

Tesla's Latest Wonder

Illustrating the Method by Which Electric Power Is Conducted From One Place to Another Without Wires. The Balloons Act as the Poles of the Dynamos and the Current Flashes Across Through the Rarefied Air.

TESLA'S latest electrical wonder is out. It is out because he has just received patents on it in this and other countries.

What Tesla proposes to do now is to transmit almost any amount of power almost any distance without wires, and without loss. Although moving ships at sea may use the system for propulsion it is mainly intended for use on land.

To illustrate the anticipated results in the most concrete form it is proposed, for instance, that water power shall generate a great quantity of electricity on the lower courses of streams coming from the Sierras; that this electricity shall be conducted to a balloon arrangement floating a mile or two above the earth; that there shall be in San Francisco a similar balloon high above the city and that all the electrical energy conducted to the first balloon shall pass without loss and without wires to the balloon over the city, from which it shall descend to turn wheels and light lamps, etc.

A secondary result would seem to be that ships minus boilers and minus coal shall plow their way from the Golden Gate to Puget Sound, their churning propellers being driven by motors which draw their energy through the air from stations arranged every hundred miles or so along the shores.

This may seem a crazy idea to some people, but then it was a more crazy idea once that a man's voice should be heard 2000 miles away and that a waterfall should turn a mill a hundred miles away, and besides Nikola Tesla says so and he is acknowledged as one of the very best electric experts in the country.

In one sense Tesla is a greater wizard than Edison. They are twin wizards in the wondrous field of electrical science, but they are wholly unlike. Edison is wholly practical and he cares for nothing that he cannot make a commercial success. His spur is not devotion to science as it was with Franklin, Faraday, Volta, Galvani and the rest. Tesla is rather Edison's reverse as a genius. He plunges into electrical mystery and seeks scientific facts, phenomena, laws and principles rather than patents though he looks out for the patents when they are in sight.

Young Tesla has started the world about as much as has Edison, but you don't find his name on the patent plates of as many machines about town. He made electrical engineers marvel by smilingly passing a million volts of electricity through his body and he showed them how to light a room brilliantly with a simple empty glass tube which he held in his hand or laid on the table without any connecting wires.

In various ways he has led the scientific world far toward the final mystery of this "form of radiation." This latest advance of his is both scientific and practical.

"Tesla's system of electric power transmission through natural media" is the descriptive title of this latest invention of his.

This at once suggests the new telegraphy without wires, which promises to be a commercial feature of everyday life to-morrow or next day, but the one system is wholly different from the other.

In the wireless telegraphy an apparatus sends out in all directions through air, buildings, earth and water a series of "Hertzian waves" as a lighthouse lamp sends out light waves. The length and frequency are regulated, and the receiving apparatus, if adapted to these waves, responds as one tuning fork will to its like. In this case the electrical phenomena proceed in all directions like sound or ripples from where a stone strikes in the water.

Tesla, however, proposes to generate energy at one point and pass it all

without loss through the air direct to a distant point, where it may be used for light or power. A comprehension of his invention depends upon an understanding of "voltage."

An electric current may be large in quantity and low in intensity or small in quantity and high in intensity as a stream of water be large in volume and slow of motion or may be small and rapid. A stream of water an inch in diameter will exert more power than a small river if the pressure is great enough.

In handling electricity quantity is reduced to intensity and the reverse by means of "transformers." In long-distance transmission of power the energy is transformed to a high intensity of voltage and then sent over the wires, and where it is received it is again transformed to a lower voltage and greater quantity for use.

Here is another preparatory illustration. Most people have seen electric sparks jump from one brass ball to another in electrical apparatus. The distance these sparks will jump depends not on the amount of electricity generated but on its intensity or voltage.

Now, there are two things which mainly underlie Tesla's new scheme. One is the production of voltages before hardly dreamed of, and the other is the increased conductivity of the air when it is rarefied as it is at high altitudes.

Up to date 15,000 volts has been the measure of the intensity at which electric power has been transmitted over copper wires, though now they are talking of doubling it. Tesla proposes to transmit it without wires at 2,500,000 volts or more. At this voltage a given quantity transmitted would produce about 200 times the ordinary amount of power when reduced with transformers.

