Inventing Solutions: The Story Between Edison And Tesla

Introduction

When do people mention the labels of the most famous inventors and entrepreneurs, who do you think of first? Most people’s choices are Thomas Edison's name. Edison was known to the world mostly because he invented the electric light bulb. In fact, his contribution goes far beyond that. In addition to light bulbs, gramophones, motion movie cameras, are also masterpieces of this invention king. He also contributed to the improvement of telephones and telegraphs. During his life, Edison applied for a total of 1093 patents. (Thomas Edison, 2009). He was regarded as one of the most contributing scientists in the field of engineering and even thought that he would have a greater impact on the contemporary world than any other engineer. However, after generations of researchers have gradually solved Edison as a businessman and compared Edison with other engineers such as Nikola Tesla in many aspects, some researchers have begun to deny the great evaluation of Edison mentioned above, doubt his scientific research due to contribution, and his wonderful moral character. The purpose of this paper is to evaluate Edison's work and its impact as objectively as possible by comparing it with Nikola Tesla's work and having a detailed understanding of both sides' real working experiences.

The story between Edison and Tesla

Edison and Tesla can be said to be competitors and enemies of their lives. Nicholas Tesla was also a legend in science. We are benefiting from Tesla's contribution in all aspects today, but Tesla did not get huge commercial success from his inventions as a result and was poor in his old age. Instead, Edison was the king of invention at the time, a famous businessman, and the owner of the light bulb company. He was selling electricity to others. The electricity he sold was different from what Tesla later sold. Edison produces direct current, while Tesla produces alternating current. Different choices of invention products and different understandings of future trends at the time became the original reasons for the differences between the two men. Before objectively evaluating these two inventors, we should first understand the differences between the two inventors, which means that we need to understand their respective inventions.

Edison invented direct current, which does not change direction. For example, the current of a dry cell is a direct current. The way to generate direct current is to simply move a conductor in a magnetic field. For example, if a conductor is rotated in a magnetic field, one pole is connected to the center of the conductor, and the other pole is connected to the edge of the conductor. As long as the magnetic field rotates at the proper speed, current can be generated and the bulb will light up. (DC generation, n.d.). Therefore, this electricity becomes a direct current. When Tesla first prevailed, he thought that there were a lot of defects in DC. His dream was to invent an alternating current that can make up for the shortcomings of direct current, that is, the electricity we use today. His idea was to place the coil in the middle of the two stages of the magnet (the magnetic field that he later defined), rotate the coil around the central axis, cut the magnetic induction lines in the magnetic field to generate electricity, and the direction of this electricity changes from moment to moment. Therefore, the current that changes in this direction from time to time is called alternating current. (Basic AC Theory: Electronics Textbook.

n.d.)

However, the studying of alternating current was unsuccessful when he first studied, so he wanted to ask Edison for help. Edison offered conditions to Tesla from a businessman's perspective. If Tesla can help Edison complete the improvement of the DC generator, Edison will give Tesla $ 50,000. This money can help Tesla complete the research on alternating current. However, Edison did not fulfill his promise and joked that he was just playing an American joke with Tesla after he finally improved the DC generator completely for more than a year. Tesla then left Edison's company in anger and sought other sources of funding. (Nikola Tesla, 2019). In the end, with the financial support of Westinghouse boss George, Tesla succeeded in inventing the alternating current and obtained copyright fees at a more affordable price. (Nikola Tesla. 2009). However, due to the obstruction of Edison's use of commercial means, Tesla did not actually get the royalties like astronomical figures. Behind Edison's obstruction is the fear of alternating current. He feared that AC would take up most of his market. Before you understand that the invention of AC has a huge threat to Edison's company, you should understand the advantages of AC over DC.

In the process of power transmission, the low-voltage transmission of electrical energy is very large, so the distance of low-voltage transmission is limited; however, if the high-voltage transmission is to users, the electrical equipment will be overloaded and damaged. For example, if you use 100,000 volts to power the user, the user's light bulb will burst directly. Therefore, the biggest problem of direct current is that it cannot be transformed, and the disadvantage of not being transformed is that the loss is high and cannot be transmitted over long distances. Edison's solution was to build a power station every one kilometer. The biggest advantage of alternating current is that it can transform the voltage, can carry out long-distance transmission, and can guarantee a large amount of power consumption. The principle of AC voltage transformation is that after power is generated by a power plant, it is sent to a transformer to be boosted to high voltage for convenient transmission. Before the transmitted high-voltage electricity is sent to the user, it is stepped down by a transformer and finally sent to the customer to complete the transmission. This mode is also the current transmission mode.

Because of Edison's obsession with the monopoly market, various measures have been taken to prevent the use of alternating current. For example, in order to emphasize that alternating current is dangerous, he publicly executed large animals. He used AC power to kill the elephant. He also made it into a movie and showed it to the world. Moreover, the U.S. Senate passed a bill at the time that the death penalty will no longer use hangings but AC chairs. The first time an electric chair was used to execute a death sentence, the wrong use of the executor caused a tragedy. The current should be passed from the head so that the person will die immediately. But at that time, the current entered from the arm, the voltage was too high, the arm was on fire, but no one died.

The end of the AC and DC war was at the 1893 World Expo. In 1983, the United States World Expo invited tenders, and the government hoped that hundreds of thousands of light bulbs could be placed in the Expo Park. Due to the high-power consumption, direct current cannot be achieved at all. And AC power can not only generate electricity from a distance but also effectively ensure sufficient power. Therefore, Tesla easily won the bid. However, when the project is implemented, the difficulty of the project is not to supply power, but to make bulbs. Because Edison's bulb company refused to sell any bulbs to Tesla. Finally, at the opening of the Expo, the moment the USA President pressed the button, hundreds of thousands of light bulbs

were lighting together. Since then, people have realized the future of AC.

Comparing

Compared with Tesla, Edison was more like an excellent businessman, but he did not have Tesla's vision in the invention. Otherwise, direct current rather than alternating current should be used in society now. Therefore, he cannot be called the inventor who contributed most to the field of modern engineering, but he can be called one of the merchants who contributed most to the field of modern engineering. Edison was more like a commercial brand. He has an excellent and professional research team. His team included physicists, mechanics, and a large number of engineers. When products were developed, Edison was very good at promoting them, including himself. Therefore, being good at promotion was the important reason why he was well known all over the world, not his strong creative ability as a scientist. Compared with Tesla, the difference in values was their most fundamental difference. Tesla was more inclined to focus on updating technology to achieve personal value and ideals, while Edison was more inclined to make money to achieve satisfaction.

Morally, Edison should be questioned. In the course of doing business, he fully demonstrated the image of a profitable businessman. For example, he tricked Tesla into improving his motor for him, sacrificing animal life, and other people's interests, and violations of legal principles have reached commercial ends.

Conclusion

Edison is a famous inventor and entrepreneur in modern times. He has made outstanding contributions to modern engineering. Its main contribution lies in the promotion of invented products, such as light bulbs, gramophones, and video machines. The frequency and acceptance of these products have indeed changed the world and the way people live. Edison did participate in the invention of these products. However, the invention of these products is not very forward-looking compared to the invention of other inventors. For example, Tesla's AC is still widely used in the world. Therefore, it cannot be said that Edison is the most far-reaching person in the field of modern engineering. Every investor in history should be respected, and future generations of students and researchers cannot be blindly worshipped because one of them is well-known. It is correctly recognized that the contribution of each inventor to society is the best education for future generations.

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