CHEMICAL ENERGY POWER PLANT

FIELD/AREA OF THE INVENTION

This invention is all about creating clean and sustainable energy by turning chemical energy into electricity using simple electrochemical cells. It is meant to provide cheap, green energy that is appropriate for both rural and urban Areas. With the use of materials like copper and zinc plates along with salt water, it produces electricity in a sustainable manner and is able to fulfill both small- and large-scale energy requirements.

BACKGROUND OF THE INVENTION

The majority of conventional electricity is derived from fossil fuels, which are extremely harmful to our environment - they create pollution and degrade natural resources. Renewable sources such as wind and solar energy are certainly better for our environment, but they can be expensive, they rely on varying or inconsistent climate factors, and they can sometimes be unreliable. In many rural or undeveloped areas, access to consistent electricity remains poor due to poor infrastructure and servicing. While small electrochemical cells were piloted for small installations, they have not been scaled to assist extended rural villages with electricity. Now, with this technology, we are able to offer an affordable, environmentally clean way of producing electricity that is scalable. It can be used to enhance electricity needs without competing with other alternative green energy forms.

OBJECTIVE OF THE INVENTION

1. Develop a concentrate, eco-friendly way to create electricity that isn't harmful to the environment.

2. Make it inexpensive and easy to maintain.

3. Make it simple enough that people in villages and remote areas can use it without any special equipment.

4. Make it scalable to provide power for larger businesses and larger needs.

5. Use everyday stuff like copper, zinc, and salt water to make energy.

6. Help the country save money and grow by using less imported fuel.

FEATURES OF THE INVENTION

- Environmentally Friendly: Doesn’t produce any harmful emissions or waste while working.

- Cost-Effective: Made from cheap materials like zinc plates, copper plates, and salt water.
- Scalable Design: You can add more electrochemical cells and trays to boost the voltage and power output.
- Efficient Energy Conversion: Uses the chemical reaction between zinc and copper in salt water to generate electricity directly.
- Great for Coastal Areas: Works well without complicated infrastructure, perfect for nearby cities and places off the grid.
- Versatile: The electricity produced can be used as is or increased for bigger, commercial needs.
- Sustainable: Runs without using up non-renewable resources, so it's good for the long haul.

EXPERIMENTAL HARDWARE/MAIN COMPONENT DESCRIPTION

The main parts of this invention are pretty simple:

1. **Zinc Plate (Anode):** This is the negative side where the chemical reaction releases electrons.
2. **Copper Plate (Cathode):** This is the positive side where electrons are accepted.
3. **Electrolyte Solution:** Just salt mixed with water, which helps the electrical charge flow between the plates.
4. **Cell Trays:** Each tray has about 50 tiny cells lined up in series to produce around 50 volts of electricity.
5. **Series Connection:** Four trays are hooked together to get about 200 volts total.
6. **Output Terminals:** These are where you get the electricity out to use right away or send to a transformer to boost the power.
7. **DC to AC convertor:** There is a module that converts the DC voltage into AC for further usecase.

Each tiny cell makes about 1.1 volts, and by connecting them in a row, the voltage adds up. The trays are designed so you can easily add or remove them to get more or less power. The whole setup is small, light, and easy to build with regular tools, so it can be made locally without much hassle. It's a simple but reliable way to generate electricity without needing much upkeep.

WORKING METHODOLOGY

The invention works by converting chemical energy into electricity using electrochemical reactions. Inside each cell, a zinc plate (the anode) and a copper plate (the cathode) sit in salty water (salt mixed with water).

Step 1 – Electrochemical Reaction:
When the circuit is connected, zinc atoms at the anode lose electrons (called oxidation), turning into zinc ions. Meanwhile, hydrogen ions in the salty water gain electrons at the cathode (called reduction). This flow of electrons through the circuit creates potential difference or electricity.

Step 2 – Single Cell Output:
Each tiny cell produces about 1.1 volts of direct current (DC).

Step 3 – Series Connection for Voltage Boost:
About 200 cells are linked one after another in a tray to generate roughly 200volts.

Step 4 – Multi-Tray Setup:
Four trays are connected in series to reach a total of around 200 volts.

Step 5 – Using the Power:
The electricity generated can power small devices directly or be boosted with a transformer for larger, commercial use.

