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Eco-Friendly Industrial Heating System (IDEA)

- **It is a pending patent in Egypt with number EG/P/2024/466**
- This invention is an environmentally friendly industrial heating system that can provide the same temperature value as other systems that rely on burning natural gas, petroleum materials or flammable organic materials at a lower cost and higher efficiency and without carbon emissions or harmful gases production, it doesn't consume a large amount of ineffective/reactive power and doesn't cost much financially in terms of electricity consumption bills.
- It has high efficiency, unlike heating systems that rely on conductive metal coils such as copper or tungsten, for example. They depend on the passage of a large electrical current through a coil made of an electrically conductive material to generate a high magnetic field that is used in heating, such a system consumes a large amount of ineffective/reactive power, and its efficiency is low.

Continue: Eco-Friendly Industrial Heating System (IDEA)

- This system can replace heating systems that rely on electrically conductive coils or those systems that rely on fuel. For example, but not limited to, this system works more efficiently than its counterparts in home appliances such as: heater, cooker, iron, heater, kettles, ovens, microwave, and other heating devices are used in many industrial systems, such as industrial boilers, spark starters, or combustion devices in power plants.
- This system basically consists of three main parts:

(1) An electronic element whose role is to convert electricity into thermal energy with a value of up to 300 degrees Celsius. One unit of the electronic element consumes an amount ranging from 1 to 5 watts.

(2) The heating element, which is a substance such as paraffin wax or iron powder, receives the heat coming from the electronic element, so it heats up and the temperature of this substance increases until it reaches 1800 degrees Celsius in the case of iron powder.

(3) The cooling element and its function is to cool the electronic element to protect it from damage and melting. It may be water, air, or water mixed with glycol, depending on the required temperature.

Eco-Friendly Industrial Heating System (Technical problem)

1. High cost, lack of efficiency and many environmental pollutants resulting from the use of these systems such as carbon dioxide emissions.
2. Consuming a large amount of ineffective/reactive power, decrement of power factor and increment of electricity bills.
3. The spread of a large amount of heat in the atmosphere, which negatively affects climate change.

Eco-Friendly Industrial Heating System (Advantages)

1. Low operating costs, high efficiency, and almost no environmental pollutants resulting from the operation of this system.
2. There is no consumption of inactive/reactive power as the electronic element (TEG) operates with direct current, even if the available source is alternating current as the system has an auxiliary circuit to unify/rectify the alternating current and convert it to direct current, which means high efficiency and high power factor and only active power consumption, thus reducing the value of electricity bills as the system works with any current source, whether direct or alternating, which means that it works with electricity coming from renewable energy sources, government electricity sources, or stored in batteries.
3. This system is distinguished by its unique ability to work in both cases and in reverse, meaning that it can convert electricity into thermal energy and convert thermal energy into electricity.
4. This system does not depend at all on natural gas, petroleum materials, or flammable organic materials. Therefore, it is a sustainable system that is safe for individuals and the environment.
5. It keeps pace with international trends in relying on renewable energy sources and the current global situation in the problems of providing natural gas and petroleum materials.

Continue: Eco-Friendly Industrial Heating System (Advantages)

6. It also keeps pace with the global trend to resolve the environmental crises, the problems of climate change and global warming, as it does not produce environmental pollutants and does not dissipate heat in the atmosphere, but on the contrary, it converts heat into electricity.

7. It has the lowest rate of electricity consumption, as the smallest building unit in the system consumes 1 to 5 watts of electricity.

8. This system is characterized by reaching high temperatures of up to, but not limited to, 1800 degrees Celsius, like other systems that rely on electrically conductive coils, or that rely on arc or electrical sparks, or that rely on burning natural gas, petroleum materials, or organic materials.

9. This system is also characterized by the presence of auxiliary circuits, including those for unifying the current to make the system work with any electricity source, and a circuit that controls the amount of temperature by controlling the amount of current reaching the electronic element.

Eco-Friendly Industrial Heating System (Areas of implementation)

- This system can replace heating systems that rely on electrically conductive coils or those systems that rely on fuel. For example, but not limited to, this system works more efficiently than its counterparts in home appliances such as: heater, cooker, iron, heater, kettles, ovens, microwave, and other heating devices are used in many industrial systems, such as industrial boilers, spark starters, or combustion devices in power plants.
- Generally, it can be used with any system/device needs heat.

Eco-Friendly Industrial Heating System (Operation diagram)