GRAHAM POWER, A NEW METHOD OF GENERATING POWER

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ABSTRACT

Titled “Graham Power, A New Method of Generating Power” inventor David Graham. Graham power is a power plant. In its simplest form, it is an air conditioning/refrigerant system which also produces power. This is accomplished by adding a turbine to an air-conditioning system. The evaporation process extract heat from the air and the turbine converts that heat into power. In fact it is a power generating system. Graham Power recycles the very fuel that it uses. Graham Power does not consume fuel nor does it release CO2 gas to the environment. It simply draws heat from the surrounding air and transforms it into useful power. In the process of extracting heat from the environment it cools the air. This cooling effect is beneficial to the atmosphere which is currently overheating.
GRAHAM POWER, A NEW METHOD OF GENERATING POWER

[0001] Be it known that I, David J Graham, a Citizen of Canada, residing in Edmonton, Alberta, have invented a new method of generating power, which I choose for lack of a better word to call Graham Power. The title of this invention is “Graham Power, A New Method of Generating Power”. This is a utility patent application, under the provisions of 35 U.S.C. § 119(e) which was proceeded by a Provisional Application for Patent of the same name filed by David J. Graham on Oct. 24, 2006 Application No. 60/853,724. The country code for the priority application is U.S. 60/853,724.

CROSS REFERENCE TO RELATED APPLICATIONS

[0002] Not applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0003] Not applicable.

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISC APPENDIX

[0004] Not applicable.

BACKGROUND OF THE INVENTION

[0005] In the thermodynamics of heat engines the working fluid is generally air and CO2. For example in a jet engine the compressor drives high pressure air into the combustion chamber. In the combustion chamber the air is expanded by applying heat. The heat is produced by the burning of jet fuel. The super hot air expands rapidly and is directed and blasted into the turbine which produces power. Then the super heated air is blasted out a nozzle to propel the plane forward. In a gas turbine the turbine section of a jet engine is maximized to produce power out while the exhaust heat is minimized. Under the thermodynamics of heat engines you also find refrigeration and air-conditioning system because these systems involve heat from evaporation and condensation rather than the burning of a fuel. The primary purpose of a heat engine is to convert heat into power. This invention can be classified as a Power Plant 060 subclass 641.1 Utilizing Natural Heat.

BRIEF SUMMARY OF THE INVENTION

[0006] Graham power in its simplest form, is an air-conditioning/refrigerant system which also produces power. This is accomplished by adding a turbine to an air-conditioning process. The evaporation process extract heat from the air and the turbine converts that heat into power.

[0007] For purposes of explanation consider a gas turbine modified as follows. The working fluid is not air but a refrigerant gas. The working fluid is not heated by burning fuel but by the natural evaporation process of a liquid refrigerant as it evaporates and expands rapidly into a gas. This rapidly expanding gas is directed into a turbine through a nozzle at high speeds. The output of the turbine produces power which then runs the compressor and/or a generator. Then the refrigerant gas is compressed back into a liquid state to be stored and recycled. In a second version of the invention the heat from the condensation process is recycled to further heat the refrigerant gas before it enters the turbine providing even more heat to be converted into power.

[0008] In an air-conditioning system the evaporator draws heat from a cooling media, air, to evaporate the liquid refrigerant into a gas. The amount of heat obtained from evaporation is generally greater than the amount of heat released from condensation, provided that the evaporator is configured to superheat the refrigerant. The heat from condensation in a second version of this invention is recycled to the intake of the turbine. The evaporation process consumes no work. It is a natural process that draws heat into the system. The compression process consumes approximately 18 to 20% of the energy produced from the evaporation process, plus inefficiencies and friction. If the heat from condensation is recycled back to the turbine, additional heat is available to produce more power. Normally there are considerable inefficiencies in a turbine, generator and motor. Provided that these inefficiencies and friction are kept to a minimum, the system will be self sustaining. One of the best way to do this is to use the most efficient turbines and compressors, and to eliminate the gear box, to the generator.

[0009] Graham Power is much more than an air-conditioning system. It is a power generating system that has the potential to revolutionizes the generation of power. Graham Power recycles the very fuel that it uses to generate power. Since self-sustaining Graham Power will continue to run until the system is turned off, breaks down or a leak occurs. Graham Power does not consume fuel nor does it release CO2 gas to the environment. It simply draws heat from the surrounding air and transforms it into useful power. In the process of extracting heat from the environment, it cools the surrounding air. This cooling effect is beneficial to the environment.

