

## НИКОЛА ТЕСЛА І ЙОГО ВІНАХОДИ В ГАЛУЗІ ЕЛЕКТРОЕНЕРГЕТИКИ

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### *Анотація*

*В даній роботі здійснено огляд біографії сербського та американського винахідника і фізика Нікола Тесла. Проаналізовано його великий внесок в розвиток електро- та радіо техніки а також фізики в цілому. Розглянуто один з його найвідоміших винаходів– резонансний трансформатор (трансформатор Тесла), та одну з його сучасних найпростіших модифікацій.*

**Ключові слова:** електричне коло, котушка, магнітне поле, струм, генератор, двигун.

### *Abstract*

*In this work we made an overview of biography Serbian and American inventor and physicist Nikola Tesla and was analyzed his great contribution to the development of electric and radio engineering and physics in general. We considered one of his most famous invention namely resonant transformer (Tesla transformer) and one of its modern simplest modifications..*

**Keywords:** electric circuit, coil, magnetic field, current generator engine.

## NIKOLA TESLA AND HIS INVENTIONS IN THE ELECTRIC POWER INDUSTRY

Nikola Tesla (10 July 1856 – 7 January 1943) was a Serbian American inventor, electrical engineer, mechanical engineer, physicist, and futurist best known for his contributions to the design of the modern alternating current (AC) electricity supply system.

Tesla gained experience in telephony and electrical engineering before emigrating to the United States in 1884 to work for Thomas Edison in New York City. He soon struck out on his own with financial backers, setting up laboratories and companies to develop a range of electrical devices. His patented AC induction motor and transformer were licensed by George Westinghouse, who also hired Tesla for a short time as a consultant. His work in the formative years of electric power development was involved in a corporate AC/DC "War of Currents" as well as various patent battles.

Tesla went on to pursue his ideas of wireless lighting and electricity distribution in his high-voltage, high-frequency power experiments in New York and Colorado Springs, and made early (1893) pronouncements on the possibility of wireless communication with his devices. He tried to put these ideas to practical use in an ill-fated attempt at intercontinental wireless transmission, his unfinished Wardenclyffe Tower project. In his lab he also conducted a range of experiments with mechanical oscillators/generators, electrical discharge tubes, and early X-ray imaging. He also built a wireless controlled boat, one of the first ever exhibited.

Tesla was renowned for his achievements and showmanship, eventually earning him a reputation in popular culture as an archetypal "mad scientist".] His patents earned him a considerable amount of money, much of which was used to finance his own projects with varying degrees of success. He lived most of his life in a series of New York hotels, through his retirement. Tesla died on 7 January 1943. His work fell into relative obscurity after his death, but in 1960 the General Conference on Weights and Measures named the SI unit of magnetic flux density the tesla in his honor. There has been a resurgence in popular interest in Tesla since the 1990s [1].

A Tesla coil is an electrical resonant transformer circuit invented by Nikola Tesla around 1891. It is used to produce high-voltage, low-current, high frequency alternating-current electricity. Tesla experimented with a number of different configurations consisting of two, or sometimes three, coupled resonant electric circuits.

Tesla used these coils to conduct innovative experiments in electrical lighting, phosphorescence, X-ray generation, high frequency alternating current phenomena, electrotherapy, and the transmission of electrical energy without wires. Tesla coil circuits were used commercially in sparkgap radio transmitters for wireless telegraphy until the 1920s, and in medical equipment such as electrotherapy and violet ray devices. Today their main use is for entertainment and educational displays, although small coils are still used today as leak detectors for high vacuum systems [2].

The term "Tesla coil" is applied to a number of high voltage resonant transformer circuits.

Tesla coil circuits can be classified by the type of "excitation" they use, what type of circuit is used to apply current to the primary winding of the resonant transformer.

Solid State Tesla Coil (SSTC) - These use power semiconductor devices, usually thyristors or transistors such as MOSFETs or IGBTs, to switch pulses of current from a DC power supply through the primary winding. They provide pulsed (disruptive) excitation without the disadvantages of a spark gap: high temperatures. They allow fine control of the voltage, pulse rate and exciting waveform. This type is used in most commercial, industrial, and research applications as well as higher quality entertainment coils.

At the stand the simplest low-power coil of this look is presented (figure 1). It is constructed on one semiconductor transistor [3].

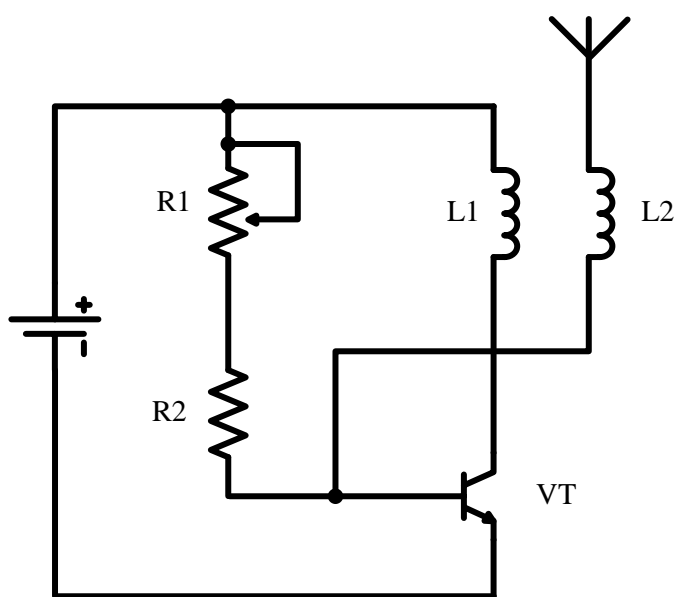


Figure 1– Circuit of simplest low-power Solid State Tesla Coil.

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