.
6. Modular housing according to any of previous claims, **characterized in that** the fuel insert(2) with solid fuel comprises core of paraffin or natural wax with higher melting point (212) surrounding with paraffin or natural wax of lower melting point (211).

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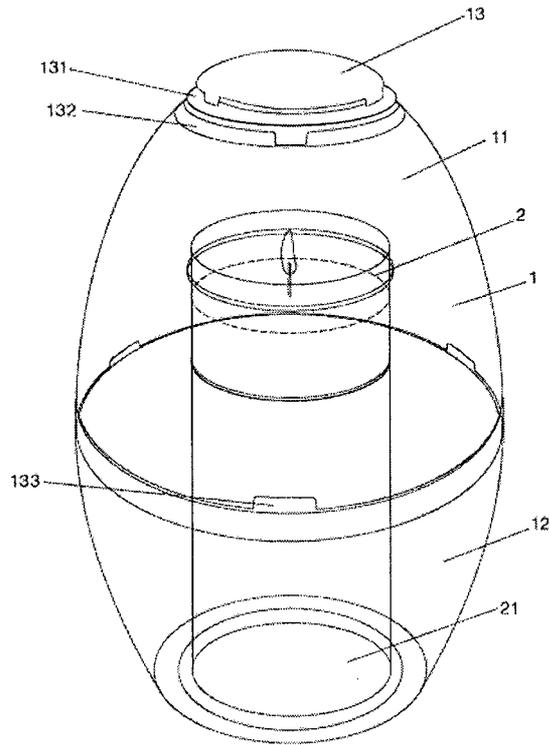


