



(51) International Patent Classification:

F21S 4/00 (2016.01) *F21V 5/04* (2006.01)
F21V 29/00 (2015.01)

(21) International Application Number:

PCT/US2018/000108

(22) International Filing Date:

25 April 2018 (25.04.2018)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/603,587 05 June 2017 (05.06.2017) US
15/732,525 22 November 2017 (22.11.2017) US

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(81) Designated States (*unless otherwise indicated, for every*

kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every*

kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,

(54) Title: HIGH PRESSURE HYDRO-COOLED MISTING/VAPOR ILLUMINATION SYSTEM FOR LED DEVICES USING LIQUID OR GAS

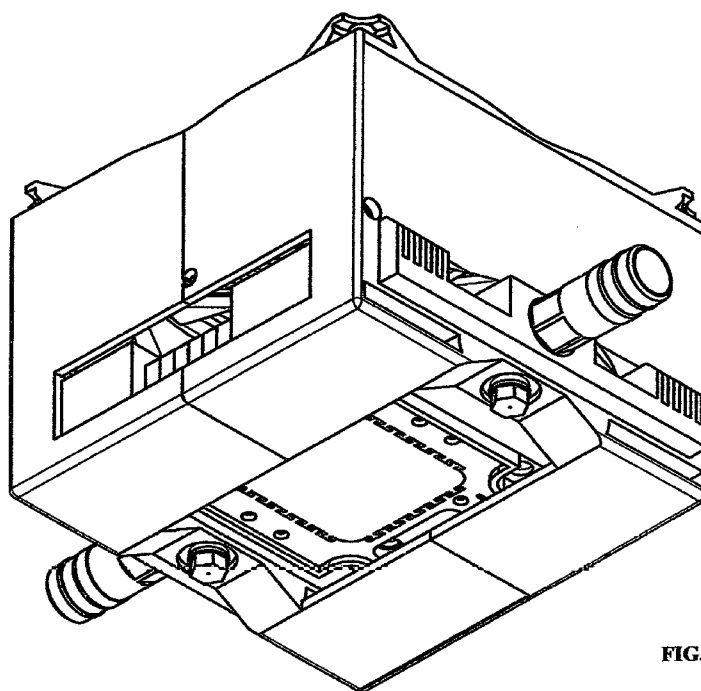


FIG. 9

(57) Abstract: The utility model embodies a greenhouse hydro-cooled grow light LED system that administers a mist or vapor. This system operates in a range of temperatures, which are determined by the liquid temperature running through the channelled copper heatsink. The manipulation of the liquid's temperature produces the desired humidity. A brass high pressure liquid barbed valve fitting is secured on either side of the light housing, which is also connected to a humidity sensor electrical outlet. Low humidity closes the liquid valve. This allows a liquid pressure increase in all liquid lines, until the liquid release pressure of 60 psi is reached. The mist/vapor component is realized through the placement of high pressure mist nozzles. At release pressure, an atomized mist with droplets under 60 microns is outflowed.



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report (Art. 21(3))*
- *with amended claims (Art. 19(1))*

HIGH PRESSURE HYDRO-COOLED MISTING/VAPOR ILLUMINATION SYSTEM FOR LED DEVICES USING LIQUID OR GAS

FIELD OF THE INVENTION

[0001] The present invention relates to manipulating the lighting systems operating environment. In particular, this invention correlates to the placement of an interior component which has the capacity to change the internal operating temperature of the light. In addition, what makes the present invention unique is that it can also influence and manipulate the external encompassing atmospheric environment by using the elements onboard in concert with each other. Some of which is achieved with a misting or vapor valve.

BACKGROUND

[0002] This customized LED allows for the manipulation of the environment it resides in which you can adjust and control the environment simultaneously using the light source. This works due to the utilization of principles based on vapor pressure deficit science. VPR is the difference between the amount of moisture in the air and how much moisture the air can hold when it is saturated. This system auto adjusts to levels that corresponds to desired VPR levels for any given temperature fluctuation. The positive temperature coefficient 100 ohm thermistor is secured to the chip's copper base plate, regulates the power delivered to the light via a pulse

width modulation signal line. This is preset to prevent a rise in temperature, outside of the optimum desired temperature zone. In conjunction, the addition of the high pressure atomizing system will fill in the other side of the equation. The VPD chart shows the perfect equilibrium set between the two of the custom LED chip.

RELATIVE HUMIDITY

°F	°C	100%	95%	90%	85%	80%	75%	70%	65%	60%	55%	50%	45%	40%	35%
59	15	0.0	0.8	1.7	2.5	3.4	4.2	5.1	5.9	6.8	7.6	8.5	9.4	10.2	11.1
61	16	0.0	0.9	1.8	2.8	3.7	4.6	5.5	6.4	7.3	8.2	9.1	10.0	10.9	11.8
63	17	0.0	1.0	2.0	2.9	3.9	4.9	5.8	6.8	7.8	8.8	9.7	10.6	11.6	12.6
64	18	0.0	1.0	2.0	3.1	4.1	5.1	6.2	7.7	8.2	9.3	10.3	11.3	12.4	13.4
66	19	0.0	1.1	2.2	3.3	4.4	5.5	6.8	7.7	8.8	9.9	11.0	12.1	13.2	14.3
68	20	0.0	1.1	2.4	3.5	4.7	5.9	7.0	8.2	9.4	10.6	11.7	12.8	14.0	15.2
70	21	0.0	1.2	2.4	3.7	4.9	6.2	7.4	8.6	9.9	11.1	12.4	13.7	14.9	16.1
72	22	0.0	1.3	2.6	3.9	5.3	6.6	7.9	9.2	10.5	11.9	13.2	14.5	15.8	17.2
73	23	0.0	1.4	2.8	4.2	5.6	7.0	8.5	9.9	11.3	12.7	14.1	15.4	16.8	18.2
75	24	0.0	1.5	3.0	4.5	5.9	7.4	8.9	10.4	11.9	13.4	14.9	16.4	17.9	19.4
77	25	0.0	1.6	3.2	4.8	6.4	8.0	9.5	11.1	12.7	14.3	15.9	17.4	19.0	20.5
79	26	0.0	1.7	3.4	5.1	6.7	8.4	10.1	11.8	13.4	15.1	16.8	18.4	20.1	21.8
81	27	0.0	1.8	3.5	5.3	7.1	8.9	10.7	12.4	14.2	16.0	17.8	19.6	21.3	23.1
82	28	0.0	1.9	3.8	5.7	7.6	9.5	11.4	13.3	15.1	17.0	18.9	20.7	22.6	24.5
84	29	0.0	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.1	24.1	26.1
86	30	0.0	2.1	4.2	6.4	8.5	10.6	12.7	14.8	17.0	19.1	21.2	23.3	25.4	27.5
88	31	0.0	2.2	4.5	6.7	9.0	11.2	13.4	15.7	17.9	20.2	22.4	24.6	26.9	29.1
90	32	0.0	2.4	4.7	7.1	9.5	11.9	14.2	16.6	19.0	21.3	23.7	26.1	28.4	30.8
91	33	0.0	2.5	5.0	7.5	10.0	12.5	15.0	17.6	20.1	22.6	25.1	27.6	30.1	32.6
93	34	0.0	2.7	5.3	8.0	10.6	13.3	15.9	18.6	21.2	23.9	26.5	29.2	31.8	34.5

