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COMPLETE SPECIFICATION
(See sections 10 & rule 13)

1) TITLE OF THE INVENTION

"Sustainable Room Heating Device And Heat Generation Method"

2) APPLICANT(S)

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3) PREAMBLE TO THE DESCRIPTION

COMPLETE SPECIFICATION

The following specification particularly describes the invention and the manner in which it is to be performed.

SUSTAINABLE ROOM HEATING DEVICE AND HEAT GENERATION METHOD

FIELD OF THE INVENTION

The present invention relates to the field of heat generation devices and heat generation methods. More specifically, the present invention relates to a room heating device that uses Low Energy Nuclear Reaction (LENR) technology to produce thermal energy within an enclosure in a sustainable, eco-friendly, efficient, and long-lasting manner.

BACKGROUND OF THE INVENTION

Background description includes information that may be useful in understanding the present invention. It is not an admission that any of the information provided herein is prior art or relevant to the presently claimed invention, or that any publication specifically or implicitly referenced is prior art.

There are numerous reasons behind the worldwide growing demand for energy and most of them are because of the shortcomings in the presently available sources of energy. The conventionally available sources of energy are natural gas, oil, coal, gas, wind, Uranium, and solar energy.

Discussing more on the evolution of the aforementioned sources of energy, coal entered into as a source of energy with the advent of steam engines. For automobiles, petroleum and Compressed Natural Gas (CNG) evolved as potential sources of energy. Natural gas has been used for electricity generation and heat production also, for both industrial and domestic purposes.

Nowadays, the research community is trying to find out sustainable forms of energy resources. Energy generated through wind and sun is now very massively used in many countries as an eco-friendly way of generating energy for various purposes. Other than this, fossil fuels are also used to generate energy. The main problem faced while using fossil fuels as a source of energy is that they are unequally distributed and nonrenewable in nature.

A wide range of fuels is being used to generate heat/thermal energy in large and small-scale industries. The most dominantly used sources of thermal energy generation are natural gas, nuclear uranium, coal, oil, diesel, and biomass materials. Currently, the whole of humanity is dependent on these sources of energy to generate heat energy.

Unfortunately, each one of these has its own limitations either with efficiency or with cost or with restricted availability or major concern on safety and/or environment. Countries like India, depend on importing the raw materials at huge costs and other geopolitical challenges.

In the exemplary case of US10902982B2 discloses an electrically conductive PTC ink with double switching temperatures and applications thereof in flexible double-switching heaters. The double-switching heater includes a double-switching PTC ink deposited on a substrate to form one or more resistors. The double-switching PTC ink has a first resin that provides a first PTC effect at a first temperature range and a second resin that provides a second PTC effect at a second temperature range, where the second temperature range is higher than the first temperature range. The substrate may be a flexible substrate or a rigid substrate and may be deformable to generate a three-dimensional structure. The substrate may be polyester, polyimide, polyamide, polypropylene, thermoplastic polyurethane, fiberglass, cement board, carbon composite materials, polyethylene terephthalate, polyethylene, aluminum, steel, glass composite, molded plastic, high-density polyethylene, or styrene ethylene butylene styrene.

In an exemplary scenario, room heaters available in the market for remote and isolated areas employ one or more sources of thermal energy generation. So many advancements are taking place to upgrade the technology of heaters available in the market (like the one explained in the aforementioned paragraph for patent no. US10902982B2).

Usually, room heaters are based on coal or kerosene as input to generate thermal (heat) energy as output. This as a by-product produces harmful gases like Carbon-monoxide (CO) and Carbon-di-Oxide (CO_2) as by-products while burning which are not environmentally friendly and cause health hazards. Further, the fuel (kerosene /coal) needs to be replenished continuously and the maintenance and revenue expenditure of the equipment and the logistic chain is also high for them.

Therefore, the scientific fraternity is in search of other energy sources and energy generation technologies with the properties like low cost, eco-friendliness, sustainability, and easiness to handle so that such sources of energy can be used in new generation room heaters to evolve sustainable and technologically advanced means of generating heat for long hours.