It is a well-known laboratory fact that rarefied air is a conductor of electricity, though one of much resistance. The Crookes tubes of X ray fame depend on this principle. With one sweep

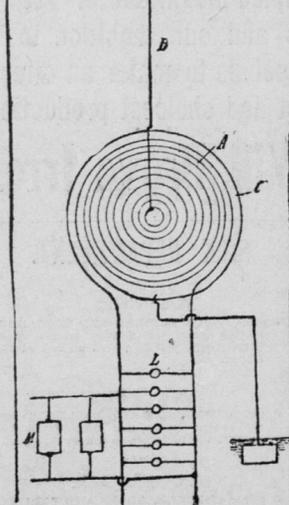
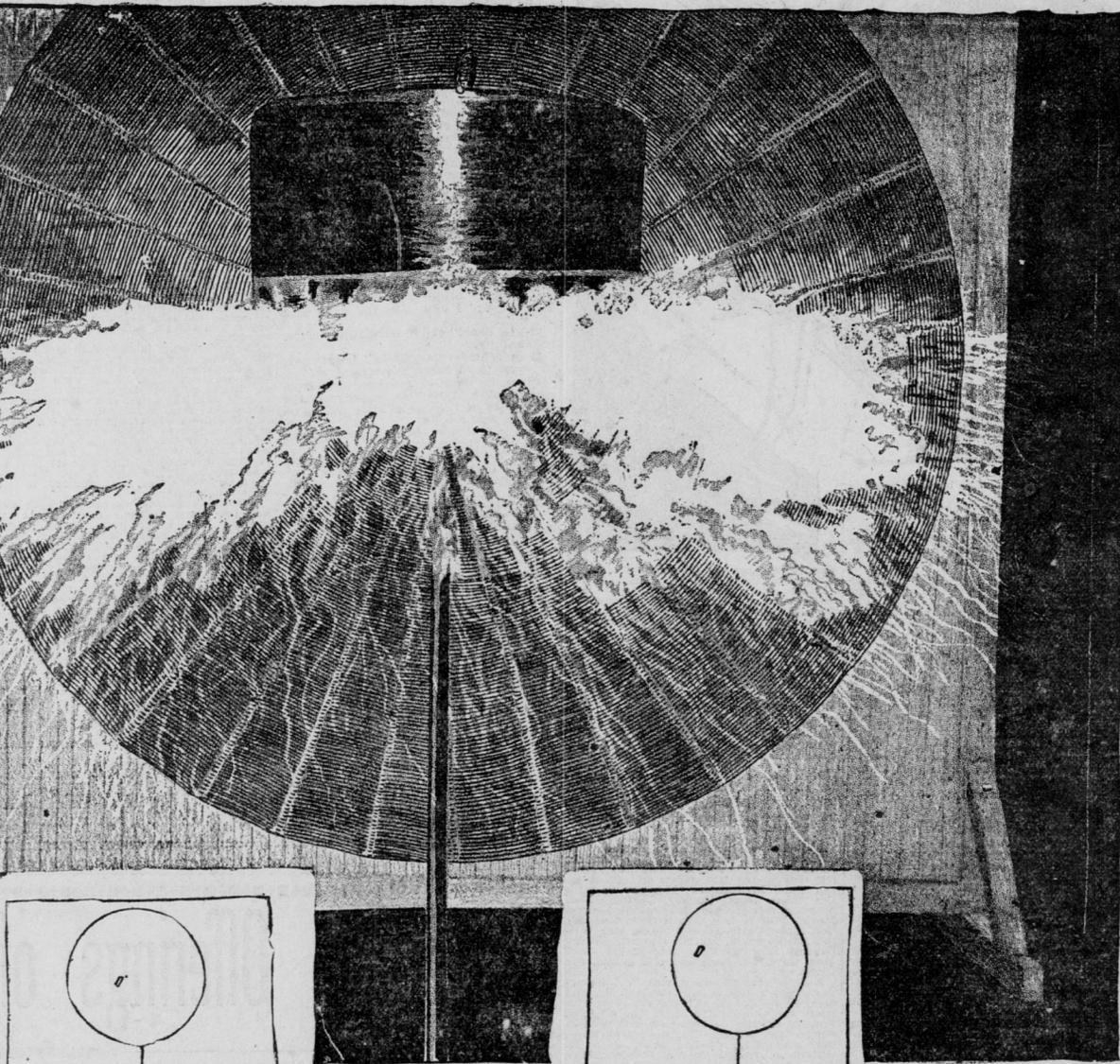
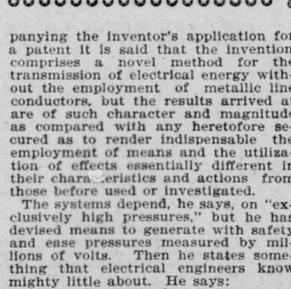


DIAGRAM ILLUSTRATING PRINCIPLE OF TESLA'S RECEIVER OF ELECTRIC POWER.
C1—Primary coil.
A1—Secondary coil.
D1—Receiving terminal supported by balloon.
L, M—Lamps and motors energized by transmitted current.

