

Nikola Tesla's Patent Applications for Which Patents Were Not Granted

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Abstract — In this paper are presented the results of an investigation directed to discovering and identifying Nikola Tesla's patent applications filed with the United States Patent Office, but for which appropriate patents were not granted to him. The investigation showed that Tesla had at least 33 American patent applications for which patents were not granted, that shed a new light on his inventive activities in the United States of America. The subject matter of these patent applications are different Tesla's inventions in the fields of electrical engineering, mechanical engineering and processing technology, more precisely metallurgy.

Keywords — Nikola Tesla, metallurgy, patents, applications.

I. INTRODUCTION

AT the beginning of the 1990s, Mr Aleksandar Marinčić, the former Director of the Nikola Tesla Museum, in cooperation with the Federal Patent Office (today: the Intellectual Property Office of Serbia), obtained copies of all of Nikola Tesla's patents that the European Patent Office (EPO) had in its possession, as an act of good-will due to the beginning of close cooperation between the SFRY and EPO, as described in more detail in [1]. In the course of 1992 and 1993, a group of patent engineers - consisting of Mr Ivan Župunski, Mrs Snežana Šarboh, Mr Bogdan Todorov, Mrs Ljiljana Kovačević, Mr Jovan Perić and Mr Slobodan Stojković - spent more than six months at the Nikola Tesla Museum on the task of analyzing the archives and creating a list of all of Tesla's patents. In addition to the archives of the Museum, they also examined the patent documentation received from the EPO, i.e. the copies of Tesla's patents from the EPO internal patent database, that later (more precisely in 1998) became available free of charge under the name ESPACENET at [2]; the above mentioned copies are currently kept in the Nikola Tesla Museum. The results of this research were submitted to the Director of the Federal Patent Office as an internal report of the expert group. The significance of this report is that it was the first document confirming the existence of Nikola Tesla's British patents for inventions that lacked previous equivalent US patents, as described in [3].

Furthermore, already during the research and selection of the working material, there were obvious indications of the existence of Nikola Tesla's applications to the US Patent Office that had no corresponding patents. This was

a clear indication that Nikola Tesla did not receive patents for all of the applications he had submitted. However, due to the interruption of the research that soon followed, the systematization of this data has never been completed, and neither the number of applications made, nor which of Tesla's inventions these applications pertained to, has ever been established.

Since no significant papers on this subject have been published to date, Mr Vladimir Jelenković, the Director of the Nikola Tesla Museum, welcomed the proposal of me and my colleague Slobodan Stojković to conduct another research covering all patent applications submitted to the US Patent Office, then patent applications that Nikola Tesla prepared for submission but never submitted, as well as patent applications prepared for patent filing in other countries for which he never received patents.

II. THE AMERICAN PATENTS OF NIKOLA TESLA

Though the life and deeds of Nikola Tesla which have always attracted great public attention and were the subject of numerous research projects that resulted in the extensive literature, there is a disproportionately small number of the papers aiming at Tesla's activities related both to protection of his inventions and his work dealing with the industrial property in general. Inter alia, so far the lists of his patents have been published in [3]-[5], as well as the complete texts of some of his patents either as a part of his selected works (see [6]) or collected works (see [7]).

The previously conducted investigations have shown that Tesla had a total amount of 112 granted American patents, but the final amount of Tesla's patents originating from other countries has not been determined yet – so far there have been discovered over 160 Tesla's patents thereby he had protected his inventions in at least 26 different countries on each of the five continents.

III. NIKOLA TESLA'S PATENT APPLICATIONS FOR WHICH THE AMERICAN PATENTS WERE NOT GRANTED

Unlike Tesla's patents to date there has been no relevant information about patent applications for which Tesla did not receive patents available. The reasons for this situation are twofold. First of all, one should bear in mind the examination procedure at the US Patent Office at the time Tesla was filing his patent applications. Namely, in cases when the applicant did not receive the patent, the documents from such a patent application were not made public, for instance by publishing the patent application or in any other manner. The files containing these applications were archived in the archives of the US Patent Office, remaining unknown to the public. On the other

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hand, the disposal of the records from these archives had been done after prescribed time intervals, therefore making it impossible to find appropriate records there any more. Fortunately, the corresponding copies of the mentioned patent applications that belonged to Nikola Tesla himself were preserved largely at the Nikola Tesla Museum in Belgrade and the appropriate archive material was a subject of the above mentioned investigation.

