OVERVIEW OF WIRELESS POWER TRANSFER SYSTEM.

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ABSTRACT

We cannot imagine the world without electric power. Generally the power is transmitted through wires. This paper describes an original idea to eradicate the hazardous usage of electrical wires which involve lot of confusion in particularly organizing them. Imagine a future in which wireless power transfer is feasible: cell phones, household robots, mp3 players, laptop computers and other portable electronics capable of charging themselves without ever being plugged in, freeing us from that final, ubiquitous power wire. Some of these devices might not even need their bulky batteries to operate. This paper includes the techniques of transmitting power without using wires with an efficiency of about 95% with non-radiative methods. Due to which it does not effect the environment surrounding. These techniques Includes resonating inductive coupling in sustainable moderate range. The coupling consists of an inductor along with a capacitor with its own resonating frequency. In any system of coupled resonators there often exists a so-called "strongly coupled" regime of operation. If one ensures to operate in that regime in a given system, the energy transfer can be very efficient. Another technique includes transfer of power through microwaves using rectennas. This is particularly suitable for long range distances ranging kilometers. With this we can avoid the confusion and danger of having long, hazardous and tangled wiring. This paper as a whole gives an effective, high performance techniques which can efficiently transmit the power to the required area varying in distance.

Keyword *: - Wireless power transfer, Fundamental Problems, Application prospects*

1. INTRODUCTION

Unless you are particularly organized and good with tie wrap, you probably have a few dusty power cord tangles around your home. You may have even had to follow one particular cord through the seemingly impossible snarl to the outlet hoping that the plug you pull will be the right one. This is one of the downfalls of electricity. While it can make people's lives easier, it can add a lot of clutter in the process. For these reasons, scientists have tried to develop methods of **wireless power transmission** that could cut the clutter or lead to clean sources of electricity.

Researchers have developed several techniques for moving electricity over long distances without wires. Some exist only as theories or prototypes, but others are already in use. This paper provides the techniques used for wireless power transmission.

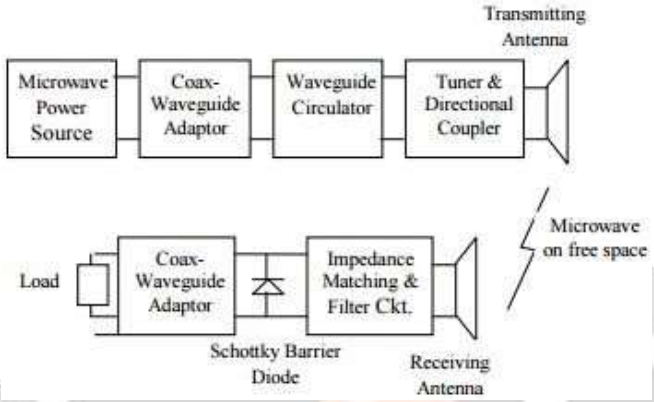
2. LITERATURE SURVEY

1. In 1826 Andre-Marie ampere developed ampere's circuital law showing that electric current produce a magnetic attenuated signal will be taken separated based on the direction of propagation by directional couplers bye directional couplers.

2. The transmitting antenna radiates the power uniformly through the space to antenna in receiving side.

3. Antenna receive the transmitted power and convert the microwave power into DC power.

BLOCK DIAGRAM



Functional Block Diagram of Wireless Power Transmission System.

3. WORKING

Block diagram that it consisting of transmitter and receiver section. Wireless power transmission is useful where continuous energy transfer is needed but interconnecting wires are inconvenient,hazardous are impossible.

WPT is transmission of electric power from one place to another place through the vacuum without use of wire. Above figure shows complete block diagram of the working of controlling unit using WPT system.

The main idea behind this technique is to used two coils with high quality factors. Coils are element's that store energy in the magnetic field.A high Q factors means that the coils is closer to the ideal coils, Thus that does not lose much energy due to the resistance of wires or capacitance.

4. METHODOLOGY

i)Short distance induction:

These methods can reach at most a few centimetres The action of an electrical transformer is the simplest instance of wireless energy transfer. The primary and secondary circuits of a transformer are electrically isolated from each other. The transfer of energy takes place by electromagnetic coupling through a process known as mutual induction. (An added benefit is the capability to step the primary voltage either up or down.) The electric toothbrush charger is an example of how this principle can be used.

A toothbrush's daily exposure to water makes a traditional plug-in charger potentially dangerous. Ordinary electrical connections could also allow water to seep into the toothbrush, damaging its components. Because of this, most toothbrushes recharge through inductive coupling.

You can use the same principle to recharge several devices at once. For example, the Splashpower recharging mat and Edison Electric's Power desk both use coils to create a magnetic field. Electronic devices use corresponding built-in or plug-in receivers to recharge while resting on the mat. These receivers contain compatible coils and the circuitry necessary to deliver electricity to devices' batteries

ii)Moderate distance:

Household devices produce relatively small magnetic fields. For this reason, chargers hold devices at the distance necessary to induce a current, which can only happen if the coils are close together. A larger, stronger field could induce current from farther away, but the process would be extremely inefficient. Since a magnetic field spreads in all directions, making a larger one would waste a lot of energy.

An efficient way to transfer power between coils separated by a few meters is that we could extend the distance between the coils by adding resonance to the equation. A good way to understand resonance is to think of it in terms of sound. An object's physical structure -- like the size and shape of a trumpet -- determines the frequency at which it naturally vibrates. This is its **resonant frequency**. It's easy to get objects to vibrate at their resonant frequency and difficult to get them to vibrate at other frequencies. This is why playing a trumpet can cause a nearby trumpet to begin to vibrate. Both trumpets have the same resonant frequency.

iii)Long-distance Wireless Power:

Whether or not it incorporates resonance, induction generally sends power over relatively short distances. But some plans for wireless power involve moving electricity over a span of miles. A few proposals even involve sending power to the Earth from space. In the 1980s, Canada's Communications Research Centre created a small airplane that could run off power beamed from the Earth. The unmanned plane, called the Stationary High Altitude Relay Platform (SHARP), was designed as a communications relay. Rather flying from point to point, the SHARP could fly in circles two kilometers in diameter at an altitude of about 13 miles (21 kilometers). Most importantly, the aircraft could fly for months at a time.

COMPONENTS USED

4.1 Hardware components

The major components are given below.

1. HF Transformer
2. Voltage Regulator
3. Filter
4. Transistor
5. LED
6. Brushless DC Motor
7. Diode
8. Resistor, Capacitor
9. Electromagnetic coil

4.2 Hardware testing

1. Continuity Test
2. Power On Test

5. CONCLUSION

The crucial advantage of using the non-radiative field lies in the fact that most of the power not picked up by the receiving coil remains bound to the vicinity of the sending unit, instead of being radiated into the environment and lost. With such a design, power transfer for laptop-sized coils are more than sufficient to run a laptop can be transferred over room-sized distances nearly omni-directionally and efficiently, irrespective of the geometry of the surrounding space, even when environmental objects completely obstruct the line-of-sight between the two coils. As long as the laptop is in a room equipped with a source of such wireless power, it would charge automatically, without having to be plugged in. In fact, it would not even need a battery to operate inside of such a room." In the long run, this could reduce our society's dependence on

batteries, which are currently heavy and expensive.
At the same time for the long range power transmission, power can be sent from source to receivers instantaneously without wires, reducing the cost.

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