OBJECTIVES OF THE INVENTION

The principal objective of the present invention is to overcome the disadvantages of the prior art.

An object of the present invention is to provide a room heating device and a heat generation method that generates heat in a sustainable and eco-friendly manner.

Another objective of the present invention is to provide an efficient and long-lasting substitute to already available heat-generating fuels.

Another objective of the present invention is to envision a room heating device that generates thermal energy through low energy nuclear reaction (LENR) technology.

Yet another objective of the present invention is to envision cost-effective and easily collectible/handy energy sources for generating thermal energy.

The foregoing and other objects, features, and advantages of the present invention will become readily apparent upon further review of the following detailed description of the preferred embodiment as illustrated in the accompanying drawings.

SUMMARY OF THE INVENTION

The present invention relates a room heating device that generates heat in a sustainable and long lasting manner through a heat generation method involving Low Energy Nuclear Reaction (LENR) technology.

According to an embodiment of the present invention, the sustainable room heating device comprises a cylindrically elongated hollow reactor, a pair of flanges rimmed around flat faces of the hollow reactor for creating vacuum therein, one or more gasket(s) sandwiched between each combination of the flat faces and flanges for preventing the escape of a gas entering therefrom into the hollow reactor and a cylindrical flanged container housed within the hollow reactor to undergo a low energy nuclear reaction to release heat, wherein the reaction involves synergistic amounts of Deuterium gas and Hydrogen gas in contact over Palladium treated Nickel-Chromium catalyst under temperature ranging from 200ºC - 400ºC and pressure ranging from 4000 - 5000 Pascals.

According to another embodiment of the present invention, a heat generating method involves a low energy nuclear reaction within the realm of a cylindrical flanged container to release heat, wherein the reaction involves synergistic amounts of Deuterium gas and Hydrogen gas in contact over Palladium treated Nickel-

Chromium catalyst under temperature ranging from 200ºC - 400ºC and pressure ranging from 4000 - 5000 Pascals.

According to another embodiment of the present invention, a gas inlet traversing centrally through the flanges and the gasket(s) from atleast one side feeds the gas inside the container. According to another embodiment of the present invention, the one or more gasket(s) are preferably made up of Copper metal. According to another embodiment of the present invention, the hollow reactor is entirely hermetically sealed.

According to another embodiment of the present invention, the hollow reactor and the container are made up of stainless steel. According to another embodiment of the present invention, the hollow reactor is flanged by ConFlat-40 flanges and the container is flanged by ConFlat-16 flanges. According to another embodiment of the present invention, the heater generates heat ranging from 110 Watts – 150 Watts upon drawing substantial power through a power source.

While the invention has been described and shown with particular reference to the preferred embodiment, it will be apparent that variations might be possible that would fall within the scope of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings are included to provide a further understanding of the present disclosure and are incorporated in and constitute a part of this specification. The drawings illustrate exemplary embodiments of the present disclosure and, together with the description, serve to explain the principles of the present disclosure.

In the figures, similar components and/or features may have the same reference label. Further various components of the same type may be distinguished by following the reference label with a second label that distinguishes among the similar components. If only the first reference label is used in the specification, the description is applicable to any of the similar components having the same reference label irrespective of the second reference label.

Figure 1 illustrates a schematic drawing of a room heating device, according to an embodiment of the present invention.

Figure 2 illustrates an exemplary laboratory prototype of the room heating device, according to an embodiment of the present invention.

Figure 3 shows a graphical representation of the comparison of calorimeter power output versus reactor input power for active and calibrated experiments, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

As used in the description herein and throughout the claims that follow, the meaning of “a,” “an,” and “the” includes plural reference unless the context clearly dictates otherwise. Also, as used in the description herein, the meaning of “in” includes “in” and “on” unless the context clearly dictates otherwise.

If the specification states a component or feature “may”, “can”, “could”, or “might” be included or have a characteristic, that particular component or feature is not required to be included or have the characteristic.