The analysis of the archive material has proved an assumption that it contains Tesla's patent applications for which the American patents had not been granted. Also it has been established that the archives of the Nikola Tesla Museum contain complete descriptions of inventions for some patent applications including appropriate drawings, while for others there are only individual text segments of the description of the invention and/or a drawing thereof, while in yet other cases there are only notes about a submitted patent application without any additional material.

The following Table 1 contains the patent applications for which there exists at least the information about the filing date and the application number under which the patent application was filed with the US Patent Office, irrespective of whether the title of invention, its description and/or sketches and drawings were preserved.

TABLE 1: THE LIST OF NIKOLA TESLA'S PATENT APPLICATIONS FOR WHICH THE AMERICAN PATENTS WERE NOT GRANTED.

<i>Nr.</i>	<i>Title of Invention</i>	<i>Application Number</i>	<i>Application Date</i>
1.	Method of and Apparatus for Generating Electric Currents	239,481	26.05.1887
2.	Electric Motors	251,659	06.10.1887
3.	Electric Generators	251,660	06.10.1887
4.	Apparatus for Increasing Traction of Car Wheels	293,058	08.12.1888
5.	Electrical Meters	387,722	06.04.1891
6.	Electric Lighting Devices	399,948	18.07.1891
7.	Armatures	482,630	07.08.1893
8.	Armatures for Alternating Current Motors	485,865	19.09.1893
9.	Reciprocating Engines	495,347	03.01.1894
10.	Reciprocating Engines	501,008	21.02.1894
11.	Method of Removing Gaseous Matter from Closed Receptacles	579,448	15.02.1896
12.	Industrial Utilization of Water for Heating Purposes	17,612	23.05.1900
13.	Art of Transmitting Electrical Energy Through the Natural Media	43,368	15.01.1901
14.	Production and Application of Electric Force	213,055	17.06.1904
15.	Methods of and Apparatus for Transmission of Electrical Energy	256,022	17.04.1905
16.	Method of Deriving Energy from Fluids	678,817	20.02.1912
17.	Method for Fluid Propulsion	735,914	10.12.1912
18.	Transmission of Electrical Energy Through the Natural Media	81,768	03.03.1916
19.	System of Wireless Transmission	91,679	17.04.1916
20.	Transmission of Electrical Energy through Natural Media	277,130	15.02.1919
21.	Construction of Steam and Gas Turbines	499,520	09.09.1921
22.	Method of and Apparatus for Thermo-Dynamic Transformation of Energy	533,524	02.02.1922
23.	Method and Apparatus for Fluid Propulsion	533,525	02.02.1922
24.	Method of and Apparatus for Balancing Rotating Machine Parts	546,037	23.03.1922
25.	Method of and Apparatus for Production of High Vacua	546,038	23.03.1922
26.	Method of and Apparatus for Deriving Motive Power From Steam	546,039	23.03.1922
27.	Method of and Apparatus for Economic Transformation of the Energy of Steam by Turbines	546,308	24.03.1922
28.	Apparatus for the Generation of Power by Elastic Fluid Turbines	548,233	30.03.1922

29.	Methods of Generating of Power by Elastic Fluid Turbines	548,234	30.03.1922
30.	Process of Treating and Transporting Sulfur	645,568	15.06.1923
31.	Apparatus for Treating and Transporting Sulfur	645,569	15.06.1923
32.	Economic Method of Operating Automobiles and the Like	244,345	03.01.1928
33.	Apparatus for Operating Automobiles and the Like	244,346	03.01.1928

The inventions covered by the 33 above listed patent applications belong to the fields of electrical engineering, mechanical engineering, and even processing technology, more precisely metallurgy. Some of the listed inventions Nikola Tesla successfully patented in other countries – there are the inventions covered by the six out of seven British basic patents GB 179,043, GB 186,082, GB 186,083, GB 186,084, GB 174,544 and GB 186,799. However, Tesla did not obtain US patents for these inventions, despite the fact that he submitted equivalent patent applications to the US Patent Office under the numbers 499,520, 546,037, 546,038, 546,039, 546,308, 548,233 and 548,234, wherein he did it after submitting the above mentioned patent applications in the UK.