When temperatures are at certain levels you need corresponding humidity levels to unlock superior photosynthesis absorption. This custom fabricated silicone LED chip, utilizing a light spectrum that is tailored to only emit wavelengths with the highest efficiency for plant growth. You have the ability to regulate your vpd levels completely through this lighting system.

[0003] Drawbacks from conventional LED light fixtures in an agricultural, scientific or biomass capacity, required additional equipment, such as air-conditioners and humidifiers. These were needed primarily to control satisfactory atmospheric conditions necessary for a successful outcome. This High Pressure Internal Hydro-Cooled Misting/Vapor System lessens much of that need for the added equipment outside of the proposed system.

[0004] Therefore, a need exists in the field for an LED light source that is capable of operating in a cool state, since that will extend the operating life of the light source. A further desired feature exists in that the internal cooling feature also has the ability to utilize mist or vapor, as an atmospheric contributor to desired humidification and temperature conditions. Liquids are vaporized by means of light and not heat making the LED efficient. Vapor activation is triggered by a psi threshold in the irrigated lines of the device. Below this threshold the atomization ceases and the irrigated flow into the device recirculates in the user preference operation setup by the consumer. This system can also be used more specifically in the application of liquid nutrients, chemicals and other liquids necessary in a controlled (scientific) environment directly influencing the environment for a specific desired outcome.

BRIEF SUMMARY OF THE INVENTION

[0005] During operation LED lights require the coolest temperatures for consistent maximum intensity and function. The present invention is comprised of a high pressure internal hydro-cooling misting/vapor utility. This system can affect the lights operating temperature by providing the ability to add moisture or a specific liquid substance while also providing humidity to a designated area below the light. The light's hydro-cooling function can be used to influence the atmospheric conditions of the area depending on the temperature of the liquid running through the fixture. This is preset by a water chiller attached to the reservoir of liquid that runs through the manifold for the light's irrigation. The high pressure misting/vapor process is regulated by a solenoid valve that cuts off the flow to the irrigated manifold which is connected to the light system. This creates the adequate back-pressure to activate the vapor mist nozzles. When humidity levels are achieved the humidity control outlet, the solenoid is plugged into, will release the pressure back into its recirculating flow state, until humidity is again required.

[0006] With a simple LED chip and valve change, diversifies the system to offer up an array of other functions. Between an algae bioreactor to a fire-extinguishing office/commercial lighting system, further highlighting the applications and abilities of this invention to extend beyond exclusivity to only agriculture.

BRIEF DESCRIPTION OF THE DRAWING

[0007] Some embodiments of the present invention are illustrated as an example and is not limited by the figures of the accompanying drawings, in which like references may indicate similar elements and in which:

[0008] FIG. 1 - Figure 1 depicts a perspective view of one example of the high pressure hydro-cooled misting/vapor LED device with embodiments of the present invention.

[0009] FIG. 2 - Figure 2 depicts the front view of the high pressure hydro-cooled misting/vapor LED device.

[0010] FIG. 3 - Figure 3 depicts the back view of high pressure hydro-cooled misting/vapor LED device.

[0011] FIG. 4 - Figure 4 depicts the top view of high pressure hydro-cooled misting/vapor LED device.

[0012] FIG. 5 - Figure 5 depicts bottom view of high pressure hydro-cooled misting/vapor LED device.

[0013] FIG. 6 - Figure 6 depicts both the right and left view, being identical, of the high pressure hydro-cooled misting/vapor LED device.

[0014] FIG. 7 - Figure 7 illustrates an exploded view of the high pressure hydro-cooling misting/vapor LED device with elements and placement according to various embodiments

described.

[0015] FIG. 8 - Figure 8 depicts the cross sectional view of the high pressure hydro-cooled mist/vapor LED device

[0016] FIG. 9 - Figure 9 depicts the enlarged view of assembled high pressure hydro-cooled misting/vapor LED device illustrating an enhanced indication of the misting/vapor feature.

[0017] FIG. 10 - Figure 10 illustrates the operational layout of the high pressure hydro-cooled misting/vapor LED device.

DETAILED DESCRIPTION OF THE INVENTION

[0018] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the term “and/or” includes any and all combinations of one or more of the associated listed items. As used herein, the singular forms “a,” “an,” and “the” are intended to include the plural forms as well as the singular forms, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises” and/or “comprising,” when used in this specification, specify the presence of stated features, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, steps, operations, elements, components, and/or groups thereof.

[0019] Unless otherwise defined, all terms(including technical and scientific

terms) used herein have the same meaning as commonly understood by one having ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and the present disclosure and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0020] In describing the invention, it will be understood that a number of techniques and steps are disclosed. Each of these has individual benefit and each can be used in conjunction with one or more, or in some cases all, of the other disclosed applications. For the sake of clarity, this description will refrain from repeating every possible combinations of the individual steps in an unnecessary fashion. Nevertheless, the specifications should be read with the understanding that such combinations are entirely within the scope of the invention.

[0021] The present disclosure is to be considered as an exemplification of the invention, and is not intended to limit the invention to the specific embodiments illustrated by the figures or description below.

[0022] The present invention will be described by referencing the appended figures.

FIG. 1 depicts a perspective view of the elements.

FIG. 2 is the front view of same invention.

FIG. 3 is the back view of same invention.

FIG. 4 is the top view of same invention.

FIG. 5 is the bottom view of same invention.

FIG. 6 is the (left and right) side view of same invention.

