

METHOD AND APPARATUS FOR SINGLE LINE ELECTRICAL TRANSMISSION

FIELD OF TECHNOLOGY

This invention relates to the field of electrical technology, and relates particularly to a method for the continuous transformation of electrical energy with fits subsequent transmission from an initial source (transformer) to a consuming device, and also to an apparatus for the implementation of this method of transformation and the supplying of power to electrical devices through a transmission line which does not form a closed circuit, ie consists of a single conducting wire.

BACKGROUND ART

There exists a means for the transmission of electrical energy along a conducting wire which does not form a closed circuit ie, a single conducting wire. It is based on the discovery in 1729 by the English physicist Stephen Grey of the phenomenon of electrical conductivity. The essence of this phenomenon consists in the fact that electricity may be transmitted from one body to another along a metal conductor or a length of yarn, and that the electrical charge is distributed over the surface of the conductor.

See Yu. A. Khramov, *Physicists: A Biographical Reference Book* (Moscow, "Nauka" 1983) (in Russian); and *Dictionary of scientific biography* (New York, Charles Scribener's Sons 1970-1978).

As to closed circuits, a well known means for the supplying of power to electrical devices has existed since the creation in 1799 by the Italian scientist Alessandro Volta of the first source of prolonged electrical current (Volta's column). This means is based on the transmission of electrical energy generated in the initial source to the consuming device directly through a transmission line consisting of two conducting wires which together with the source and the load form a closed circuit.

See Yu. A. Khramov, *Physicists: A Biographical Reference Book*, M. I. Radovsky, *Galvani and Volta* (Moscow-Leningrad 1941) (in Russian); and G. Polvani, *Alessandro Volta* (Pisa 1942).

There exists another important type of closed circuit that represents a means for the supply of power to electrical devices based on the discovery made by M Faraday and J Henry of the phenomenon of electromagnetic induction (published by M Faraday in 1831, and on the invention by P N Yablochkov in 1876 of the electrical transformer. The essence of this means consists in the transformation of the current or the voltage of electrical energy generated in the initial source and the transmission line to the consuming device.

See M. Faraday, *Experimental Research in Electricity* (Moscow-Leningrad, Publishing House of the Academy of Sciences of the USSR 1947-1959) (in Russian); Yu. A. Khramov, *Physicists: A Biographical Reference Book*; *The Large Soviet Encyclopedia*, 3rd Ed. (Bol 26 Moscow, "Soviet Encyclopedia" 1977) (in Russian).

As to wireless means, there exists a means for the supplying of power to electrical and radio devices by using an electromagnetic field. This means is based an G Herz's experimental proof in 1888 of the existence of electromagnetic waves, the discovery of which was forecast by J Maxwell in 1865. The means essentially consists in the transformation of electrical energy from the initial source into an electromagnetic field which is radiated into space and received by the consuming device.

Dictionary of Scientific Biography. New York, Charles Scribener's Sons, 1970-1978. Yu A Khramov, *Physicists: A Biographical Reference Book*. Moscow, "Nauka", 1983 (in Russian); J K Maxwell, *Selected Works on Electromagnetic Field Theory*, Moscow "Gosizdat", 1954 (in Russian).

There also exists an electrical device for the transmission of the energy of free electrical charges from the initial source by means of a non-conducting ribbon. This is the so-called high voltage electrostatic generator, which was designed and constructed by the American physicist Van de Graaf between 1929 and 1933. In this device electrical charges are sprayed from needles under high voltage on to a moving ribbon and transferred to an insulated metal dome, where they accumulate. The charges may be sprayed on to the ribbon and collected from it; the ribbon and the dome may be negatively or positively charged.

See K. E. Swarts, *The Uncommon Physics of Common Phenomena*, Vol. 2, translated from the English by E. I. Butikov and A. S. Kondratiev (Moscow 1987) (in Russian); *Biography*; and Yu. A. Khramov, *Physicists: A Biographical Reference Book*.

It is believed to have been proposed to provide a means for the supply of power to electrical devices via a single-wire transmission line, demonstrated by N Tesla in the late nineteenth century.

See John O'Neill, *Electrical Prometheus*, (Moscow "History of Technology" 1944) (in Russian); B. N. Rzhonsnitsky, *Nikola Tesla* (Moscow "Molodaya Gvardiya" 1959) (in Russian); and G. K. Tsvetava, *Nikola Tesla* (Leningrad "Nauka" 1974) (in Russian).

It is believed there is a trace mentioned by John O'Neill of one more distinctive means for electrical transmission but description of this trade did not have details and was not confirmed by any original document.

OBJECTS OF THE INVENTION

An object of the present invention is to provide an increase of the coefficient of efficiency to transmission from an initial source to a consuming device in electrical technology, and also a simultaneous reduction in the metal content of the transmission line.

SUMMARY OF THE INVENTION

According to a first aspect of the present invention there is provided a method of supplying power to one or more electrical devices, including generation and transformation of electrical energy and subsequent transmission thereof to a receiving device via a transmission line, the method being characterised by the transformation of the electrical energy which is generated into the energy of oscillation of a field of free electrical charges such as a displacement current or longitudinal wave of an electrical field, the density of which charges varies in time, and the transmission of the energy via a transmission line which does not form a closed circuit comprising a single-wire transmission line and, where necessary, its transformation into the electromagnetic energy of conduction currents.

Thus, the invention provides transformation of electrical energy generated in an initial source into energy of oscillation of a field of free electrical charges (the displacement current or longitudinal wave of the electrical field), which energy is transmitted to the consuming device via a conductor of the transmission line which does not form a closed circuit and, where necessary, transformed into the electromagnetic energy of closed circuit conductive currents.