Fig. 1

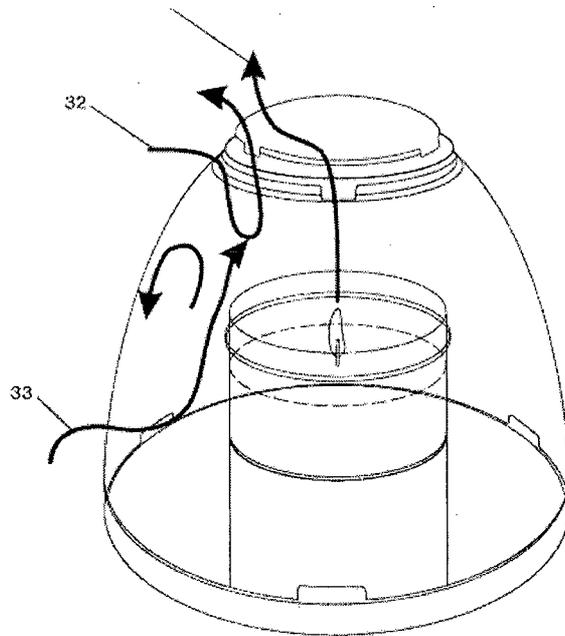


Fig. 2

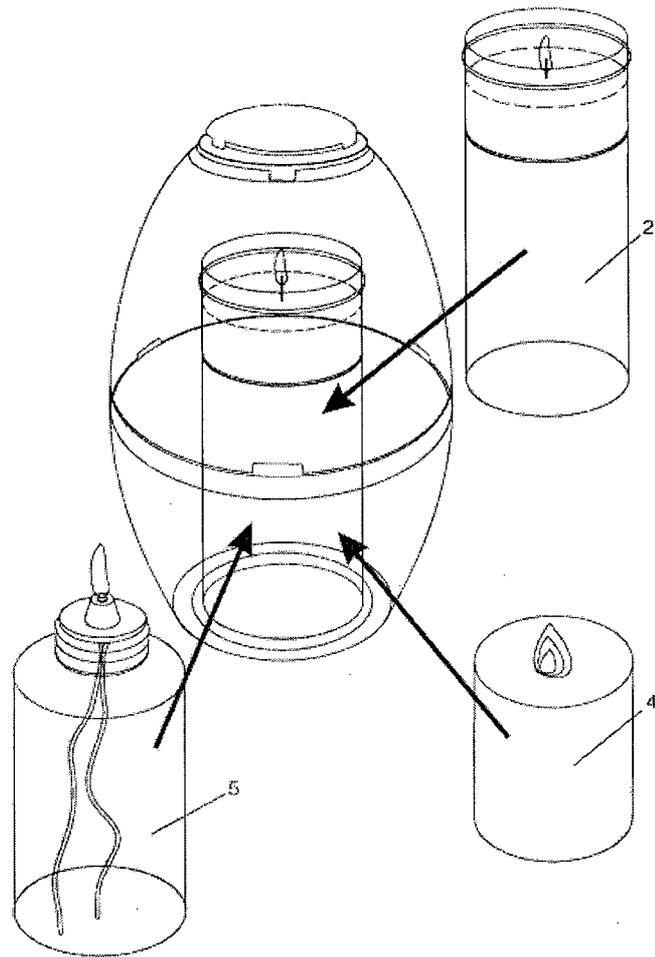
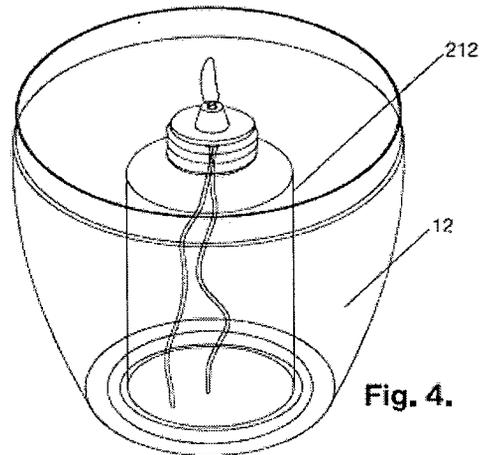
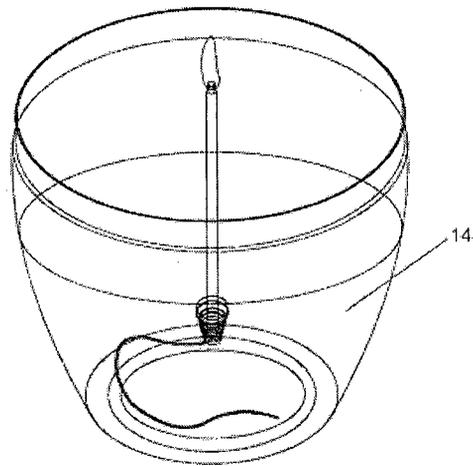


Fig. 3



**Fig. 4.**



**Fig. 5.**

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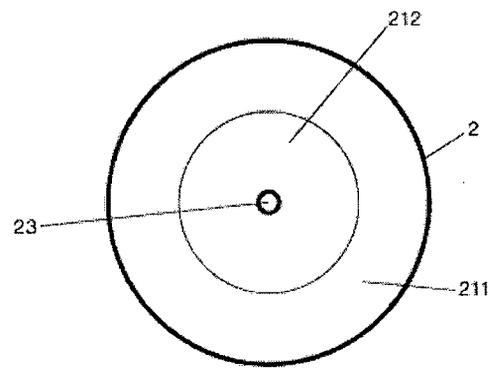


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No  
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A. CLASSIFICATION OF SUBJECT MATTER  
 INV. C11C5/00 F21S4/00 F21S15/00 F21V15/01 F21V35/00  
 F21V37/00 F23D3/02 F23D3/16  
 ADD.  
 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)  
 F21V F21S F23D C11C

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 practical, search terms used)  
 EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	page 1, line 1 - page 3, line 68; figures 1-5	6
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Y	paragraphs [0011], [0034] - [0037], [0042], [0044] - [0046]; figures 1,3,4,6,7,9 ----- -/--	6

Further documents are listed in the continuation of Box C.

See patent family annex.

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Date of the actual completion of the international search  16 May 2011	Date of mailing of the international search report  30/05/2011
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Goltes, Matjaz
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## INTERNATIONAL SEARCH REPORT

International application No  
PCT/SI2011/000002

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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Information on patent family members

International application No

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