FIG. 7 is the exploded view of the high pressure hydro-cooled mist/vapor light system. The majority of the assembly is based on the precise measurements of the aluminum lamp body which enables it to cocoon (hugs) the internal elements, 120mm inline high velocity fan and thermistor which is placed between LED chip and is then secured with 4 m3 screws to the copper heatsink with liquid core channel.

- a. **Element 1**, in both figures, is the half piece (2.5mm) aluminum lamp body shell with **element 8** built in fan guard and wire restraining bushing.
- b. **Element 7** 120mm waterproof ip68 rating inline fan to promote additional cooling to the systems operating components. This fan's durability can endure dust, water, high heat and high humidity.
- c. **Element 2** copper heat sink component with liquid core channel. **Element 5** brass high pressure mist nozzle.
- d. **Element 4** high powered silicone covered LED chip, pure copper c11000 base plate with **Element 3** embedded Positive Temperature Coefficient (PCT) 100k ohm thermistor. The power is regulated by the thermistor which sends the appropriate amount power to the light according to the temperature of the environment the light is operating in to ensure proper intensity.
- e. **Element 6** two 3/8" threaded NPT 3/8" brass high pressure liquid barbed fitting to attach 3/8" water line. This is also the connection point where another unit can be attached, turning the single device into a multiple unit system.
- f. **Element 9** two titanium bolts 118 ml length, m4 x 0.7 join the two sides of the device housing adding reinforcement.
- g. **Element 10** four m3 screws which secures the LED to heatsink. Nestling the thermistor between the two.
- h. **Element 11** four 14 gauge copper wires which connect to power source. Two connect to the heatsink and two to the fan.

FIG. 8 is the cross sectioned view of same invention.

FIG. 9 is the enlarged view of same invention emphasizing position and location of misting/vapor valves in relation to chip placement.

FIG. 10 is the operational view showing only one unit and depicts placement of power supply.

In multi unit systems, there are multiple devices that are joined at either one or both sides as stated in **element 6** of same invention.

[0022] While preferred materials for elements have been described, the device is not limited by these materials. Other materials may comprise some or all of the elements of the present invention.

[0023] Although the present invention has been described and illustrated herein with reference to preferred embodiments and specific example thereof, it will be readily apparent to those of ordinary skill in the art that other embodiments and examples may perform similar functions and/or achieve like results. All such equivalent embodiments and examples are within the spirit and scope of the present invention.

CLAIMS

We claim:

1. A method of high pressure internal liquid cooling process through an LED device;
A method in which results in a thermally cooler operating temperature, producing consistent luminosity of an LED high power light engine and lengthening the life of the of the LED.
2. A method of atomization (misting/vapor) of various liquids/gas through an LED device is claimed;
Including allowing for multiple setup atomization options to suit the specific technology demands. The atomization method through the apparatus of **Claim 1** wherein permits VPD levels to be achieved allowing maximum absorption of photons from the LED device. VPD scientific measurement involving temperature and humidity, creating optimal “vapor pressure deficit” levels will unlock a plants ability to absorb photon energy at a higher rate. Vapor activation is triggered by a psi threshold in the irrigated lines of the device. Below this threshold the atomization ceases and the irrigated flow into the device recirculates in the user preference operation setup by the consumer.
3. The system according to **claim 2**, wherein creates a controlled atmosphere for plants; to absorb photons emitted by the light source which is tuned to emit photons that only correlates with photosynthetic response. These additional features added into the primary function of this illumination device allows for overhead operational cost reductions.
4. This system’s copper alloy channeled heatsink is also claimed to facilitate liquid to run through channel;
has an inherent broad spectrum antibacterial efficacy against some of the most toxic species of bacteria, fungi and viruses. With the utilization of a pure oxygen free copper heatsink component the pressurized mist/vapor is also sanitized resulting in the assurance of a sterile indoor growth environment.
5. Fire extinguishing capabilities are claimed;
and achieved with a simple spectrum LED chip change and valve modification when using this high pressure hydro-cooled misting/vapor illumination system in a commercial environment.
6. Algae Bioreactor according to **claim 5** further comprising of a change from copper to a suitable alloy heatsink warranted by the conditions.

AMENDED CLAIMS

received by the International Bureau on 17 October 2018 (17.10.2018)

We claim:

1.(i) A method of atomization (misting/vapor) of various liquids/gas through an LED device is claimed;

Including allowing for multiple setup atomization options to suit the specific technology demands. The atomization method through the apparatus of **Claim 3** wherein permits VPD levels to be achieved allowing maximum absorption of photons from the LED device. VPD scientific measurement involving temperature and humidity, creating optimal “vapor pressure deficit” levels will unlock a plants ability to absorb photon energy at a higher rate. Vapor activation is triggered by a psi threshold in the irrigated lines of the device. Below this threshold the atomization ceases and the irrigated flow into the device recirculates in the user preference operation setup by the consumer.

2.(ii) The system according to **claim 1**, wherein creates a controlled atmosphere for plants; to absorb photons emitted by the light source which is tuned to emit photons that only correlates with photosynthetic response. These additional features added into the primary function of this illumination device allows for overhead operational cost reductions.

3.(iii) A method of high pressure internal liquid cooling process through an LED device; A method in which results in a thermally cooler operating temperature, producing consistent luminosity of an LED high power light engine and lengthening the life of the of the LED.

4. This system’s copper alloy channeled heatsink is also claimed to facilitate liquid to run through channel; has an inherent broad spectrum antibacterial efficacy against some of the most toxic species of bacteria, fungi and viruses. With the utilization of a pure oxygen free copper heatsink component the pressurized mist/vapor is also sanitized resulting in the assurance of a sterile indoor growth environment.

5. Fire extinguishing capabilities are claimed; and achieved with a simple spectrum LED chip change and valve modification when using this high pressure hydro-cooled misting/vapor illumination system in a commercial environment.

6. Algae Bioreactor according to **claim 5** further comprising of a change from copper to a suitable alloy heatsink warranted by the conditions.

