Method of a configurable lasing medium in a laser device

FIELD OF THE INVENTION

The present invention relates to a method of a lasing medium (gain media) with a gas injector valve, also fitted with a gas ejector valve, a gas sensor and is in communication with a gas storage array, array, injector valve, ejector valve and sensor are controlled by means of a connected processor, the function of the injector valve being to introduce a pre-determined gas lasing medium to produce a laser of a specified wavelength, and the function of the ejector valve removes the said gas from the lasing medium for a second introduction of a second gas lasing medium to produce a laser of a different wavelength.

SUMMARY OF THE INVENTION

It is object of the present invention to provide a method of a lasing medium (gain media) with a gas injector valve, also fitted with a gas ejector valve, a gas sensor and is in communication with a gas storage array, array, injector valve, ejector valve and sensor are controlled by means of a connected processor, the function of the injector valve being to introduce a pre-determined gas lasing medium to produce a laser of a specified wavelength, and the function of the ejector valve removes the said gas from the lasing medium for a second introduction of a second gas lasing medium to produce a laser of a different wavelength.

A laser basically is constructed of three main components, the first is a pump, the second a lasing medium or gain media, and finally a resonator.

The pump will provides energy to the laser system, the lasing medium determines the wavelength of the resultant laser beam, while the resonator, mainly an assembly of optics and mirrors, provide the gathering of a highly focused, or coherent beam of a specific wavelength.

In the current state of development, it is the resonator (of which some are highly complicated in design) that can vary the wavelength of the laser beam from the system.

The gain medium, can be made and comprise of several types of materials, depending on the desired laser beam characteristics.

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Lasing mediums can be liquids such as chemical solvents, which may be ethylene glycol or ethanol, these are added to dyes such as fluorescein, to then derive a desired wavelength of the laser system.

Lasing mediums can also be gases such as carbon dioxide or mixtures such as helium-neon, and usually, the laser system's pump is by electrical discharge, which will then simulate the emission of photons.

Solid-state lasing mediums are composed of two main types, one of which are those usually made from a cocktail of glasses and crystals and impurities such as YAG – yttrium aluminium garnet, Nd:YAG, Cr:sapphire, Er:YLF, just to name a few.

The second will be those made from semiconductors, which are highly successful in a diverse range of low-power applications since these laser systems can be made very compact and are generally very rugged. Laser beams featured in consumer products such as Compact Disc players, DVD players and laser pointers are usually made with this type of medium.

The present invention has particular use to a gas-based lasing medium within a laser system.

A series of gas tanks each storing a different gas are connected to a mixing valve, which supplies a selected gas or gas mixture to the lasing medium of the laser system.

The gas or gas mixture is piped from the tanks to the lasing medium using a connected, one-way gas valve injector.

Once the gas within the lasing medium is stabilized, the injector will be sealed by means of a servo or actuator, and the pump will agitate the gas mixture by means of an electric discharge.

The resonator gathers and produces a resultant laser beam with a wavelength that is determined by the gas injected into the lasing medium.

Once the wavelength of the laser beam requires change, instead of phase shifts implemented on the resonator, the gas present in the lasing medium is then sucked out

from an ejector valve back to a gas tank for storage.

The injector valve may also inject a clearing gas to fully dispose of any residue lasing medium gas previously piped into the said medium.

The injector will then begin to inject a second gas type in a manner consistent and similar to that of the first injection.

Once the second gas injected is stabilized in the lasing medium, the laser system will pump the lasing medium, allowing the resonator to gather and produce a laser beam of a separate and desired wavelength.

The lasing medium may also be fitted with at least one gas sensor which will continuously measure and send back gas composition and characteristics data to a connected remote processor.

The remote processor may also be controlled by a series of software code routines that can determine the exact type of gas required in order to achieve the different desired laser beam and wavelength characteristics.

This remote processor may therefore be in control of the servo, gas valves (injector and ejector valves) in order to perform the role of pumping, regulating and monitoring the flow rate of gases entering and exiting the lasing medium.