[0010] Whether the system produce a little or much power it will lower the costs of air conditioning dramatically. If the system proves to be self sustaining it will eliminate the cost of air conditioning. Air Conditioning is the largest consumer of power in the US today. If the system produces excess power it can be designed to produce sufficient power to run a house. No matter how much power this system produces it will make conventional air conditioning obsolete.

[0011] In the early stages of development Graham Power will revolutionize the air conditioning and refrigeration industries making all current air conditioning obsolete overnight. In the more advanced stages with higher efficiencies of compressor, turbine and generator, Graham Power will revolitization power generation and place a small self-sustaining power plant in every home. A power plant not connected to the electrical grid and one that does not consume fuel or release CO2 gas. This means of generating power can also be used in vehicles.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0012] FIG. 1 illustrates the simplest version of this invention where a turbine 4 is added to an air-conditioning system. FIG. 2 illustrates a second version of this invention where a turbine 4 and a condenser/heat exchanger 6 are added to an air-conditioning system.
DETAILED DESCRIPTION OF THE INVENTION

[0013] FIG. 1 embodies a concept of this invention. Motor/generator 1 is connected by common shaft 13 to compressor 2 and turbine 3. These three components work as follows. When the motor/generator 1 is turned on, valve 10 is opened and motor/generator 1 drives compressor 2 and turbine 3. As the expanding refrigerant gas begins to drive turbine 3, less power is drawn from motor/generator 1. Once turbine 3 generates sufficient power to drive the compressor 2 no power is drawn from motor/generator 1. When turbine 3 generates more power than compressor 2 requires the motor/generator 1 will produce electricity which is feed back into the electrical grid. In most applications the motor/generator 1 will be two separate units, a motor and a generator connected to shaft 13. The embodiment of motor/generator 1 contained herein is designed to convey the concept rather than the engineering details.

[0014] The arrows indicate the flow of refrigerant through the system as follows. Storage tank 4 contains a liquid refrigerant under pressure. Throttle valve 10 opens and releases the liquid refrigerant into the evaporating unit 5. The liquid refrigerant enters evaporator 5 where it is expanded into a gas and draws heat from the air which is circulated by a fan, not shown, across evaporator 5. The normal evaporator controls are set to maximize the superheating of the refrigerant. This increases the heat to turbine 3 and the power produced by turbine 3. The superheated refrigerant gas enters compressor 2 where it is compressed. Then the refrigerant gas enters turbine 3 and is further accelerated by the turbine nozzle before hitting the blades or disc as the case may be. Since a turbine is generally designed with a much larger exit hole then inlet to maintain the proper pressure gradient a funnel 11 is required to reduce the exit to match the piping employed. After the funnel 11 is a valvular conduit 12. The valvular conduit basically acts as a check valve only allowing one way flow. The refrigerant, at this point, may be in the form of a vapor and a liquid, is then directed into a second small compressor 14 and than to the condenser 13 with a fan, not shown. The condenser 13 allows the refrigerant to condense totally into a liquid by releasing its heat to the air. The liquid refrigerant is recycled back to the storage tank 4.

[0015] The storage tank 4 is on the high pressure side while the exit from the evaporator 5 is on the low pressure side. The compressor 2 raises the pressure while the turbine 3 lowers the pressure. The valvular conduit 12 allows a pressure gradient to separate the high pressure side from the low pressure side. Still the refrigerant will only flow across a pressure gradient when the pressure at the exit of turbine 3 is as high as the pressure in tank 4. For this reason a second compressor 14 may prove necessary. In fact the turbine’s power output will pulse on and off. When turbine 3 is on it produces power and when the turbine 3 exit pressure drops sufficiently to prevent flow, turbine 3 will cease producing power. Eventually the compressors 2 will pressurize the system sufficiently to reestablish flow and the turbine 3 will begin to produce power again. Thus turbine 3 will cycle on and off. It is a design matter to balance the sizing of compressor 2 and 14. It may be possible with the correct sizing of compressor 2 to eliminate the need for compressor 14.

[0016] Evaporator 5, and condenser 13 are commonly found in every air-conditioning system available today.

[0017] FIG. 2 embodies another concept of this invention. This particular configuration produces continuous power from the turbine. This embodiment has the same motor/generator 1, compressor 2 and turbine 3 configuration but with the compressor 2 and turbine 3 interchanged. Thereafter it deviates in that it utilizes a condenser/heat exchanger 6 to recycles the heat from condensation back to the turbine 3 to produce added power. Compressor 2 allows separation between the high pressure and the low pressure side. Level control 7 forces the condensation process to occur in the condenser/heat exchanger 6 by turning pump 8 and valve 9 on and off.