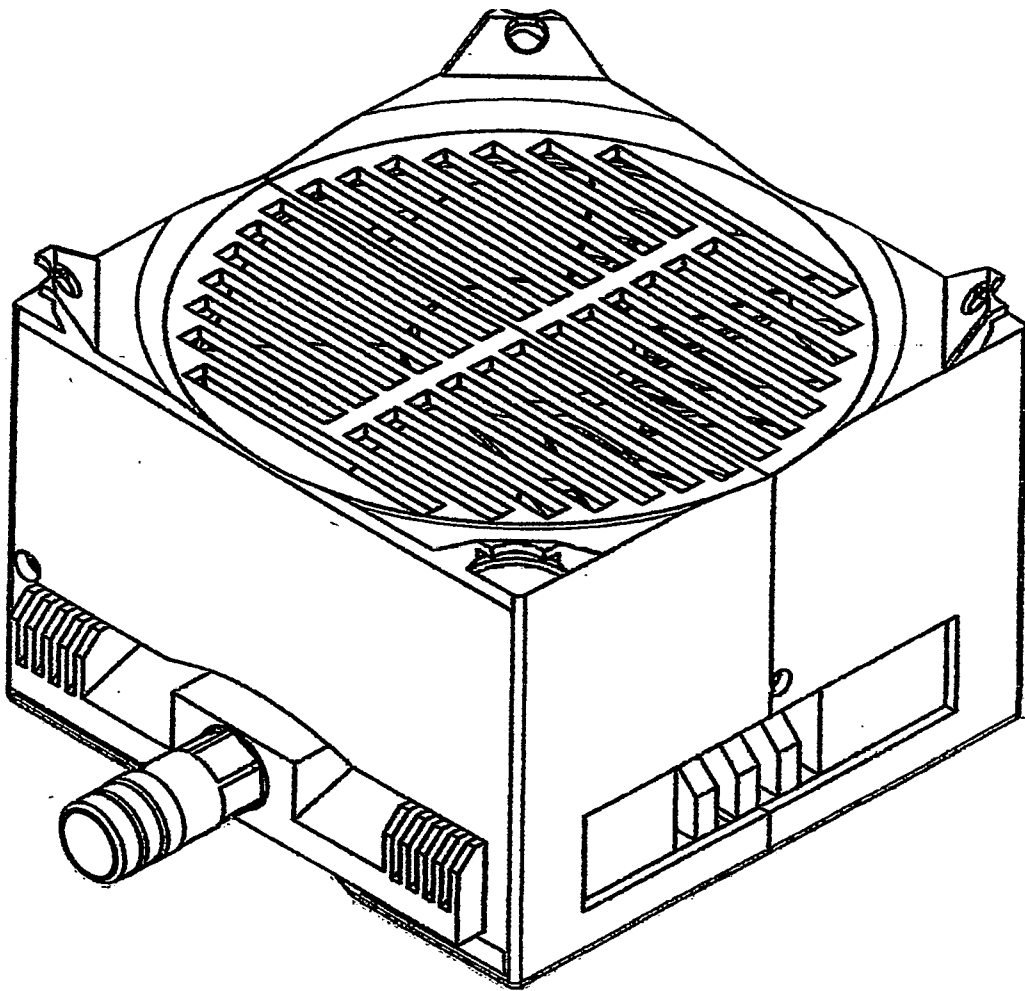


FIG. 1

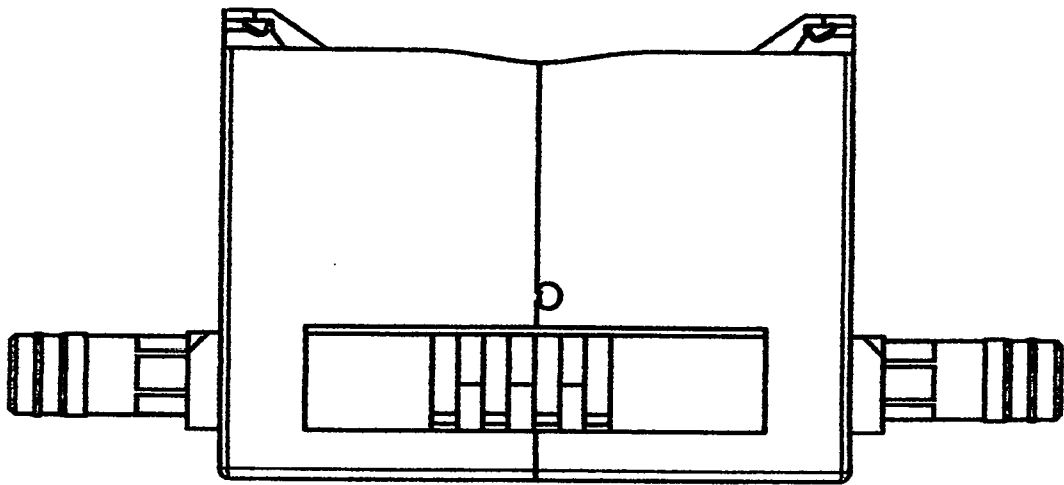


FIG. 2

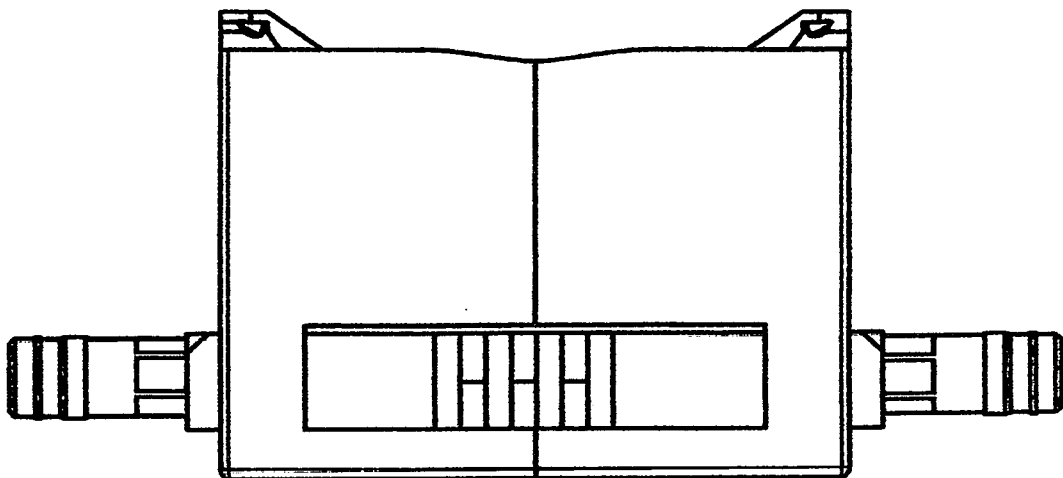


FIG. 3

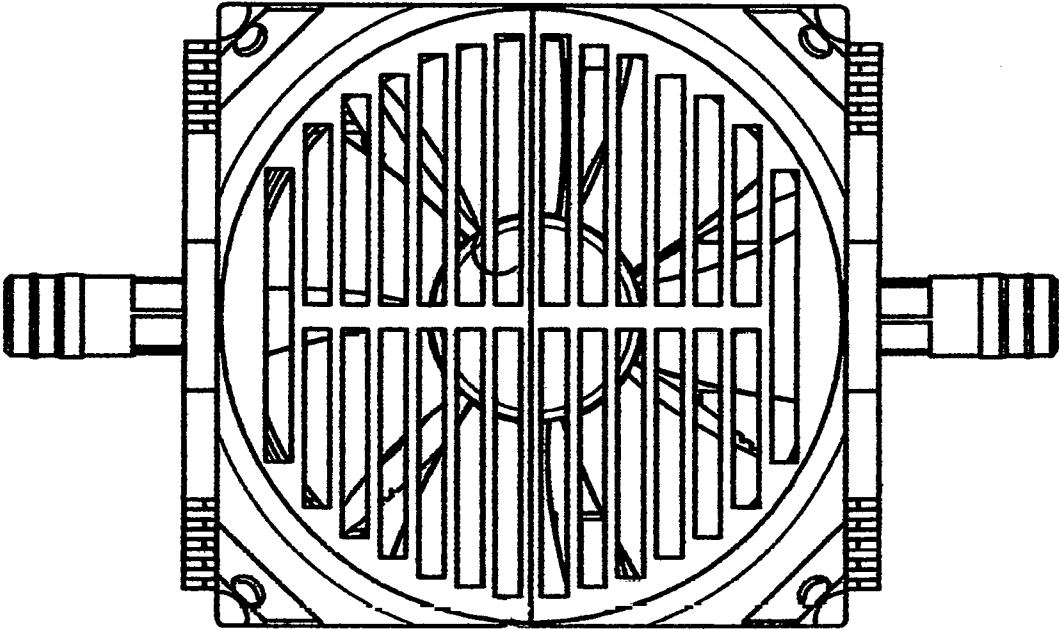