Step 6 – Environmental Benefit:
This process doesn't release any harmful gases and uses recyclable materials, making it friendly to the environment.

Step 7 –Running electronic components:
The voltage produced will help in running LEDs,Wireless EV charging system.

The system is modular, so you can add more cells or trays depending on how much power you need. Since there are no moving parts, there's less wear and tear, and maintenance mostly involves topping up the salty water and cleaning or replacing the plates now and then.

CLAIMS

1. Scalable Power Creation
The system makes electricity using zinc and copper plates submerged in salt water. A little power is produced in a small cell, but once many cells are combined together, the power accumulates. It is modular, thus able to create electricity for very small devices or be combined for larger constructions.

2. Environmentally Friendly and Sustainable Source of Power
Electricity is produced through a natural reaction – the zinc plate gives off the electrons (oxidization) while the hydrogen ions from the salt water accept the electrons at the copper plate (reduction). This process is one of the simplest ways to create clean electricity, with no smoke, no harmful gases, and no waste. Therefore, it is safe for people and the environment.

3. Low Cost and Readily Available
The basic materials (zinc, copper, and salt water) produce low-cost power and are available nearly everywhere. This keeps the cost to build the system very low and makes it easy to maintain. The common parts mean it will work in cities or villages, without expensive or technologically advanced construction.

4. Ideal Power Source for Coastal Regions
Coastal regions are well suited as they have easy access to salt water. The system does not rely on costly or specialized chemicals, making it even cheaper to produce and maintain. This makes

it a great fit for both coastal and isolated communities that are struggling to produce low-cost, reliable electrical power.

ABSTRACT

This invention is a new type of chemical energy power system that produces electricity in a clean, sustainable, and inexpensive manner by using electrochemical cells. This system has zinc plates which are the negative electrodes (anodes) and copper plates which are the positive electrodes (cathodes). It also utilizes a saline water solution to act as the electrolyte medium. In each electrochemical cell there is a reaction which produces about 1.1 volts of DC energy. By connecting 50 of these cells in series in one tray, the system can produce 50 volts DC. If four trays are connected in series the unit will produce about 200 volts DC in total which can be used directly for small scale energy or could be transformed using transformers for larger commercial electric energy applications.

The design of this technology is inherently modular and scalable, which is one of its major strengths. It is easy to configure to meet specific energy needs, being equally viable in rural areas without advanced infrastructure, as it is in urban areas with relatively high energy demand. The technology also enables users to consistently employ low-cost energy. As zinc, copper, and salt water are all low-cost materials that are relatively easy to access, and the creation of electrodes out of those materials can allow for easy and local manufacturing. Because the technology has virtually no moving parts to speak of, it has less maintenance, and is limited to replenishing the electrolyte and maintaining the electrodes.

DESCRIPTION OF DRAWINGS

The diagrams show the arrangement of the electrochemical cells, how they connect in series in each tray, and how they have been assembled in multiple trays to produce a higher voltage. The diagrams also show how the zinc and copper plates are arranged in the saline solution, the modular tray design, and lastly how the electrical output terminals are placed. Overall, design can easily be seen from the diagrams and will assist with something that is reproducible and scalable in design.

Fig. 1.1: Single Cell
This is a very basic electrochemical cell. An electrochemical cell, as shown in this figure, consists of a zinc rod (the anode) and a copper rod (the cathode) immersed in a saltwater solution ($NaCl + H_2O$). This is where the chemical reaction occurs – zinc is oxidized (loses electrons) and copper is reduced (gains electrons). This flow of electrons between the electrodes produces a small amount of electricity.

Fig. 1.2: Single Tray Connections
This is one tray and has 50 individual cells (in series). The advantage of wiring the cells in series to provide a higher output voltage is simply that we gain the added voltage of 50 cells versus 1 cell. One copper electrode and one zinc electrode are connected in series with positive (copper) and negative (zinc) poles arranged sequentially so the tray functions as one large power source.

Fig. 1.3: Four Tray Connections
This is the same layout as above, except this has four trays, each with 50 cells connected in series

and tray-to-tray connections to increase power output. The goal of this layout was to maximize electrical output. In this case, the total interconnected combination of four trays actually produces 200 volts of direct current (DC). While it is producing direct current, the modular nature of this system makes it somewhat efficient.