Exemplary embodiments will now be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments are shown. This disclosure may however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. These embodiments are provided so that this disclosure will be thorough and complete and will fully convey the scope of the disclosure to those of ordinary skill in the art. Moreover, all statements herein reciting embodiments of the disclosure, as well as specific examples thereof, are intended to encompass both structural and functional equivalents thereof. Additionally, it is intended that such equivalents include both currently known equivalents as well as equivalents developed in the future (i.e., any elements developed that perform the same function, regardless of structure).

Various terms as used herein are shown below. To the extent a term used in a claim is not defined below, it should be given the broadest definition persons in the pertinent art have given that term as reflected in printed publications and issued patents at the time of filing.

In some embodiments, the numerical parameters set forth in the written description and attached claims are approximations that can vary depending upon the desired properties sought to be obtained by a particular embodiment. In some embodiments, the numerical parameters should be construed in light of the number of reported significant digits and by applying ordinary rounding techniques. Notwithstanding that the numerical ranges and parameters setting forth the broad scope of some embodiments of the invention are approximations, the numerical values set forth in the specific examples are reported as precisely as practicable. The numerical values presented in some embodiments of the invention may contain certain errors necessarily resulting from the standard deviation found in their respective testing measurements.

The present invention relates to Low Energy Nuclear Reaction (LENR) technology based room heating device and heat generation method to produce heat using more efficient, abundant, low cost, sustainable and eco-friendly fuels.

Referring to Figure 1, a schematic drawing of a room heating device is presented, according to an embodiment of the present invention. The room heating device embodies a hollow reactor **(1)**, a pair of flanges **(2)**, one or more gaskets **(3)**, a gas inlet **(5),** and a cylindrical flanged container **(4)** all rested on a base **(6)**. The room heating device works on the principle of a Low Energy Nuclear Reaction (LENR) Technology to pressure excessive heat therearound.

According to an embodiment of the present invention, the hollow reactor **(1)** forms the outer covering of the room hearting device. The reactor **(1)** is hollow from inside and is of an elongated shape in order to conveniently house some embodiments within its premises if required.

The elongated shape of the reactor **(1)** in the form of a cylinder. The inner length of the reactor **(1)** ranges from 80mm to 90mm and the outer length of the reactor **(1)** ranges from 86mm to 96mm. The inner diameter of the reactor **(1)** ranges from 27mm to 37mm, thus ensuring a substantially spacious hollow portion inside the reactor **(1)** for suitable reactions to occur conveniently.

The reactor's **(1)** body is preferably made up of stainless steel, ideally, SS-316, and the reactor **(1)** is capable of operating as a stand-alone source of energy. The body is made in such a way that it has several layers of strengthening steel to provide maximum resistance against the reactions happening inside the reactor **(1)**.

According to another embodiment of the present invention, the flat faces of the cylindrical reactor **(1)** are rimmed by a pair of flanges **(2)**. A person having average skill in the art would understand the fact that the count of the pair of flanges **(2)** can be increased depending on the requirement. The requirement would in turn depend on the fact that if the reactor **(1)** is properly hermetically sealed through the available pair of flanges **(2)**, or there is a need for more flanges **(2)** welded around the flat faces of the reactor **(1)**.

One flange **(2)** of the pair of flanges is welded around one of the reactor's **(1)** flat face and the other one is welded around the other flat face of the reactor **(1)**. The main specialty of the flanges **(2)** is to create a 100% vacuumed environment inside the hollow reactor **(1)** for any subsequent reactions to occur. The type of the flanges **(2)** used is preferably ConFlat-40 (CF-40).

The flanges are circular in shape and a variety of flanges can be employed which vary very minutely in shape, structure and configuration. The flanges are made up of stainless steel and are affixed on the surface of the reactor **(1)** through nuts and bolts drilled thereon.

In terms of dimensional ranges, the wall thickness of the pair of flanges ranges from 11.7mm to 13.7mm and the circular diameter of the flanges ranges from 60mm to 80mm, wherein the dimensions more or less depend on the length and diameter of the cylindrical reactor **(1)**.