FIG. 4

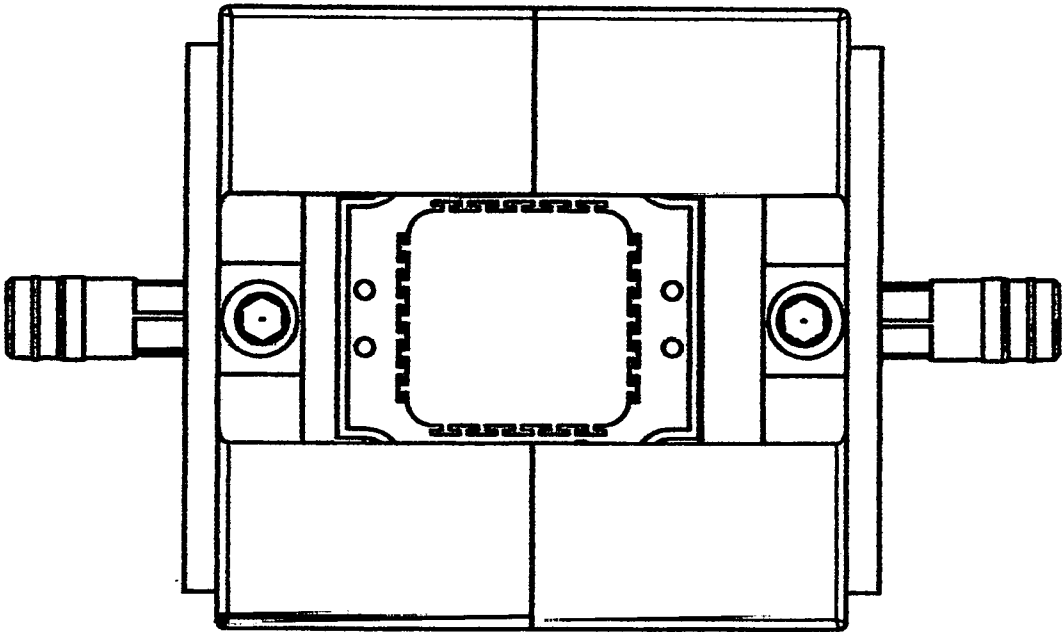


FIG. 5

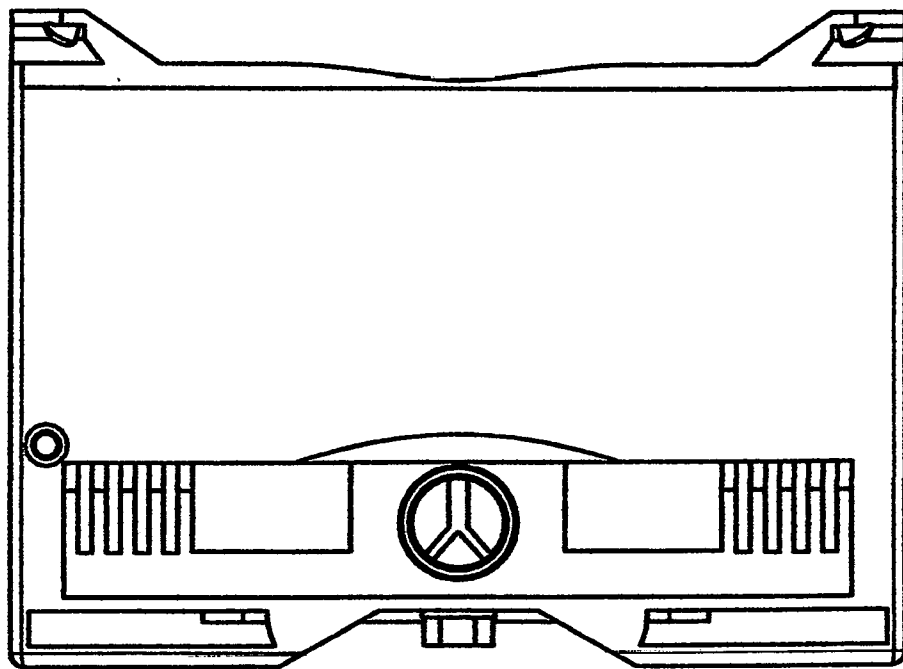


FIG. 6

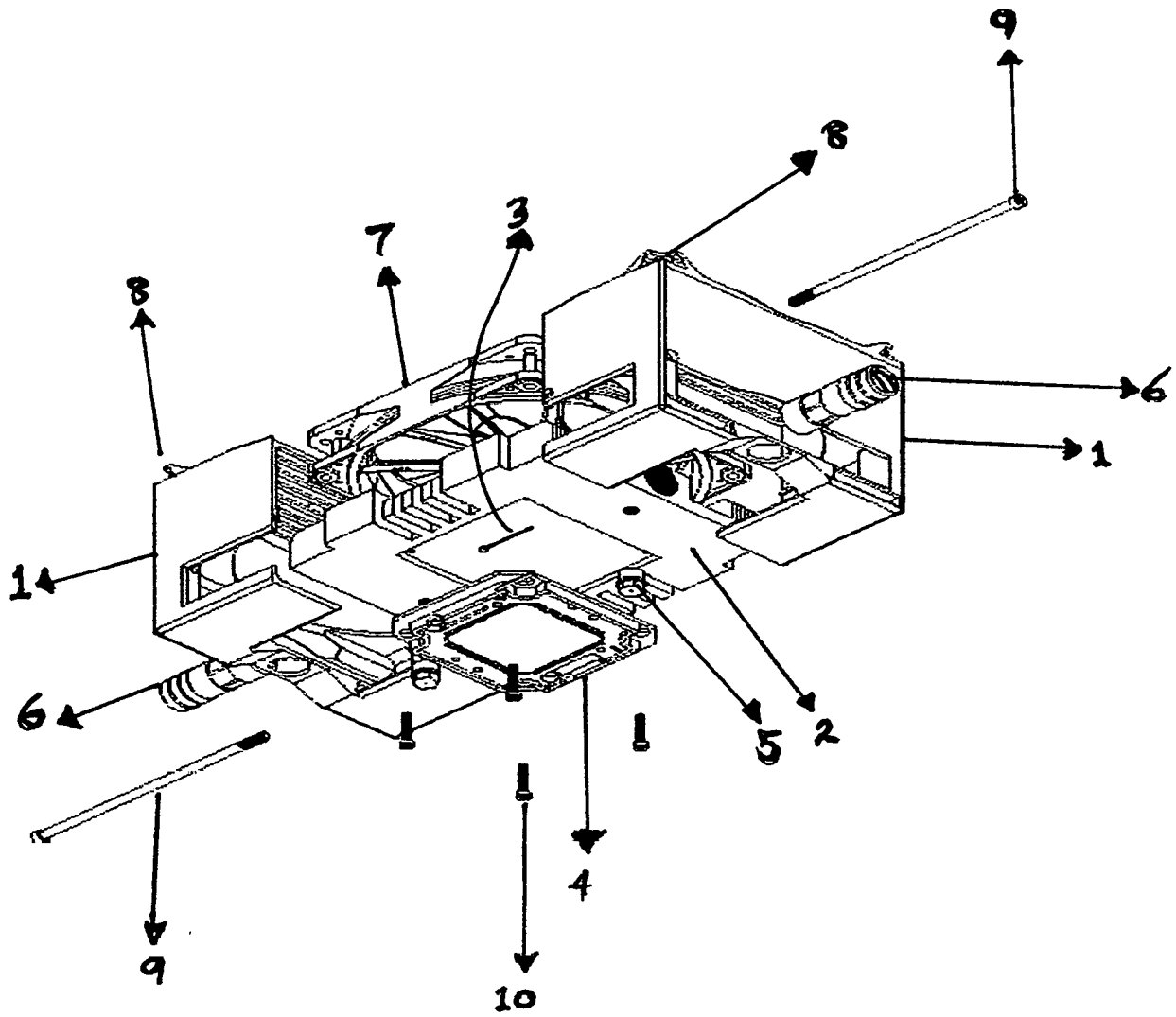