BRIEF DESCRIPTION OF THE DRAWINGS

Illustrative embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 illustrates a gas laser medium within a laser system with a gas injector, a gas ejector, a gas sensor and a gas storage array.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

According to one embodiment of the present invention, there is provided a method of a

lasing medium (gain media) with a gas injector valve, also fitted with a gas ejector valve, a gas sensor and is in communication with a gas storage array, array, injector valve, ejector valve and sensor are controlled by means of a connected processor, the function of the injector valve being to introduce a pre-determined gas lasing medium to produce a laser of a specified wavelength, and the function of the ejector valve removes the said gas from the lasing medium for a second introduction of a second gas lasing medium to produce a laser of a different wavelength.

The present invention has particular use to a gas-based lasing medium within a laser system.

A series of gas tanks each storing a different gas are connected to a mixing valve, which supplies a selected gas or gas mixture to the lasing medium of the laser system.

The gas or gas mixture is piped from the tanks to the lasing medium using a connected, one-way gas valve injector.

Once the gas within the lasing medium is stabilized, the injector will be sealed by means of a servo or actuator, and the pump will agitate the gas mixture by means of an electric discharge.

The resonator gathers and produces a resultant laser beam with a wavelength that is determined by the gas injected into the lasing medium.

Once the wavelength of the laser beam requires change, instead of phase shifts implemented on the resonator, the gas present in the lasing medium is then sucked out from an ejector valve back to a gas tank for storage.

The injector valve may also inject a clearing gas to fully dispose of any residue lasing medium gas previously piped into the said medium.

The injector will then begin to inject a second gas type in a manner consistent and similar to that of the first injection.

Once the second gas injected is stabilized in the lasing medium, the laser system will pump the lasing medium, allowing the resonator to gather and produce a laser beam of

a separate and desired wavelength.

The lasing medium may also be fitted with at least one gas sensor which will continuously measure and send back gas composition and characteristics data to a connected remote processor.

The remote processor may also be controlled by a series of software code routines that can determine the exact type of gas required in order to achieve the different desired laser beam and wavelength characteristics.

This remote processor may therefore be in control of the servo, gas valves (injector and ejector valves) in order to perform the role of pumping, regulating and monitoring the flow rate of gases entering and exiting the lasing medium.

In another embodiment of the present invention, a gas laser system is connected to a power source, and the power source is periodically recharged from energy conversion units such as a solar panel, wind turbine, or thermal-to-electric power conversion system.

In another embodiment of the present invention, the gas laser system may be connected to a power source that is an internal combustion engine, or a heat exchanger device being connected to the said internal combustion engine.

The internal combustion engine may also have an exhaust system that extracts and filter the carbon dioxide exhaust, and processes the filtered carbon dioxide gas for storage into the laser system gas storage tank.

The carbon dioxide gas is then pumped into the gas laser system gain media to supply the laser system with a supply of gas for continuous operation.

In this embodiment, the internal combustion engine may also provide electric power for a voltage to be discharged in the gas gain media while supplying the carbon dioxide gas for the laser's operation.

The laser may be subsequently utilized to heat up water in a water treatment system to produce potable water.

The laser system may also be utilized as a high temperature heat source.

The laser system may also be utilized as a salt evaporation device, since the laser system can heat up a pond containing brine solution, or accelerate existing solar pond evaporator (to produce salt), or be utilized in a vacuum evaporator unit.

In another embodiment of the present invention, the gas laser system is connected to a powerplant system, which may be part of a larger facility or device such as a marine vessel, a terrain vehicle (such as a military truck), or an electric power plant.

In another embodiment of the present invention, a laser system is connected to a power source, and the power source is periodically recharged from energy conversion units such as a solar panel, wind turbine, or thermal-to-electric power conversion system.

In another embodiment of the present invention, the laser system may be connected to a power source that is an internal combustion engine, or a heat exchanger device being connected to the said internal combustion engine.

In another embodiment of the present invention, the laser system is connected to a powerplant system, which may be part of a larger facility or device such as a marine vessel, a terrain vehicle (such as a military truck), or a electric power plant.

In another embodiment of the present invention, a gas laser system is connected to a gas gain media, which is further constructed with a flow rate sensor and a valve.

The valve is connected to a gas tank. The gas tank constantly supplies a flow of gas which may be mixed and vary in gas composition to the gain media, creating a laser system that produces a varying laser beam wavelength.

In another embodiment of the present invention, a gas laser system is connected to an internal combustion engine, with an engine exhaust recovery device routing engine exhaust into a carbon dioxide filter.