According to another embodiment of the present invention, one or more gasket(s) **(3)** may be sandwiched between each combination of the flanges **(2)** and the flat face. The count of the gasket(s) **(3)** may be increased or decreased depending on the requirement. Gaskets **(3)** may be of any shape, but since the flat face and the flanges **(2)** are circular in shape, it’s best to have a circular gasket to provide the entire covering.

The function of the gaskets **(3)** is to prevent the escape of gas injected inside the reactor **(1)** from any of the leaking portions. To ensure this, the gaskets **(3)** used herein are ideally flat pieces of rubber used to completely airtight the passage between the flat faces of the reactor and the flanges **(2)**.

The diameter of a piece of the gasket **(3)** may be the same as that of the flanges **(2)** or of the reactor **(1)** in order to provide full coverage. The gaskets **(3)** comprise of leakproof vacuum sealant and are sandwiched between the reactor’s **(1)** flat face and the flanges **(2)** through the nut and bolt assembly. The metal used to make the gasket(s) **(3)** is preferably Copper metal.

As indicated in Figure 2, an exemplary laboratory prototype of the room heating device is illustrated, according to an embodiment of the present invention. In an instance, the whole assembly of the cylindrical reactor **(1)** welded with the pair of flanges **(2)** and gaskets **(3)** therebetween weighs the whole device to approximately 1.2-3.5 kilograms and is rested on a base **(6).**

According to an embodiment of the present invention, the reactor houses the cylindrical flanged container **(4)**. For this to be done, the container **(4)** may have dimensions and structure comparatively smaller than that for the reactor **(1)**. Upon industrial manufacturing of the room heating device, as explained in this document, the container **(4)** is housed inside the reactor **(1)** and upon being manufactured, it is impossible to take that out for the lifetime of the room heating device.

The container **(4)** may be cylindrical in shape or may have any other shapes including, but not limited to, sphere, oval, cuboidal, and cubical. The container **(4)** is also flanged by a pair of flanges **(2)**, wherein the type of the flange used in the container is ConFlat-16 (CF-16). The ConFlat-16 flanges are also made up of stainless steel and pasted on the flat faces of the cylindrical container **(4)**.

According to an alternate embodiment, if the shape of the container **(4)** is different from the cylindrical shape, then the shape of the flanges needs to be different as well, which should be ideally the same shape as that of the ends of the shape of the container **(4)**.

Within the container **(4)**, the Low Energy Nuclear Reaction (LENR) technology is made practically feasible by creating proper temperature and pressure inside the reactor **(1)**. The reactor **(1)** creates and thus provides the whole volume, pressure and temperature (i.e. the whole environment) for the LENR technology to happen successfully.

According to an embodiment of the present invention, a gas inlet **(5)** is connected to and within the reactor **(1)** to inject and eject back the gasses inside and outside the reactor **(1)** respectively. In an exemplary scenario, the gas inlet **(5)** traverses centrally through the flanges **(2)** and then through the gaskets **(3)** and finally through the central hole in the flat faces of the cylindrical reactor **(1)** to reach within the container **(4)** of the reactor **(1)**.

The whole gas inlet **(5)** passage is sealed for any gas leakages through rubber shielding, thus creating a properly airtight environment without any gas leakages. As an advancement, the gas inlets **(5)** may be more than one in count depending on the requirement. As an advancement, the gas inlets **(5)** can be incorporated from multiple sides of the reactor **(1)** or maybe multiple in the count to ensure gas inlet **(5)** into the reactor **(1)** from multiple passages.

From the gas inlet **(5)**, Deuterium gas and Hydrogen gas may be injected into the container **(4)**, which is present inside the reactor **(1)**. Synergistic amounts of Deuterium gas and Hydrogen gas are injected into the container **(4)** of the reactor **(1)**. Moreover, the gases entering into the container **(4)** through the reactor **(1)** should be clean, dry and non-contaminated by atmospheric effects.