FIG. 7

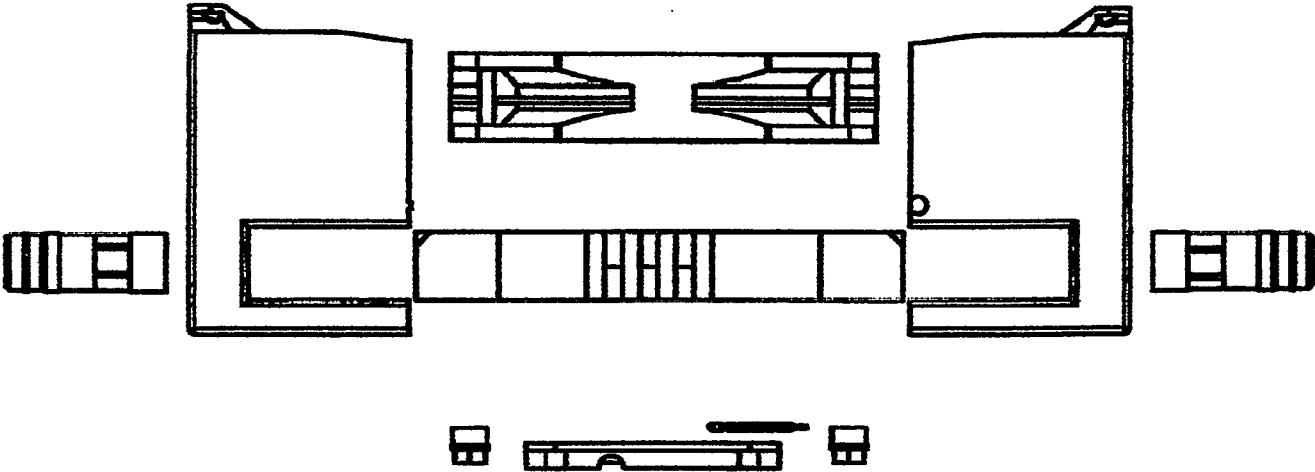


FIG. 8

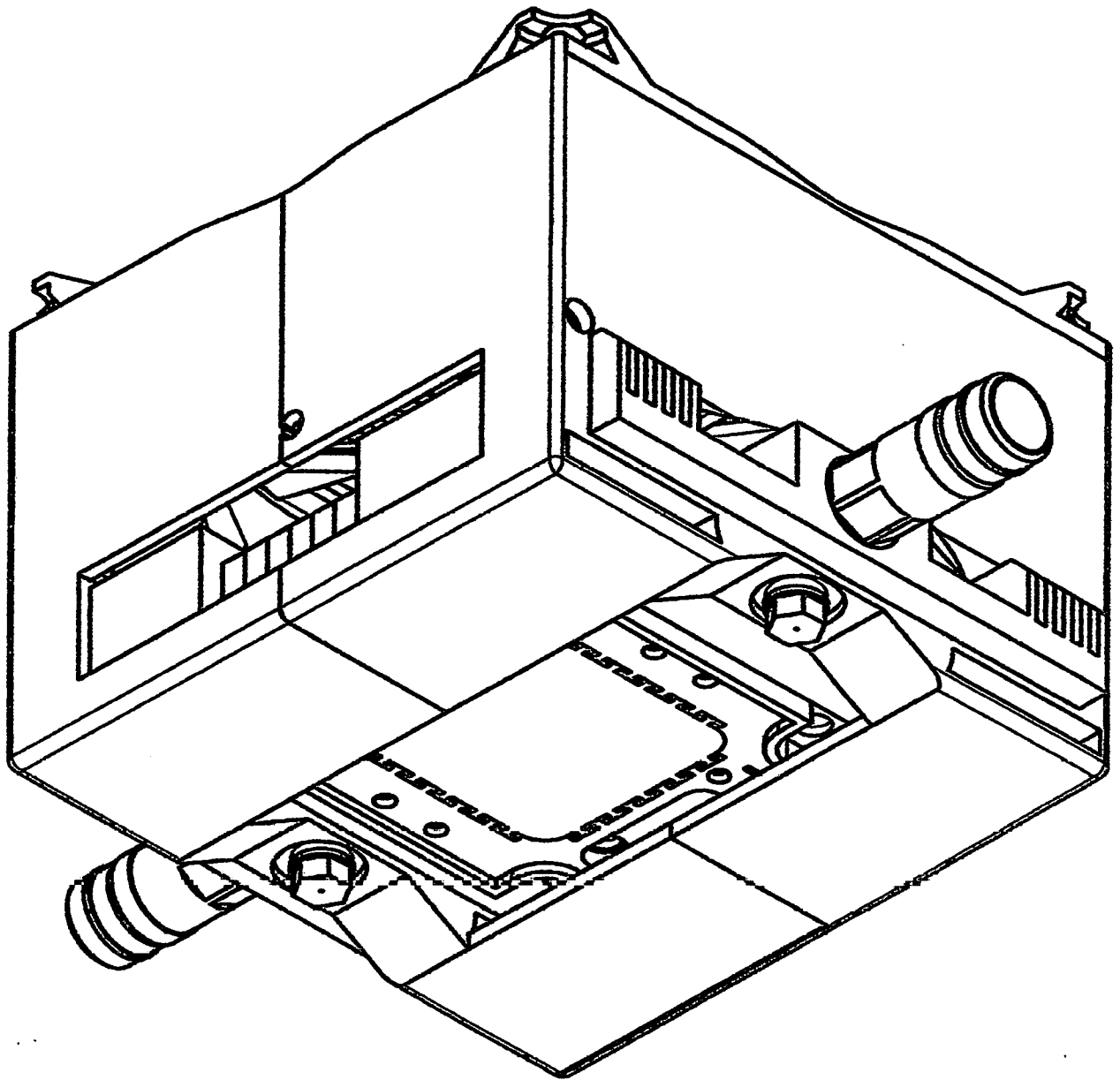


FIG. 9

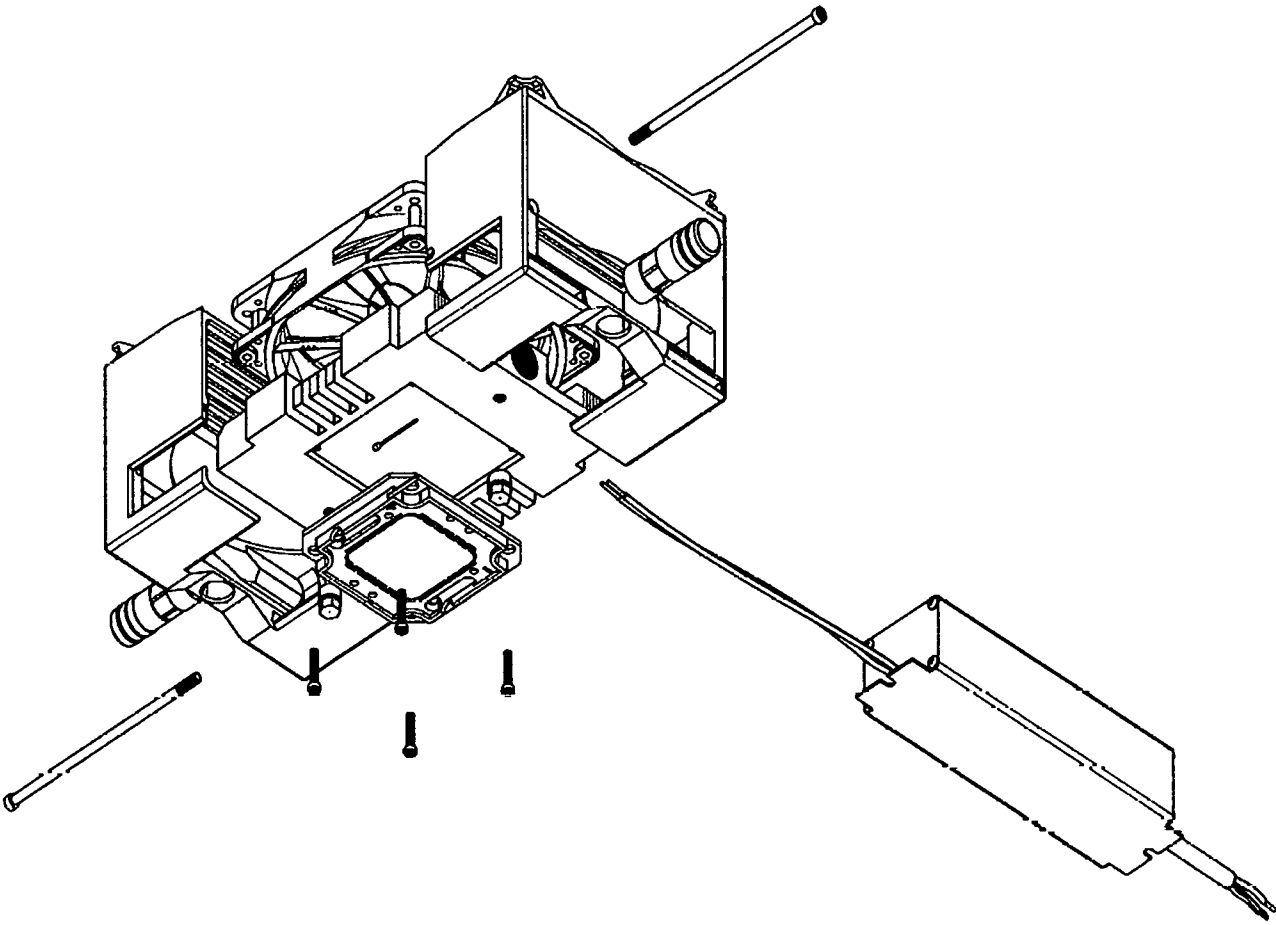


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 18/00108

A. CLASSIFICATION OF SUBJECT MATTER
 IPC(8) - F21S 4/00, F21V 29/00, F21V 5/04 (2018.01)
 CPC - F21K 9/23, F21V 29/402, F21V 29/505