The filter will extract carbon dioxide gas, and store the gas in a tank, for use by the gas laser gain media. The gain media will also be powered from the internal combustion engine to provide an electric discharge to "pump" the laser system.

The laser beam is directed at a heat exchanger.

The heat exchanger may cause a temperature difference between two points, creating a air flow differential between the two said points.

An airflow turbine may be constructed in between the two points to generate mechanical power for propulsion.

By way of example, another invention is hereby described:

A heating tower or enclosure is connected via a pipe or airflow tunnel, to an intake tower or enclosure.

A turbine is fitted in the airflow tunnel.

The heating tower is heated to create an updraft of heated air from the bottom of the enclosure or tower to a tower exit pipe.

This creates a pressure difference between the heating tower and the intake tower.

The intake tower is connected to an air intake duct, which, due to the pressure difference between the two towers, is drawn in towards to heating tower.

The turbine in the tunnel connecting the intake tower and the heating tower will begin to rotate, thus creating mechanical energy, which can be harnessed by means of a connected power generator.

The heating tower can be heated using a variety of heat sources, such as a furnace, waste incinerator, and boiler or heat reactor.

The updraft-heated air in the heating tower may also be recirculated for re-heating by the heating tower.

The intake tower may be further connected to a wind tunnel, which is further installed with wind turbines to further harness the pressure differences to generate power.

The intake tower may also be installed with baffles to reduce noise.

The above power generation device can also be designed where the laser system is the primary heating source, and is further powered by a combination of an internal combustion engine, solar or renewable energy systems.

In another embodiment of the present invention, a laser system is connected to an internal combustion engine, which can be powered with alternative fuels such as ethanol (also called bio-diesel).

The laser may be a system with a gas gain media, and is operated by the internal combustion engine.

The said engine may also further supply, using its exhaust gas, filtered gas to supply the gain media with lasing medium gas.

The laser is directed at a heat exchanger, which will heat up water.

This exchanger may be connected to a water treatment system; the water being heated up is raw water.

The raw water is heated incrementally to a certain temperature and depending on flow rate, at a specified volume.

The raw water may be heated successively using the above method until a desired volume and temperature is achieved, prior to allowing the heated water to be "flashed" in a multi-stage distillation plant.

The present invention has the advantage of using less number of stages of the multi-stage flashing distillation plant, since the raw water can be heated to a suitable temperature range prior to this "flashing".

This method described above may also be utilized as a method to treat ballast water of marine vessels.

Modifications within the spirit and scope of the invention may readily be effected by persons skilled in the art. It is to be understood, therefore, that this invention is not limited to the particular embodiments described by way of example hereinabove.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method for a gas lasing medium of a laser system to be fitted with a gas injector valve, a gas ejector valve, and a gas sensor

2. A method as claimed in claim 1, where gas injector valve and gas ejector valve may share the same valve port to the gas lasing medium

3. A method for a gas lasing medium to be connected to at least one gas storage tank, where the tank may provide different gas types for introduction into the medium for the purpose of changing the wavelength of the resultant laser beam produced from the laser system

4. A method and apparatus for a laser system with an adjustable gas lasing medium (gain media), comprising of a gas lasing medium, said medium fitted with a gas injection and/or ejection valve

5. A method and apparatus as claimed in claim 4, where the gas medium is further connected to a gas storage tank

6. A method and apparatus as claimed in claims 4 and 5, where the gas present in the gain media may be pumped out, and be replaced with another second gas

7. A method and apparatus for a laser system to be connected to a gas gain media, media is further equipped with a gas valve, laser system is in communication with a remote processor, and a series of gas tanks

8. A method and apparatus as claimed in claim 7, the remote processor will instruct the gas valve to be connected to a specified gas tank or a combination of gas tanks, and begin to pump gas into the gain media

9. A method and apparatus as claimed in claims 6 and 7, where a gas sensor will inform the remote processor on the stability of the gas pumped into the gain media

10. A method and apparatus as claimed in claim 9, a connected pump of the laser system will begin to agitate the gas in the gain media

11. A method and apparatus as claimed in claims 1, 3, 4, 5 and 6, where a remote processor can control and regulate and mix gases in each connected gas tank, prior to discharging the prepared gas into the gain media