[0018] Motor/generator 1 is connected by common shaft 13 to turbine 3 and compressor 2. These three components work as follows. When the unit is turned on valve 10 is opened and motor/generator 1 drives compressor 2 and turbine 3. As the expanding refrigerant gas begins to drive turbine 3, less power is drawn from motor/generator 1. Once turbine 3 generates sufficient power to drive compressor 2 no power is drawn from motor/generator 1. When turbine 3 generates more power than compressor 2 requires the motor/generator 1 will produce electricity which is feed back into the electrical grid. The motor/generator 1 will most likely be two separate units, a motor and a generator connected to shaft 13.

[0019] Storage tank 4 contains a liquid refrigerant under pressure. Throttle valve 10 opens and releases the liquid refrigerant into the evaporating unit 5. The liquid refrigerant enters evaporator 5 where it is expanded into a gas and draws heat from the air which is circulated by a fan, not shown, across evaporator 5. The normal evaporator controls are set to maximize the superheating of the gas. The refrigerant gas enters a valvular conduit 12 before it enters a condenser/heat exchanger 6 to absorb additional heat from the cooling process. The valvular conduit 12 acts as a check valve allowing the gas to only flow in one direction.

[0020] Refrigerant gas exits evaporator 5 and flows through condenser/heat exchanger 6 where it absorbs heat from the condensing process. The valvular conduit 12 prevents the gas from reversing flow as the additional heat is absorbed from the condensation process. The super heated refrigerant gas enters turbine 3 where power is extracted from the heat. The refrigerant exits turbine 3 at a low pressure in a wet vapor state and enters compressor 2. The refrigerant exits the compressor 2 and enters the condenser/heat exchanger 6 where it is condensed into a liquid refrigerant. Level control 7 maintains the liquid refrigerant at a low but appropriate level in condenser/heat exchanger 6. Pump 8 and return valve 9 are turned on when necessary by level control 7 to return the refrigerant to storage tank 4 and maintain the level in condenser/heat exchanger 6. This in effect forces the condensation process to release the heat of condensation in the condenser/heat exchanger 6 where it is transferred back to turbine 3.

[0021] Level control 7 functions in the same manner that a water level control functions in a boiler.

[0022] Condenser/heat exchanger 6 comprise two tubes. An inner tube in which the refrigerant exiting from turbine 3 is condensed and, an outer tube in which the evaporated
gas flows to turbine 3. Level control 7 forces the gas to condense into a liquid in condenser/heat exchanger 6 thus maximizing the transfer of condensation heat to the gas before it enters the turbine.

Valvular conduit 12 forces the gas to flow in one direction. A valvular conduit best suited for this application is described in U.S. Pat. No. 1,329,559 issued Feb. 3, 1920 to N Tesla. It is possible to replace the valvular conduit with a check valve.

Turbine 3 and compressor 2 must be of the highest possible efficiency. A Tesla turbine is best for this application because it will handle wet vapor without damage although other turbines may be used. Such a turbine as the one described in U.S. Pat. No. 1,061,206 issued May 6, 1913 to N Tesla. The recommended compressor is a scroll, rotary or screw type. Most forms of compressors found in modern refrigeration system will do the job.

1. A power generating system that utilizes a refrigerant gas, as the working fluid, to drive a turbine wherein the heat from evaporation is used to heat the working fluid prior to entering the turbine in a closed system that includes a turbine, compressor, evaporator, condenser, storage, and controls.

2. A power generating system that utilizes a refrigerant gas, as the working fluid, to drive a turbine wherein the heat from evaporation and condensation is used to heat the working fluid prior to entering the turbine in a closed system that includes a turbine, compressor, evaporator, condenser, heat exchanger, storage, and controls.

3. A power generating system as claimed in claim 2 whereby the condenser and the heat exchanger are combined into a single unit.

4. An air conditioning/refrigeration system that includes a turbine, powered by the refrigerant gas, to power or to aid in powering the compressor.

5. An air conditioning/refrigeration system that includes a turbine, powered by the refrigerant gas, to power or to aid in powering the compressor whereby the turbine draws it heat from the evaporation process.

6. An air conditioning/refrigeration system that includes a turbine powered, by the refrigerant gas, to power or to aid in powering the compressor whereby the turbine draws it heat from the evaporation process and the condensation process.

7. An air conditioning/refrigeration system as claimed in claim 4, 5 or 6 that produces excess power beyond the needs of the air-conditioning system itself.

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