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Nikola TESLA, electrical engineer and inventor
(10. 7. 1856-7. 1. 1943)

Nikola Tesla, American scientist of Serbian origin, gave his greatest contribution to science and technological progress of the world as the inventor of the rotating magnetic field and of the complete system of production and distribution of electrical energy (motors, generators) based on the use of alternate currents. His name was given to the SI unit for magnetic induction ("tesla"). Tesla also constructed the generators of high-frequency alternate currents and high-voltage coreless transformer known today as "Tesla Coil".

Nikola Tesla was born on July 10, 1856, at Smiljan, in the Military Border zone of Austro-Hungarian Empire, now in the Republic of Croatia. He received his education in Austria i.e. Austro-Hungary: primary school at Smiljan and Gospic (1862-70), and secondary school (Realgymnasium) at Karlovac (1870-1873). From 1875 to 1878 studied at the Polytechnic at Graz, and in 1880 he enrolled in the studies of natural philosophy at the Charles' University in Prague.

In the period 1881-82 he was employed at the Central Telegraph Office in Budapest. Here he began his career as inventor improving the voice amplifier for the telephone receiver, and in February 1882 arrived on the idea of the rotating magnetic field.

In the middle of 1882 he travelled to Paris to join Edison's Continental Company, and in 1883 moved to Strasbourg and made the prototype of the induction motor. In 1884 he travelled to USA to start working in Edison's company. In 1885 he left Edison, founded his own "Tesla Arc & Light Co." and started producing motors and generators for polyphase alternate currents.

The first patent, "Commutator for dynamo - electric machines", applied to the Patent Office on May 6, 1885 was followed by a series of patents on electric arc lamp regulators. From 1887 to 1890 he applied his well-known patents on polyphase alternate currents, generators and motors. On May 16, 1888, he presented his inventions in his first lecture on "A new system of motors and transformers of alternate currents" to the American Institute of Electrical Engineers (AIEE). Immediately after that lecture, the Westinghouse Co. bought his 40 patents on polyphase currents. In Pittsburgh (1888-89), together with engineers of the Westinghouse Co., he was engaged on the practical realization of these patents. In this period the preparations for the construction of the first power plant at the Niagara Falls according to the Tesla's system were made. The power plant was on January 12, 1895 put into operation and at that time it was reckoned as a wonder of the world.

Another wide field of his researches were alternate currents of high frequencies and their effects. On May 20, 1891, he gave a lecture to the AIEE in New York on the "Experiments with alternate currents of very high frequencies and their application in artificial lighting" In 1890 he also published the results of physiological effects of high-frequency currents.

From 1891 to 1896 Tesla applied patents on the spark oscillator coupled with a resonant transformer which substituted Hertz's oscillator and Ruhmkorf's inductor in his researches. In addition he also applied numerous patents for various auxiliary equipment e.g. circuit breakers, condensers etc.

In 1892, at the invitation of the Royal Society in London and French Physical Society he travelled to London and Paris to give the lecture on "Experiments with alternate currents of high potential and high frequency." During his stay in Europe he also visited Belgrade on June 2, 1892.

In 1893, with his system of four circuits in resonance he showed that the aerial, connection with the ground and resonance were three essential elements of wireless telegraphy and prepared the way for the invention of modern radio.

In 1895 he continued his researches of high frequency currents and their effects on rarefied gases using Lenard tubes. He was one of the first scientist on the American continent who made X-ray photos of hands, sculls, knees and elbows. He was the first to point to the harmful effects of a long exposure to these rays on human organisms.

In 1897 he applied various patents from the area of wireless telegraphy, and in 1898 the patent of the method and apparatus for controlling mechanism of moving vessels or vehicles. In New York he performed the experiment with a remote-controlled boat. As a result of these patents, the Supreme Court if the USA granted him - though post-mortem - the priority in the invention of wireless telegraphy i.e. of radio.

From 1899 to 1900 Tesla stayed at Colorado Springs. At a height of 2000 m above sea level he built a laboratory with a 200 kW transmitter. He also constructed generators and transformers

which produced frequencies of tens of thousands hertz and potentials up to 12 million volts, and improved his coreless transformer for high-frequency currents, known as Tesla transformer. In his notes on the experiments from this period he stated that the stationary waves spread through the Earth so that this effect could be used for wireless transmission of energy.

The patents from the area of wireless transmission of energy he applied from 1900 to 1902. From 1901 to 1905, intending to realize his "World-Wireless-System," he was occupied with the construction of a great experimental station, a power plant and a great aerial tower on Long Island near New York. However, this project had never been completed.

Later (1909-1922), he was occupied with mechanical engineering, inventing new types of turbines, pumps, speed indicators, flow-meters etc. His pumps without paddles are nowadays being commercially used.

Tesla spent his last years in the hotel "New Yorker" in New York, where he died on January 7, 1943.