

**MEMORY OF THE WORLD REGISTER
NOMINATION FORM**

SERBIA – Nikola TESLA’S Archive

PART A – ESSENTIAL INFORMATION

Abstract:

Nikola TESLA’S Archive consists of a unique collection of manuscripts, photographs, scientific and patent documentation which is indispensable in studying the history of electrification of the whole Globe.

Nikola Tesla, (1856 - 1943) Serbian-born, American inventor and scientist, a pioneer in electrification, significantly influenced the technological development of our civilization by his polyphase system inventions. This system is the cornerstone of modern electro-energetic system of production, long distance transmission and usage of electrical currents, electricity and communication.

Tesla’s asynchronous motor performs 95% of electric drive in the world. It is also estimated that 60% of total world energy is spent in driving these motors. The asynchronous motor is also called “the draft horse of industry” since it is used as the drive in factories, mines, power stations, in other words, in all industry. The majority of household motors are also asynchronous.

Since the beginning of its exploitation towards the end of last century up to now, the polyphase system, together with the asynchronous motor, has been perfected and improved to a remarkable and hitherto unconceivable dimensions. Simply speaking, Tesla’s work represents the cornerstone of a huge development of modern world as it has been so far developed.

Besides the alternate currents motor, he was known as the inventor of the **Tesla coil** – a high frequency transformer, which is an essential part of all contemporary HF devices. New high frequency currents produced by Tesla coil were called Tesla’s currents and the device was called Tesla coil. He was the first to research other effects produced by his currents, such as the possibility of induction heating, ozone production, and effects on the human organism. The plasma production technique that he invented was the pioneering work in the field, which only recently became remarkably important for the production of computer chips.

The remote control was one of his inventions developed towards the end of the 19th century. He was also the inventor of the system of selective reception, later known as the “spread spectrum technique”. In the same period, he discovered the principle of the logical “i” circuit without which contemporary computers would be impossible.

He is credited as being a very imaginative scientist whose ideas were paths to many important discoveries without which our civilization would lack many of its technological comforts (radio, radar, television, motors of all kinds, high frequency fields, coils, computers). Some of his ideas are still to be realized.

Way ahead of his time, he was one of the first to become aware of the emerging energy problem (1900) as a conclusion of his famous experiments in Colorado Springs (1899-1900).

In his honour, the magnetic induction unit (tesla) of the SI system is named after him.

Simply speaking, the collection documents the most important era of the history of development of the modern world, which, thanks to the Tesla system, made easy energy production and distribution possible.

1. Identity and Location: Name of the Documentary Heritage: **Nikola TESLA's Archive**

Country: Serbia and Montenegro

State, Province or Region: Serbia, City of Belgrade

Address: Krunska 51, 11000 Belgrade, Serbia

Name of the Institution: Nikola Tesla Museum

2. Legal information:

Owner: State

Custodian: : Nikola Tesla Museum, Krunska 51, 11000 Belgrade, Serbia

Legal Status:

Category of Ownership: Public

Accessibility:

The Ministry of Culture of the Republic of Serbia regulates the preservation and access to archival records. The main conditions are as follows:

- Access is limited if the physical condition of the records make it necessary.
- Records, for which a microfilm or a copy is available, may only be accessed by means of these copies (searching of the original documents limited to special cases).
- Photographs can be accessed, open to all, Tuesday to Friday from 10 a. m. to 2 p.m.

Copyright status: copyright owner Nikola Tesla Museum

Responsible administration: Historical Archive of the City of Belgrade and National Archives of Serbia

3. Identification: Nikola Tesla's Archive is part of the Nikola Tesla Museum, the unique institution which holds all the heritage left after the inventor's death.

Description: Tesla's archive consists of 580 boxes, with 160,000 pages of patent documentation, scientific correspondence, scientific papers, manuscripts, technical drawings, scientific measuring data, around 1,000 original photographs of Tesla's experiments and inventions done in a early American retouch style, personal documents, legal papers.

Bibliographic details:

LECTURES*PATENTS*ARTICLES, Published by Nikola Tesla Museum, Belgrade, 1956, pp.1-812

Nikola Tesla, Colorado Springs - Notes, Nolit, Belgrade, 1978

Patent applications: 113 USA patents, during the period 1886 until 1927. First U.S. Pat. No. 334823 (26th January, 1886): last U.S. Pat. 1655114 (3rd January, 1928).