The reason why Nikola Tesla obtained patents in some countries while patent applications for the same inventions were rejected in other countries lies in the fact that patents in one country are independent of patents in other countries, which is explicitly prescribed by the provisions of Article 4^{bis} of the Paris Convention for the Protection of Industrial Property from 1883, according to which each country has its national legal regulations and a competent body that establishes its own practice, which can result in different outcomes of procedures carried out for the same patent applications.

In addition to these six patent applications, Tesla submitted another 12 applications in the field of mechanical engineering, covering inventions that uninformed people would hardly associate with Nikola Tesla's name, such as for a device that increases the traction force of car wheels, reciprocating engines, a method for industrial use of water for heating purposes, a method and apparatus for vehicle operation, and similar. In addition, a number of Tesla's mechanical engineering patent applications pertain to improvements to Tesla's pump and turbine. Bearing in mind all of the mentioned mechanical engineering patent applications, their number amounts to 18.

There are a total of 13 patent applications in the field of electrical engineering. They primarily pertain to the field

of polyphase currents, but also to inventions in the field of direct currents and wireless transmission.

Perhaps the most interesting patent applications for which Tesla did not receive patents are the two ones from the field of processing technologies. They pertain to the process (patent application 645,568) and the apparatus (patent application 645,569) for processing and transportation of sulfur, both submitted in 1923. Moreover, Tesla's patent for the apparatus has even been approved by the US Patent Office, but since he neglected to pay the prescribed registration fee he never received the patent, and the patent document was never printed.

Since at least 8 of the patent applications listed above contain a so-called unity of invention – it means that protection both for the method and the corresponding apparatus was sought simultaneously - it follows that, in these patent applications, Nikola Tesla sought the protection of at least 41 of his inventions. However, when we subtract the inventions covered by six out of the above mentioned 11 British patents, it seems that Tesla failed to protect about 30 of his inventions; more details can be found in [8].

But this number is actually smaller, because Tesla protected some of these inventions by other patents. An example of this kind is his invention of electrical meters. Namely, Tesla had filed application 387,722 on April 6 1891, but did not pay a fee of 20 US Dollars for patent issuing within six months, causing that his patent application was considered as withdrawn.

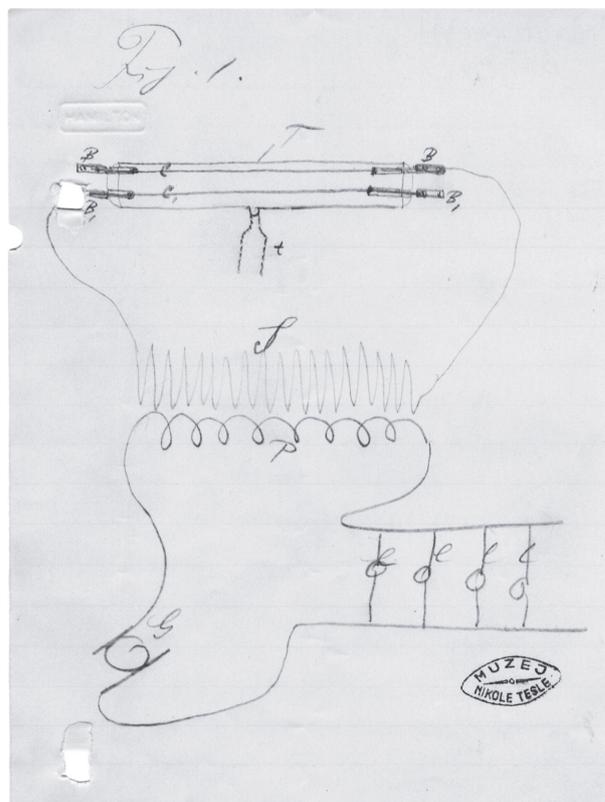


Fig. 1. A sketch for the patent application 387,722.