Tesla takes this principle from the laboratories where, only men have put it to use, and goes up to the clouds with it. He produces a wonderful voltage that will jump an enormous distance in every-day air, and proposes to take it in balloons up to where the air is a sort of natural Crookes tube. In such an altitude it will jump long distances to another terminal, he says, the layer of heavy air below being a non-conductor and resisting it like the rubber wrapping of a wire, for ordinary air is not a good conductor.

Tesla's model transformer or "oscillator" in action when creating an effective electrical pressure of two and a half million volts. The actual width of space traversed by the luminous streams from the single terminal is over sixteen feet.



TESLA'S MODEL TRANSFORMER OR OSCILLATOR

panying the inventor's application for a patent it is said that the invention comprises a novel method for the transmission of electrical energy without the employment of metallic line conductors, but the results arrived at are of such character and magnitude as compared with any heretofore secured as to render indispensable the employment of means and the utilization of effects essentially different in their characteristics and actions from those before used or investigated.

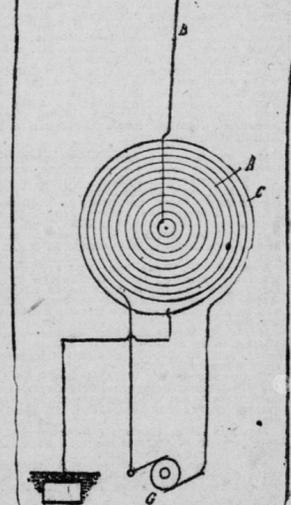


DIAGRAM ILLUSTRATING THE PRINCIPLE OF TESLA'S TRANSMITTER OF ELECTRIC POWER.
A—Primary coil.
C—Secondary coil.
G—Source of electrical energy.
D—Terminal supported by balloon.

principle that causes an X ray to glow even when removed several feet from the static machine. But whatever it is it is one of the greatest wonders of the age and surely destined to revolutionize warfare.

and without such restrictions as these must necessarily impose."

SIX POLAR EXPEDITIONS.

Mr. Wellman's Polar Expedition.

Mr. Wellman's ship, the Fridtjof, has returned from Franz Josef Land, bringing news of the expedition down to August 2. Writing to us on that date, the leader announced the landing of his party at Cape Tegethoff, and his proposed start for the north a few days later. The voyage to Franz Josef Land had been a successful one. After ten days in the ice Cape Grant was reached on July 27, Cape Flora on the 28th. Here the ship was turned back by ice, reaching Cape Tegethoff on the 30th, after which the tour of Wilczek and Salm islands was made before the final landing was effected. A house, named "Harmsworth House," as the inner shell was taken from Cape Flora, had been erected at Cape Tegethoff, but, in spite of the temptation to winter there, Mr. Wellman hoped to be able to adhere to his original plan and push northward to Crown Prince Rudolf Land, wintering there in an improvised hut of stones and snow. The house at Cape Tegethoff would be of use to fall back upon in case of need.

German Expedition to the Arctic Seas.

The Heligoland, Captain Rudger, with the German Arctic expedition under Herr Theodor Lerner on board, returned in August to Hammerfest without having discovered any traces of Andre's expedition. Some geographical work has been accomplished in the neighborhood of Kong Karls land, which, according to published statements, was found to consist of three islands, viz.: Swedish foreland, Jena

Mr. Borchgrevink's Expedition.

Mr. Borchgrevink's Antarctic expedition sailed on August 22 on the South-ern Cross, and its safe arrival at St. Vincent has since been announced.

Swedish Arctic Expedition.

Quoting from the Aftonbladet of Stockholm, the Mouvement Geographique (August 21) announced the arrival of M. Stalling, leader of the Andree search expedition, at the mouth of the Lena. The expedition had visited the New Siberian Islands, as also the neighborhood of the Anabara and Indigirka rivers, without finding a trace of the missing explorer. M. Stalling was about to proceed to the Taimyr Peninsula, en route for the Yenesei. The same paper also announced that the Norwegian navigator, M. Braekmo, had undertaken a journey to the New Siberian Islands in order to find out whether the provisions left by Baron von Toll remain intact, but from a recent telegram it would seem that he has returned without accomplishing his object.