12. A method and apparatus as claimed in claims 1, 3, 4, 5 and 6, where a remote processor can control and regulate and monitor the exit of gas present in the gain media

13. A method for a laser system to be connected to an internal combustion engine, where the engine will provide power to the said laser system

14. A method for a laser system to be connected to either a solar panel, a wind turbine or a combination thereof

15. A method for a gas laser system to be connected to an internal combustion engine, engine exhaust is filtered and prepared to supply carbon dioxide gas to the laser's gain media

16. A method as claimed in claim 15, where the internal combustion engine also provides electric power for the gas laser system

17. A method as claimed in claim 15, wherein the internal combustion engine may be a flex fuel engine

18. A method as claimed in claim 17, wherein the internal combustion engine may be capable of using ethanol fuel

19. A method as claimed in claim 15, wherein the laser is a heat source for a connected water treatment system, including a flash distillation water treatment system

20. A method for generating power, using a first enclosure tower, a second enclosure tower, a tunnel connecting both first and second tower, said tunnel installed with at least one turbine

21. A method as claimed in claim 20, where first tower is heated with a heat source to raise the air temperature and causing a temperature and pressure difference between the first tower and the second tower, and further generating the movement of air present in second tower towards first tower via the connected tunnel, and causing kinetic energy present in the movement of the said air to be converted into mechanical power of the turbine

22. A method and apparatus for generating power, using a first tower connected via a tunnel to a second tower, said tunnel is installed with at least one turbine, first tower is supplied with a heat source causing a pressure difference and airflow movement between first and second tower

23. A method and apparatus for generating power, comprising a first tower and second tower, both connected using a wind tunnel,

    Said wind tunnel is fitted with at least one wind turbine

    First tower is supplied with a heat source

    First tower has air duct allowing heated air due to heat source to flow upward creating a pressure difference between first tower and second tower

    Second tower has a connected air intake duct to allow for said pressure difference to draw in air

    Said pressure difference movement from second tower to first tower via connected wind tunnel

    Wind turbine generates power by means of a connected power generator due to airflow movement generated due to said pressure difference

24. A method and apparatus for generating power, comprising a first enclosure and second enclosure, both connected to each other using a wind pipe,

Said windpipe is fitted with at least one turbine

First enclosure is supplied with a heat source

First enclosure has air duct allowing heated air due to heat source to flow upward creating a pressure difference between first enclosure and second enclosure

Second enclosure has a connected air intake duct to allow for said pressure difference to draw in air

Said pressure difference movement from second enclosure to first enclosure via connected windpipe

Said turbine generates power by means of a connected power generator due to airflow movement generated due to said pressure difference

25. A method for generating power using a first enclosure and second enclosure, where first and second enclosure are connected by means of a wind pipe, said pipe is fitted with at least one turbine,

The first enclosure has a heat source means,

The second enclosure has an air intake means,

The first enclosure will also have an air duct means,

The said heat source will heat up air in the first enclosure, subsequently causing air to flow up to exit from air duct means,

The pressure difference between the first and second enclosure will cause air to be drawn in via the air intake means,

The intake air will flow from the second enclosure to the first enclosure by means of the wind pipe, at the same time operating the turbine to generate power

26. A method as claimed in claims 20 to 25, where the heat source in the first tower or enclosure is a waste incinerator or waste furnace

27. A method as claimed in claims 20 to 25, where the heat source in the first tower or enclosure is a laser system

28. A method as claimed in claims 20 to 25, where the heat source in the first tower or enclosure is a heat exchanger, said exchanger further connected to a incinerator, furnace or boiler

29. A method as claimed in claims 20 to 25, where the heat source in the first tower or enclosure is a heat exchanger, said exchanger further connected to a heat reaction device

30. A method as claimed in claim 29, where heat reaction device can be a combustion heat device, furnace, material incinerator, boiler or a combination thereof

31. A method as claimed in claims 20 to 25, where the heat source in the first tower or enclosure is a heat exchanger, said exchanger is further connected to a combustion device

32. A method as claimed in claims 20 to 31, where at least one turbine is added to the air intake duct of the second tower or enclosure

33. A method as claimed in claims 20 to 31, where a turbine is added to either the wind pipe or tunnel connecting the first and second tower or enclosure, or the air intake duct of the second tower or enclosure, or a combination thereof