However, Tesla did not give up and on December 25, 1893, he submitted a new patent application 493,739 for the same invention and received the patent US 514,973 on February 20, 1894, which means that this invention was

patented after all. This can be seen clearly when comparing a sketch of the electrical meter for the patent application 387,722 (Fig. 1), that can be found in [9] and a drawing from patent US 514,973 (Fig. 2), that can be found at [2].

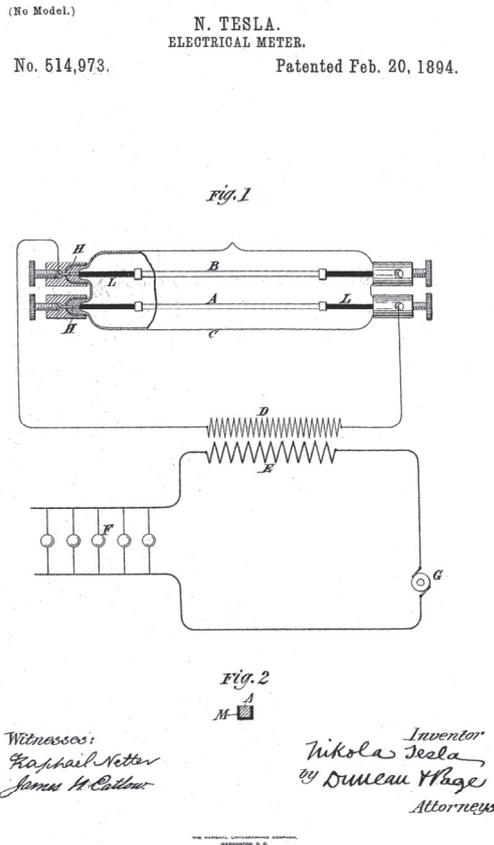


Fig. 2. A drawing from patent US 514,973.

IV. SUMMARY OF TESLA'S ACTIVITIES ON THE PROTECTION OF HIS INVENTIONS IN THE USA

Now the complete Tesla's activities on the protection of his inventions in the USA can be summarized starting from the previously published data (see [3]-[7]) and taking into account these recently discovered data.

From what we know, Nikola Tesla's efforts to patent his inventions in the USA started in 1885 and ended in 1928. Since no information exists about any patent applications filed after 1928, we can conclude that Tesla had been filing patent applications for a total of 43 years. Over this period, Tesla submitted at least 145 patent applications, out of which he received US patents for 112, which was not the case with the remaining 33.

Unlike the list of Tesla's patents, the list of patent applications for which patents were not granted is not final, because it is still possible that additional patent applications not mentioned in this paper will be discovered.

Table 2 gives a comparative overview of all Tesla's American patent applications, both of the ones for which patents were granted and the ones for which patents were not granted, sorted according to the year of filing.

V. CONCLUSION

The investigation conducted in the Nikola Tesla Museum has shown that besides 112 previously known American patents Nikola Tesla had at least 33 patent applications for which patents were not granted. The subject matter of these patent applications are different Tesla's inventions in the fields of electrical engineering, mechanical engineering and processing technology, more precisely metallurgy. The archives of the Nikola Tesla Museum contain complete descriptions of inventions for some patent applications including appropriate drawings, while for others there are only individual text segments of the description of the invention and/or a drawing thereof, while in yet other cases there are only notes about a submitted patent application without any additional material.

TABLE 2: THE LIST OF UP-TO-DATE KNOWN TESLA'S AMERICAN PATENT APPLICATIONS.

<i>Filing year</i>	<i>Filed patent applications – patent granted</i>	<i>Filed patent applications – patent not granted</i>
1885	5	
1886	3	
1887	9	3
1888	11	1
1889	15	
1890	6	
1891	7	2
1892	3	
1893	6	2
1894		1
1895		1
1896	9	1
1897	7	
1898	6	
1899	4	
1900	6	1
1901	2	1
1902	1	
1904		1
1905		1
1909	2	
1912		2
1913	1	
1914	1	
1916	6	2
1919		1
1921		1
1922		8
1923		2
1927	1	
1928		2
total	112	33

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