Nikola Tesla: Selected works, 8 volumes, Belgrade 1996, Text Book Co.

History:

After Tesla's death in 1943 in New York, his possessions and personal archive (160,000 pages) were shipped to Belgrade, Yugoslavia, where a small Memorial Museum was formed, according to wishes of his nephew, Mr. Sava Kosanovic.

During his career as an inventor, engineer and scientist, Tesla filed 118 original patents, 112 in the United States and 6 in Great Britain. He also obtained over 100 analogues – repeated patents in the countries all over the world on all five continents.

Out of 118 original patents, 40 are related to energies, 50 to the field of high-frequency currents, 17 to the mechanical engineering and the rest to various technological fields. The most important patents are the ones in the field of energy i.e. electrification because their importance was proven in every day practice.

Other Tesla inventions such as the system of four resonant circuits, the principle of selectivity in radio, logical “i” circuit, production of plasma, remote control, work on vacuum, phosphorescent and fluorescent light, remained in the shadow while others repeated and perfected Tesla’s inventions.

During his lifetime, Tesla received a great deal of recognition from many world universities and institutions. The first came at the end of 19th century when he was given the Elliott Cresson gold medal, from the Franklin Institute, for research on high-frequency currents, and his first honorary doctorate degree came from Columbia University, to be followed shortly soon after with one from Yale. Later on, he received recognition from European and American scientific institutions.

His discovery, in Budapest in 1882, of the rotating magnetic field produced by alternating currents, represented not only the basic principle on his work on the motor but also the whole system for generation, transmission and utilization of alternating currents. This system was designed at the most opportune moment, and through it, Tesla offered to the world a brilliant solution to growing demands.

Tesla’s polyphase system neatly solved all problems concerning the production, transmission and usage of currents and offered a new pattern. Tesla had evolved this system in detail while he was still in Europe, but he protected it in America by 36 patents submitted in the period between October 12, 1887 and July 13, 1891.

Through other patents, Tesla also protected: the polyphase generator with static and mobile poles, polyphase asynchronous generator, rotating transformer, regulation of number of rotations of induction motor by changing the number of poles, single-phase induction motor with rotating field generated by artificial phase, single-phase induction motor with secondary phase for starting the motor, single-phase synchronous motor with secondary phase for starting the motor, use of oil for the purpose of insulation in the high voltage technology, high voltage heavy current circuit breaker with compressed gases.

Tesla’s system of polyphase currents had achieved its greatest promotion at the Niagara Falls in the gigantic project of building the greatest powerhouse in the world. Out of the thirteen patents exploited in this electro-energetic system, nine belonged to Tesla.

He was also one of the most important inventors at the turn of the 20th century thanks to whom the rapid electrification of the world was made possible.

Bibliography:

1. Tesla, The Inventions, Researchers and Writings of Nikola Tesla; Barnes & Noble, N. Y., 1994.
2. ARNOLD E.: Asynchrone Motoren für gewöhnlichen Wechselstrom - E. T. Z. Berlin, 5. Mai 1893, Heft 18
3. ARMSTRONG EDWIN: Tribute to Tesla - Scientific Monthly, April 1943, p. 378
4. BECHARD J. ARTHUR: Electrical Genius, Nikola Tesla, Julian Messner, Inc., n. Y. 1959.
5. BLONDEL A.: Sur le diagramme complete des flux et des courants dans le moteur asynchrone Polyphase - Revue Generale de l'Electricite, tome 45, 4. Paris, Febr. 1939, p. 143
6. FLEMING A. P. M.: The Life and Work of Nikola Tesla - Nikola Tesla's special commemorative meeting, 25. XI. 1943 - The Journal of the Institution of Electrical Engineers, Part 1. No. 38, Vol. 91, London, Feb. 1944, p. 58
7. GIRARDEAU E.: Nikola Tesla pionier du Radar - Nikola Tesla - Congress, Sept. 1953, Technisches Museum für Industrie und Gewerbe in Wien, Wien 1953
8. HALLER GEORGE AND ELMER TILING CUNNINGHAM: The Tesla High Frequency Coil - Van Nostrand Co., N. York 1910
9. KAPP O. REGINALD: Tesla's Contribution to Electrical Engineering - The Engineer, London, September 14, 1956, p. 371
10. LORENZ H.: Theorie und Berechnung der Tesla - Kreisleräder - Zeitschrift für das gesamte Turbinenwesen, 29. II. 1912, Sept. Jahrgang Heft 6, S. 81
11. MARTIN THOMAS COMMERFORD: The Inventions, Researches and Writing of Nikola Tesla: - (Third edition) The Electrical Engineer, New York 1894
12. PIO - ULSKY G. N.: Die Arbeiten Nikola Teslas auf dem Gebiete der angewandten Mechanik - Gedenkbuch anlässlich des 80 - sten Geburtstages, N. Tesla Belgrade 1936, S. 337
13. PUPIN M. I.: Light and Other High - Frequency Phenomena - by Nikola Tesla - Columbia College, N. York, 15. Oct. 1893
14. SCOTT F.C.: The Contribution of Tesla to Electrical development - God. Sveučilišta u Zagrebu 1919 - 1929, p. 975
15. THOMPSON S. P.: The Inventor of Wireless Telegraphy - Saturday Review, N. Y., 5. April 1902
16. A tribute to Nikola Tesla, Father of Polyphase Alternating Current - Edison Electric Institute Bulletin, Vol. 24, No. 7, New York, July 1956, p. 235
17. Tesla Inventor Ahead of His Time - Wisdom, Beverly Hills Calif., February 1957, p. 44

