

Dynamic Wireless Power Transfer for EV's

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Abstract: *The project work described here is intended to run a car over the road without fuel and without battery, means the vehicle doesn't contain any battery or fuel tank, simply it acquires electric energy from under the road and it will be moved automatically. For this purpose, the power transmitting coils will be installed under the road and electric energy will be radiated from under the ground which will be acquired by the vehicle and moves further. The concept presented here is known as Electromagnetic field detecting car which acquires electric energy through air, so it doesn't have any physical contact with power cables. The main advantage of the system is, since it doesn't have any complex parts, it can be called as maintenance free car. The main technology involved in the system is wireless energy source available along with road at its bottom side. For real time applications entire road can be equipped with these power transmitting coils, but since it is a prototype module, system is designed with 4 coils by which the car will be moved to a little distance for demo purpose. As the car moves, it acquires energy from one coil to the other coil in a sequence of one after another, like wise energy can be acquired through-out entire route. Since the car doesn't have any power source like battery, it acquires energy from the road through power transmitting coils. The power receiving coil arranged below the chassis of car can acquire energy from one coil to the other during running. The model car is constructed with 12V DC motor and its shaft will be coupled to the axel of moving body*

Keywords: 4 No's of Power transmitting coils, one Power receiving coil, simulation of car moving mechanism, self- oscillator circuits designed with Z44 power MOSFETs, 4 No's of 12V power sources, wheels, etc

I. INTRODUCTION

This paper introduces a prototype demonstration of a battery-less electric vehicle model utilizing dynamic wireless power transfer (DWPT) through resonant inductive coupling. Conventional internal combustion engine (ICE) vehicles require extensive maintenance due to numerous mechanical components in the fuel-based propulsion system and depend on continuous fuel supply, resulting in high operational costs. While battery electric vehicles (BEVs) offer significantly lower running costs and reduced emissions, they face persistent challenges such as range anxiety—the fear of battery depletion during travel—and the inconvenience of frequent charging stops, limited public infrastructure, and long charging times. To address these limitations, the proposed system enables continuous, contactless power acquisition for an electric vehicle while in motion, eliminating the need for large onboard batteries or fuel tanks. Power transmitting coils are embedded along the roadway to generate a high-frequency alternating magnetic field. A receiving coil mounted on the vehicle's undercarriage captures this energy via electromagnetic induction across an air gap (typically 3–5 cm or more, depending on coil design and alignment). The induced AC power is rectified and conditioned to directly drive a 12 V DC motor coupled to the vehicle's axle, propelling the model forward

II. SYSTEM ARCHITECTURE

This architecture achieves battery-less (or near-battery-less) operation in the prototype by relying on continuous power handover as the vehicle moves from one coil to the next. In real-world scaling, additional elements like vehicle position detection (e.g., RFID, magnetic sensors, or V2I communication), active shielding for EMI reduction, and fault protection would be integrated. For visual reference, typical DWPT architectures feature similar block flows:



grid/inverter to primary coil to array magnetic coupling to secondary coil to rectifier/load, as commonly shown in research diagrams for segmented dynamic charging systems.