Lieutenant Peary's Expedition.

The steamer Hope, which took coal and other supplies northward for Lieutenant Peary's expedition, returned from Greenland at the end of August, having parted from the Windward at Port Foulke, at the entrance to Smith Sound. Lieutenant Peary, writing to us from Etah, August 13, states that the season as far north as Cape Sabine is a late one; he was just starting for the attack on Kane Basin and the channel above. So far his plans had progressed favorably. He had on board ten picked Eskimo (five couples), about sixty dogs, and the carcasses of sixty walrus.

Polar Exploration With Ice Breakers.

At a recent meeting of the Russian Geographical Society Admiral Makarov submitted a proposal of reaching the pole by means of powerful ice-breakers. Steamers specially built for breaking the ice were first resorted to in Russia in 1864 by the engineer, Britzoff, for breaking the ice at Kronstadt. Lately ice-breakers have been very much improved in the United States, where the happy idea of providing steamers of that sort with twin screws at the stern, and a third screw at the stem, has proved to considerably increase their breaking powers. More recently powerful ice-breakers have been constructed in the States and in England by Armstrong for Russia, for transporting the trains of the Siberian railway across Lake Baikal, and for keeping the port of Vladivostok clear of ice. Experiments were made with such steamers and altogether the theory of ice-breakers was worked out. It appears that on the American lakes the ice-breaker Ste. Mary, 3000 horsepower, calculated that, in order to sail through quite sound ice, twelve feet thick, an ice-breaker of 52,000 horsepower would be required.

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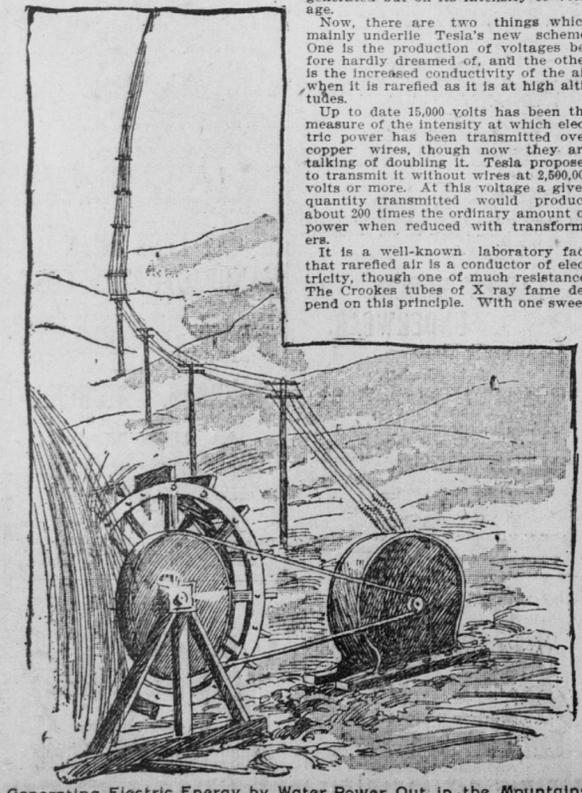
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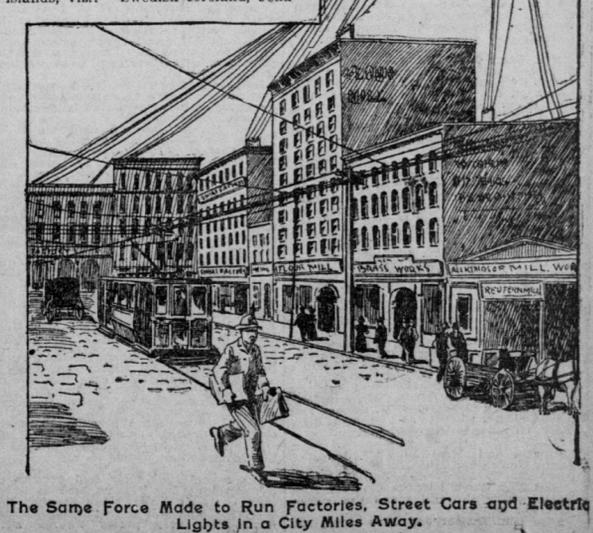
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Generating Electric Energy by Water Power Out in the Mountains.



The Same Force Made to Run Factories, Street Cars and Electric Lights in a City Miles Away.