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)

See Search History Document

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

See Search History Document

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

See Search History Document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 7,300,187 B2 to Huang et al. 27 November 2007 Entire document, especially col 1, ln 30-40; col 2, ln 20-27; col 3, ln 14-15 and col 4, ln 40-42.	1
A	US 2017/0146226 A1 (Storey et al.) 25 May 2017 (25.05.2017). Entire document, especially para [0024].	1
A	US 2012/0002401 A1 (Clifford) 05 January 2012 (05.01.2012). Entire document, especially abstract.	1

☐ Further documents are listed in the continuation of Box C.

☐ Sec patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

14 June 2018

Date of mailing of the international search report

24 AUG 2018

Name and mailing address of the ISA/US

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 Facsimile No. 571-273-8300

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
 PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 18/00108

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: claim 1 directed to a method of high pressure internal liquid cooling process through an LED device

Group II: claims 2-3 directed to A method of atomization (misting/vapor) of various liquids/gas through an LED device

Group III: claims 4 and 6 directed to a system's copper alloy channeled heatsink is also claimed to facilitate liquid to run through channel; has an inherent broad spectrum antibacterial efficacy

Group IV: claims 5 directed to fire extinguishing capabilities.

Continue on the first sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 18/00108

Continue from Box III

The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Special technical features:

Group I requires a method of high pressure internal liquid cooling process through an LED device; a method in which results in a thermally cooler operating temperature, producing consistent luminosity of an LED high power light engine and lengthening the life of the of the LED which is not required by Group II-IV.

Group II requires a method of atomization (misting/vapor) of various liquids/gas through an LED device is claimed; Including allowing for multiple setup atomization options to suit the specific technology demands, the atomization method through the apparatus of Claim 1 wherein permits VPD levels to be achieved allowing maximum absorption of photons from the LED device; wherein VPD scientific measurement involving temperature and humidity, creating optimal "vapor pressure deficit" levels will unlock a plants ability to absorb photon energy at a higher rate; vapor activation is triggered by a psi threshold in the irrigated lines of the device, below this threshold the atomization ceases and the irrigated flow into the device recirculates in the user preference operation setup by the consumer which is not required by Group I, III and IV.

Group III requires This system's copper alloy channeled heatsink is also claimed to facilitate liquid to run through channel; has an inherent broad spectrum antibacterial efficacy against some of the most toxic species of bacteria, fungi and viruses, with the utilization of a pure oxygen free copper heatsink component the pressurized mist/vapor is also sanitized resulting in the assurance of a sterile indoor growth environment which is not required by Group I, II and IV.

Group IV requires fire extinguishing capabilities are claimed; and achieved with a simple spectrum LED chip change and valve modification when using this high-pressure hydro-cooled misting/vapor illumination system in a commercial environment which is not required by Group I-III

Shared technical features:

Groups I-IV share the technical feature of a LED device.

However, this shared technical feature does not provide a contribution over the prior art because these shared technical features lacks novelty as being anticipated by US 2017/0146226 A1 to Storey et al. (hereinafter 'Storey'). Storey teaches a LED device (para [0024] 'As illustrated in FIGS. 1-12, the present invention is a water-cooled LED lighting system for indoor farming')

Groups I-IV therefore, lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature providing a contribution over the prior art.

note:

Claims 1-6 lack clarity. Claims 1-4 are not written in the acceptable one sentence format. For purposes of the search and opinion the claims are interpreted broadly. The dependency of claim 2 is stated to be on the apparatus of claim 1; however the structure of an apparatus is not specified in claim 1. Claim 2 specifies elements not supported by claim 1. Therefore claim 1 is treated as an independent claim. Claim 6, which is dependent on claim 5, specifies an algae bioreactor. However, no algae bioreactor is specified in claim 5. Further, claim 6 references the claim element copper. However, claim 5 lacks support for copper, whereas claim 4 provides support for copper. Therefore, claim 6 is treated as being dependent on claim 4 and the preamble is modified to "The system". For the purpose of the search and opinion, claims 1-6 are interpreted as follows:

1. A method of high pressure internal liquid cooling process through an LED device; a method in which results in a thermally cooler operating temperature, producing consistent luminosity of an LED high power light engine and lengthening the life of the of the LED.

2. A method of atomization (misting/vapor) of various liquids/gas through an LED device is claimed; Including allowing for multiple setup atomization options to suit the specific technology demands, the atomization method wherein permits "vapor pressure deficit" (VPD) levels to be achieved allowing maximum absorption of photons from the LED device; wherein VPD scientific measurement involving temperature and humidity, creating optimal "vapor pressure deficit" levels will unlock a plants ability to absorb photon energy at a higher rate; vapor activation is triggered by a psi threshold in the irrigated lines of the device, below this threshold the atomization ceases and the irrigated flow into the device recirculates in the user preference operation setup by the consumer.

3. The system according to claim 2, wherein creates a controlled atmosphere for plants; to absorb photons emitted by the light source which is tuned to emit photons that only correlates with photosynthetic response, these additional features added into the primary function of this illumination device allows for overhead operational cost reductions.

4. This system's copper alloy channeled heatsink is also claimed to facilitate liquid to run through channel; has an inherent broad spectrum antibacterial efficacy against some of the most toxic species of bacteria, fungi and viruses, with the utilization of a pure oxygen free copper heatsink component the pressurized mist/vapor is also sanitized resulting in the assurance of a sterile indoor growth environment.

5. Fire extinguishing capabilities are claimed; and achieved with a simple spectrum LED chip change and valve modification when using this high pressure hydro-cooled misting/vapor illumination system in a commercial environment.

6. The system according to claim 4 further comprising of a change from copper to a suitable alloy heatsink warranted by the conditions.