18. Institute Honors Nikola Tesla - Franklin Institute News, Philadelphia, June - July 1957, p. 2

4. Management plan: microfilming and digitization of the whole archive is in progress. The general aim is on-line accessibility in the near future.

Environmental Conditions: good

Physical Conditions: good. The archive is located in a special room with stable climatic conditions. Unfortunately, the documents are neither microfilmed nor duplicated. The archive does not have appropriate protection except for a museum guard.

5. Assessment against the Selection Criteria:

Influence: The inventions of Nikola Tesla (1856–1943) were fundamental to the process of electrification of the world by the AC system, which was of utmost importance to technological development and usage of electricity as a leading energy. Therefore, indirectly, his inventions have had worldwide influence. Through this development, his inventions contributed to the rapid growth of industrialization and electrification. The collection of manuscripts and drawings at the Nikola Tesla Museum comprises the most complete record of his inventions and form an essential source of information for researchers and historians of science.

Time: Nikola Tesla belonged to that breed of independent inventors-creators who were responsible for many of the most progressive ideas. He was, as a thinker and creator of inventions, rather far ahead of his time. His inventions belong to the end of 19th and beginning of 20th centuries, but are still in use without new solutions in sight.

Place: The collection of documents is yet another example of the ingenuity which emerged from Serbian people especially during the last decade of 19th and first decade of the 20th Century. One must remember that, the field of electricity development alone, besides Tesla, whose work had perhaps the farthest reach, there were several other pioneers who made themselves an excellent name in the large centres of technical development.

People: See above.

Subject/Theme: The manuscripts and drawings comprising the collection reflect a turning point in the history of electricity development and represent the original source of the appearance of an important scientific concept.

Form and Style: These documents provide an excellent insight into the working methods and style of this important inventor.

Social value: As a source of information regarding the origins of the first descriptions, this Archive may provide researchers with the missing link of some of the most fundamental developments in alternate currents, high frequency currents and related technologies.

Integrity: The Archive constitute an original collection with related correspondence. The contents have not been altered before or after transfer to the Nikola Tesla Museum.

Contextual assessment: This Archive is a unique and irreplaceable source of information regarding the first descriptions of inventions of considerable impact. It is an essential source for further research on the development of the great technical advances of the 20th Century.

Authenticity: The collection of documents consists of exclusively authentic material.

Rarity: This collection of manuscripts and drawings is unique and irreplaceable.

6. Consultation:

Owner: State

Custodian: Nikola Tesla Museum

National Memory of the World Committee: foundation in process, future president Ms. Vesna Injac, National Library of Serbia, Belgrade, Injac@nbs.bg.ac.yu

Independent institutions and experts:

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7. Nominator:

a) Yugoslav Commission for UNESCO,
President Mr. Jovan Cirilov

b) Nikola Tesla Museum
Mrs. Marija Sesic
Director

Relationship to the documentary heritage: The owner

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