III. BLOCK DIAGRAM

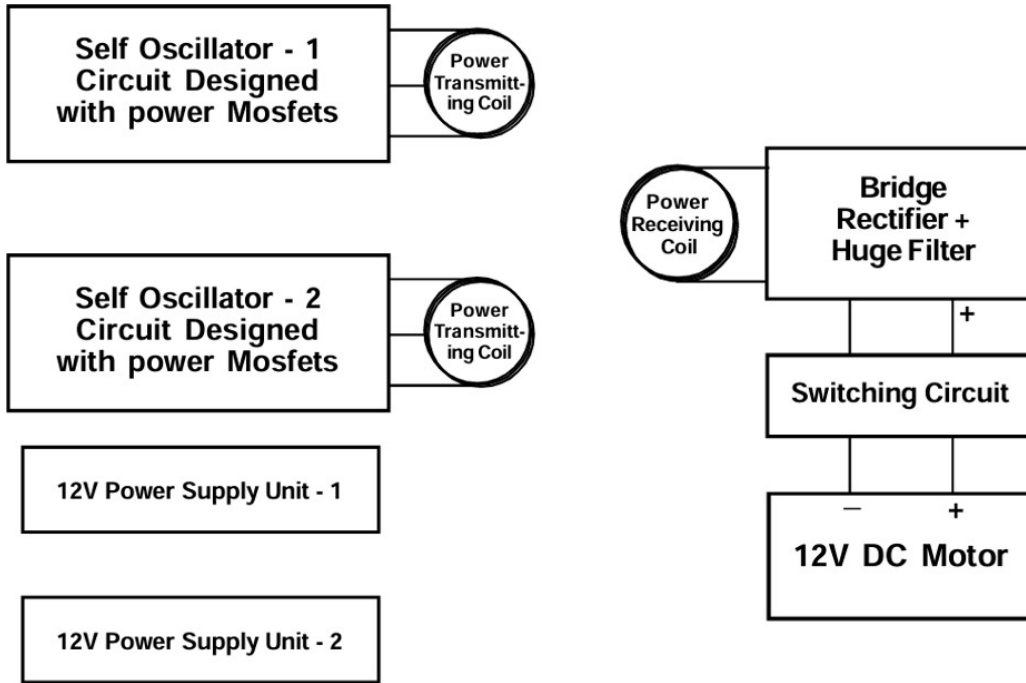


Fig. 1 Block Diagram of dynamic wireless power transfer for EV

IV. CIRCUIT LAYOUT

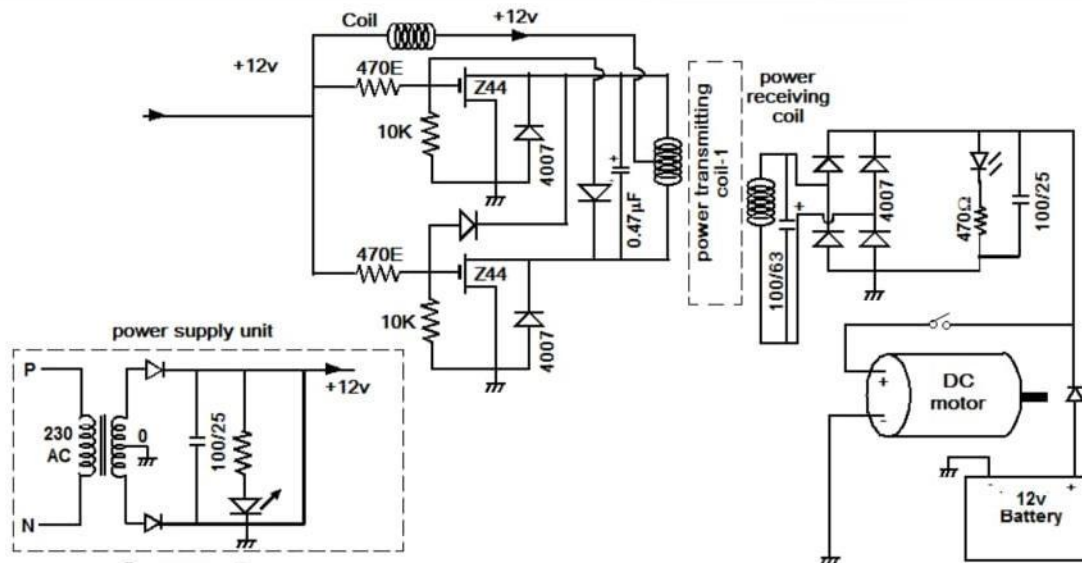


Fig. 2 Circuit Layout of dynamic wireless power transfer for EV



V. PROPOSED SYSTEM

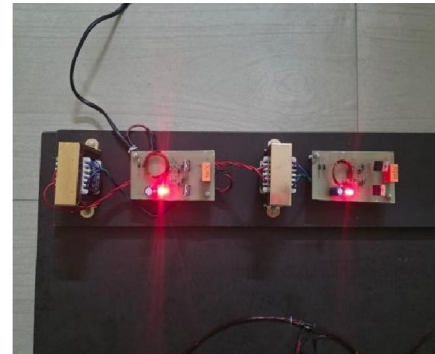
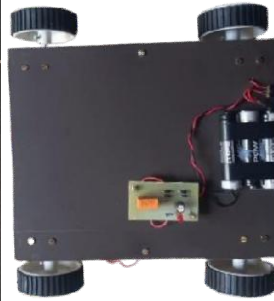
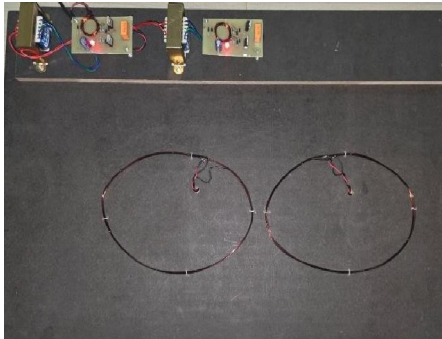


Fig 3: Supply circuit and transmitting circuit placed on the road

Fig 4: Prototype receiving circuit placed in EV

Fig 5: Power supply is given to the model LEDs representing the power flow

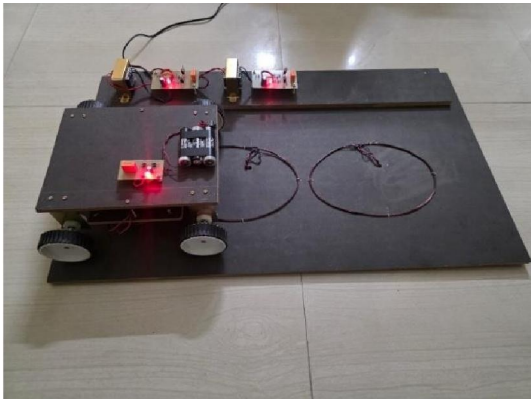


Fig 6: Car is moving from point A

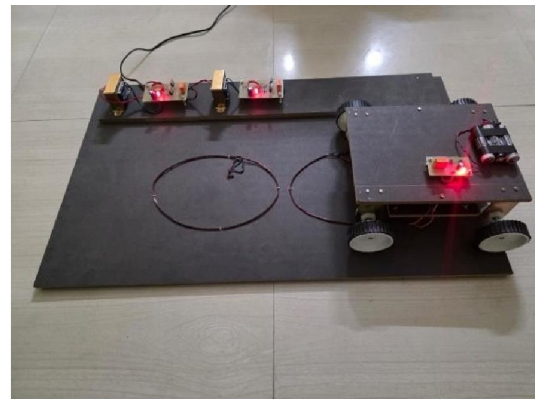


Fig 7: Car reached to point B

VI. RESULTS AND DISCUSSION

Experimental testing of the dynamic wireless power transfer for EV's of successful. When power supply is given to the model. Power is sent through the transformer and then AC is converted to DC using bridge rectifier and then DC to AC. Power is sent through transmitting coil then power is converted to electromagnetic flux. Through electromagnetic flux the EV moves by dynamic power transfer. The system successfully shows dynamic wireless power transfer for EV.

VII. FUTURE SCOPE

Future enhancements can include the vehicle cost and weight reduction by drastically reducing or eliminating the need for large onboard battery packs, DWPT could lower vehicle weight, manufacturing costs, and material requirements, making electric vehicles more affordable and efficient. Hybrid systems combining dynamic in-motion charging with static wireless pads at stops, homes, or malls.

VIII. CONCLUSION

In conclusion, this paper demonstrates a successful prototype of a battery less electric vehicle powered by dynamic wireless power transfer through resonant inductive coupling from road embedded transmitting coils. By addressing the high maintenance and fuel costs of internal combustion vehicles as well as the range anxiety and charging limitations of



conventional electric vehicles, the system offers a promising path to seamless, maintenance-free electric mobility. Resonant tuning enhances transfer efficiency across small air gaps, while capacitor buffering helps manage minor power fluctuations during coil transitions and slight misalignments. Building on foundational concepts from Tesla and modern magnetic resonance advancements, this work proves the viability of in motion charging at a small scale. With sustained research, cost reductions, standardization efforts, and collaborative investment, dynamic wireless power transfer has the potential to revolutionize transportation by enabling unlimited range, lower vehicle complexity, reduced emissions, and truly ubiquitous, invisible charging infrastructure for a cleaner and more efficient electric mobility future

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