Moreover, with the assistance of the vacuum created by the pair of flanges **(2)** and the one or more gasket(s) **(3)**, a temperature range of 200ºC - 400ºC and a pressure ranging from 4000 - 5000 Pascals can be created and maintained inside the reactor **(1)**.

The container **(4)** comprises a mesh/heating element made up of Nickel (Ni) and/or Chromium (Cr) and or a combination thereof (i.e. an alloy of Nickel and Chromium may also be used as the heating element). Alternatively, a Palladium (Pd) treated Nickel can also be used as the heating element. Here the heating element serves as a catalyst for the reaction to occur, thus generating heat.

Further, a power supply as well is provided for the internal reactions to happen. The room heater is powered using 230 Volts, 1Φ AC supply and draws 100 Watts. This triggers the LENR reaction inside the heater and as a result, heat is generated by the room heater will be 130 Watts of heat. This heat generated is radiated to the surroundings, thus making the room warmer.

In the Low Energy Nuclear Reaction (LENR) happening inside the container **(4)** of the reactor **(1)**, synergistic amounts of Deuterium gas and Hydrogen gas are absorbed by Palladium treated Nickel-Chromium catalyst under temperature ranging from 200ºC - 400ºC and pressure ranging from 4000 - 5000 Pascals. The reaction generates excessive heat continuously for many months and thus serves the purpose of room heating.

Referring to Figure 3, a graphical representation of the comparison of calorimeter power output versus reactor input power for active and calibrated experiments is illustrated, according to an embodiment of the present invention. The heater generates heat ranging from 110 Watts – 150 Watts upon drawing substantial power through a power source.

A calorimeter has been used to study the amount of heat generated at different levels of rector input power in Watts (W). The calorimeter instrument is properly calibrated first to ensure valid measurements and thereafter active experiments have been conducted on the room heating device.

As evident from Figure 3, the calibration output power value at reactor input power of 55W is 57.13W and the calibration output power value at reactor input power of 105W is 101.16W. Whereas in case of active experimentation, the reactor input power of 55W provides calorimeter output power of 69.34W and the reactor input power of 105W provides calorimeter output power of 132.17W.

Experimentally, at 50 W input power, the power output in case of active experiment is higher by 9.79 W with respect to calibration. Similarly, at 100 W input power, the output power is greater by 31.01 watts with respect to calibration.

The final analysis has been conducted in terms of coefficient of performance (COP), which is the ratio between the total heat generated and the input heat supplied through the heater.

The conventional room heaters used in cold regions in the country work on the basis of kerosene or coal and are highly inefficient as the Co-efficient of Performance (COP) is less than 1.0, thus polluting the environment by giving out toxic gases. Whereas LENR technology based room heating devices and heat generation methods have a COP of 1.5 and therefore, these are energy-saving, sustainable, non-polluting, and do not require consumables for replenishment and refueling.

Such room heating involving LENR technology as a source of energy generates warmth required in winter seasons in a sustainable, eco-friendly, cost-effective and efficient manner and that too for long hours and months without any urge to replenish/refill the used up amounts of energy so generated.

Further, once the heater is ON, the time does it take to heat up the room upto the desired temperature depends on a multitude of factors including, but not limited to, the room size, room temperature, reactor size and the number of reactors (functioning as room heaters) that may be deployed. The combination needs to be customized for every application of the room heater in an enclosure.

It should be apparent to those skilled in the art that many more modifications besides those already described are possible without departing from the inventive concepts herein. The inventive subject matter, therefore, is not to be restricted except in the spirit of the appended claims. Moreover, in interpreting both the specification and the claims, all terms should be interpreted in the broadest possible manner consistent with the context. In particular, the terms “includes” and “including” should be interpreted as referring to elements, components, or steps in a non-exclusive manner, indicating that the referenced elements, components, or steps may be present, or utilized, or combined with other elements, components, or steps that are not expressly referenced. Where the specification claims refer to at least one of something selected from the group consisting of A, B, C ….and N, the text should be interpreted as requiring only one element from the group, not A plus N, or B plus N, etc. The foregoing description of the specific embodiments will so fully reveal the general nature of the embodiments herein that others can, by applying current knowledge, readily modify and/or adapt for various applications such specific embodiments without departing from the generic concept, and, therefore, such adaptations and modifications should and are intended to be comprehended within the meaning and range of equivalents of the disclosed embodiments. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation. Therefore, while the embodiments herein have been described in terms of preferred embodiments, those skilled in the art will recognize that the embodiments herein can be practiced with modification within the spirit and scope of the appended claims.

