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Wireless Inductive Charge Sharing

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***Abstract*: Some embodiments disclosed herein provide a method for configuring wireless power and data transfer between consumer electronic (CE) devices. The method comprises identifying a plurality of antenna systems including at least a first antenna system and a second antenna system. At least the first antenna is cooperated with a first CE device and the second antenna is cooperated with a separate second CE device. Each of the plurality of antenna systems comprises a power transfer antenna and one or more communications antenna. The system provides a graphical user interface (GUI) to illustrate each of the identified antenna system, and receives user instructions corresponding to atleast two of the identified antenna systems, to generate configuration instructions in accordance with the user instructions, and to configure selected CE devices in accordance with the configuration instructions.**

***Keywords*: Inductive Charging, Wireless Power Transfer, Resonant Inductive Coupling, Tesla theory, Wireless Energy Transmission.**

1. Introduction

It is a hectic task to carry everywhere the charger of mobile phones or any electronic gadget while travelling, or it is very cruel when your mobile phone getting off by the time you urgently need it. It is the major problem in today's electronic gadgets. Though the world is leading with the developments in technology, but this technology is still incomplete because of these limitations. Now in the recent days we come across some solutions for this problem by using the Witricity (Wireless Transmission of Electricity). In 2012, Nokia Lumia phones shipped with Qi wireless charging and manufacturers such as Samsung, Google, and LG have incorporated the concept since.But this is posiible only when the device is placed onto the plate given for the wireless charging. The research appears to describe an antenna system that would allow a device, such as a mobile phone, to transfer power from a wireless charging base station. It also suggests antennas could transmit power from one consumer electronic (CE) device to another, i.e. one phone could provide power to another and can be configured by user in accordance with the graphical user interface.

A. Types of wireless power transfer

There are three types of wireless transmission of power based on the distance

- Short Range- Inductive Coupling
- Mid-Range- Resonant Inductive Coupling
- Large Range- Microwave Power Transmission

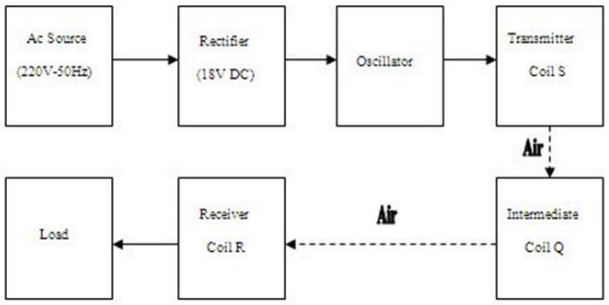

Figure Block diagram of the wireless power transfer system
Fig. 1. Wireless power transfer system

2. History

The transfer of power was the very first attempt using radio waves as a medium. Radio waves were first predicted in 1864 by James C. Maxwell. In 1888, Heinrich Hertz showed evidence of radio waves using his spark-gap radio transmitter. Nikola Tesla known as the "Father of the Wireless" believed that wireless power transfer was possible and probable. He built what was called the "Tesla Tower" Figure 1 which was a giant coil connected to a 200 foot high tower with a ball 3 feet in diameter. Tesla pumped 300kw of power into the device; the coil resonated at 150 kHz. The experiment failed due to the fact that the power diffused in all directions. William C. Brown contributed much to the modern development of microwave power transmission which for many reasons dominates research and development of wireless transmission today. In the early 1960s brown invented the rectenna which directly converts microwaves to DC current. He demonstrated its ability in 1964 by powering a helicopter from the solely through microwaves. In 1982, Brown (Raytheon) and James F. Trimer (NASA) announced the development of a thin-film plastic rectenna using printed-circuit technology that weighed only one-tenth as much as any previous rectenna" (2). This new, lighter weight rectenna led to the development of the Stationary High Altitude Relay Platform (SHARP).

Fig. 2. Transformer

3. Survey analysis

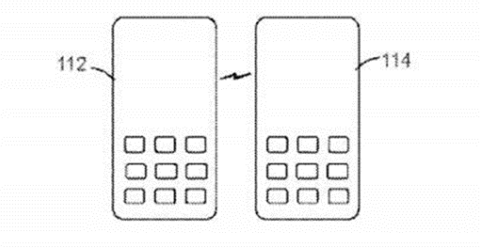

Fig. 3. Two phones

Images contained within patent documents show two phones next to each other with a visualisation of power moving between the two. Within the patented idea, which was first filed in 2016 and published at the start of March, the method of how devices could find nearby antennas is heavily discussed. This includes how data could be encrypted and how antennas would be shown on a user interfaces – possibly in a similar way to how Wi-Fi access points are displayed on phones and laptops. Researchers at Disney have been working on developing the theories for wireless power that can be used across a room. Dubbed Quasistatic Cavity Resonance for Ubiquitous Wireless Power Transfer (QSCR) the system can convert cabinets, rooms, and warehouses to generate magnetic fields that deliver power to mobile receivers. "An experimental demonstration shows that a 54 m3 QSCR room can deliver power to small coil receivers in nearly any position with 40% to 95% efficiency," Disney researchers wrote in February 2017. "Finally, a detailed safety analysis shows that up to 1900 watts can be transmitted to a coil receiver enabling safe and ubiquitous wireless power."

4. Applications

There are many applications of Wireless Power Transfer such as:

- Automatic wireless charging of mobile electronics
- Robots, packaging machinery, assembly machinery and machine tools can take advantage of this technology.
- Direct wireless power for wireless sensors and actuators, eliminates the need for expensive power wiring or battery replacement and disposal.
- Automatic wireless charging for future hybrid and allelectric passenger and commercial vehicles, at home or in parking garages.
- The IPT system is the world's first commercially wireless electric car charging system. It is described as the safest, most efficient and most effective way to transfer power without wires.

5. Future scope

A. Power is the final cord to be cut

Power is the final cord that needs to be cut for complete wireless freedom. Not only does the technology exist, it's already showing up in consumer technology. Charging stations and cases that work with current phones like the iPhone (the Duracell (Powermat, for example) are already available, and eventually the receivers will be built-in to phones and other devices.

B. Working together

Dedicated to facilitating a standard for wireless power so that devices and chargers from different companies work together, the WPC has over 100 members, including Fulton Innovation and leading technology brands like HTC, LG, Motorola, Nokia, Panasonic, Philips, Samsung, Sony, Toshiba, and Verizon.

C. Bridging the gaps

Treffers and Schwannecke both expect wireless power to eventually be as ubiquitous as Wi-Fi. Just as nearly every cafe now offers Wi-Fi for free, one day they might all offer wireless charging as well (although unlike Wi-Fi, costs do go up with usage, so cafes and other establishments will have to decide if they want to charge for power or offer it as a perk to lure customers). The obvious application for the technology is with portable devices, but its potential goes far beyond that.

6. Conclusion

The primary purpose of this research is to study the related literature of mobile phones charging in order to gain wireless charging review. These devices eliminate the need to use messy cords giving a more convenient experience and to provide with the more convenient technique to charge mobile phones, or charge sharing, purposely. The goal of the future researches is to reduce the size of the related devices and increase the distance and power transfer and the efficiency of devices as well as focusing on the techniques with less harmfulness to the human and the environment.

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