While embodiments of the present disclosure have been illustrated and described, it will be clear that the disclosure is not limited to these embodiments only. Numerous modifications, changes, variations, substitutions, and equivalents will be apparent to those skilled in the art, without departing from the spirit and scope of the disclosure, as described in the claims.

I/We Claim:

1) A sustainable room heating device, comprising:

a) a cylindrically elongated hollow reactor **(1)**;

b) a pair of flanges **(2)** rimmed around flat faces of said hollow reactor **(1)** for creating vacuum therein;

c) one or more gasket(s) **(3)** sandwiched between each combination of said flat faces and flanges **(2)** for preventing escape of a gas entering therefrom into said hollow reactor **(1)**; and

d) a cylindrical flanged container **(4)** housed within said hollow reactor **(1)** to undergo a low energy nuclear reaction to release heat, wherein said reaction involves synergistic amounts of Deuterium gas and Hydrogen gas absorbed by Palladium treated Nickel-Chromium catalyst under temperature ranging from 200ºC - 400ºC and pressure ranging from 4000 - 5000 Pascals.

2) The sustainable room heating device as claimed in claim 1, wherein a heat generation method comprises a low energy nuclear reaction within the realm of a cylindrical flanged container **(4)** to release heat, wherein said reaction involves synergistic amounts of Deuterium gas and Hydrogen gas ejected over Palladium treated Nickel-Chromium catalyst under temperature ranging from 200ºC - 400ºC and pressure ranging from 4000 - 5000 Pascals.

3) The sustainable room heating device as claimed in claim 1, wherein a gas inlet **(5)** traversing centrally through said flanges **(2)** and said gasket(s) **(3)** from atleast one side feeds said gas inside said container **(4)**.

4) The sustainable room heating device as claimed in claim 1, wherein said one or more gasket(s) **(3)** are made up of Copper metal.

5) The sustainable room heating device as claimed in claim 1, wherein said hollow reactor **(1)** is entirely hermetically sealed.

6) The sustainable room heating device as claimed in claim 1, wherein said hollow reactor **(1)** and said container **(4)** are made up of stainless steel.

7) The sustainable room heating device as claimed in claim 1, wherein said hollow reactor **(1)** is flanged by ConFlat-40 flanges and said container **(4)** is flanged by ConFlat-16 flanges.

8) The sustainable room heating device as claimed in claim 1, wherein said heater generates heat ranging from 110 Watts – 150 Watts upon drawing 100 Watts of power through a power source.

Dated: 16th December 2021

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ABSTRACT

SUSTAINABLE ROOM HEATING DEVICE AND HEAT GENERATION METHOD

The present invention relates to a sustainable room heating device and a heat generation method comprising a cylindrically elongated hollow reactor **(1)**, a pair of flanges **(2)** rimmed around flat faces of the hollow reactor **(1)** for creating vacuum therein, one or more gasket(s) **(3)** sandwiched between each combination of the flat faces and flanges **(2)** for preventing the escape of a gas entering therefrom into the hollow reactor **(1)** and a cylindrical flanged container **(4)** housed within the hollow reactor **(1)** to undergo a low energy nuclear reaction to release heat, wherein the reaction involves synergistic amounts of Deuterium gas and Hydrogen gas ejected over Palladium treated Nickel-Chromium catalyst under temperature ranging from 200ºC - 400ºC and pressure ranging from 4000 - 5000 Pascals.

Ref. Figure 1

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