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outstanding feature of the station. The purpose of this is to make alternating current electricity. Alternating current used for light and power has a "frequency" of 25 to 60 cycles per second, but the alternating current used in wireless and supplied at this station has a frequency of 22,000 cycles per second.

The only thing that moves in this giant machine is a solid steel wheel without wires and containing no copper whatsoever. This rotor, as it is called, weighs nearly three tons, and rotates at 2100 revolutions per minute. The speed of this rotating element is regulated to within one-tenth of 1 per cent, regardless of the amount of electrical load thrown on or off the circuit in the sending of messages.

**Occupies Small Space.**

The alternator is rated at 200 kilowatts and weighs about 12 tons without its base. The floor space occupied by the machine, including its base and driving motor, is only 8 feet wide by 20 feet long, which is less than 2 per cent. of the total floor space of the station.

It causes a clear cut "whistle" or flute-like sound to be sent out, with no harmonics. Harmonics have various frequencies and different wave lengths and interfere with other stations. They are useless wave lengths which fringe the message.

The magnetic amplifier is a machine that has no moving parts. Its principle depends on the invisible and motionless action of magnetism within the iron. The tiny electrical impulse from the voice wave releases the energy within the alternator and out of the high spun antennae flashes the amplified voice waves. No device has ever equalled it for clear enunciation.

The multiple tuned antennae, the third feature is like the sounding board of a piano. It augments the volume of sound so that it can be heard at a greater distance and also refines the vibrations. It can be compared best to an organ pipe.

"Speaking in the simile of the organ pipe, the action of the multiple tuned antennae may be explained as follows," said Dr. Alexanderson. "Whereas in all previous systems the antennae may be likened to a single organ pipe, the multiple tuned antennae is similar to six organ pipes tuned to the same pitch and sounded simultaneously in such a way that the combined sound is six times as strong as the sound emitted by each pipe."

**COMMUNICATION.**

Headquarters Northeastern Dept.

Boston, Mass.,

April 3, 1919.

FROM: Department Air Service Officer.

TO: The Editor of THE TECH.

SUBJECT: Air Service Publicity.

The United States Army Air Service needs 15,000 men to carry on its peace time program and replace men who enlisted for service during the emergency only. The magnificent organization we built up must be kept going. The cooperation which has been given to the Government by editors of newspapers and publications of various kinds has been greatly appreciated by all departments, and especially the War Department, during the World War. This office, in particular, is indeed very thankful and appreciative of the help your paper rendered a year ago and continuation of the liberal and generous support is solicited and most desirable.

Do you want to see our country lapse back into a state of military unpreparedness, or hold the place it has earned at such great cost of blood and treasure with leading nations of the world? The Army Air Service took a great part in winning the war. We built the "Liberty Motor," acknowledged by our Allies as one of the best, if not the best, airplane motor in record time. We trained nearly 10,000 fliers in a year. Most of all we "showed" the Kaiser.

It is most urgently requested that the enclosed article be incorporated in each issue of your paper for at least one week, if practicable, and that it be placed in as conspicuous a column as can be spared in your publication for the purpose. Your attention is particularly invited to the fact that there is no appropriation which permits payment for this kind of advertising, and therefore, if you consider the publication of this article, it will be understood that the service will be rendered gratuitously on your part.

This office is preparing copy for a feature display of the activities of the United States Army Air Service during the war, to be illustrated with numerous cuts of what this service has accomplished during the past eighteen months. It will make interesting reading matter as well as accomplish the motive for which it is written.

This letter is addressed to you in the hope that it may stimulate your interest in aeronautics and possibly result in appealing to you as an editor to write editorials based on facts for publication from time to time, and an expression of opinion as to whether your support may be expected somewhat along the line outlined above at this most critical time of our National career, will be appreciated. A self-addressed envelope, which requires no postage is enclosed. (Signed) PHILIP J. NEWLAND, 2nd Lieut. Air Service. (A). U. S. Army.

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**RADIO TELEPHONE SENDS 3200 MILES**

Marconi's announcement in London several days ago that a wireless telephone connection had been maintained between Ireland and Canada drew from the Navy Department a statement that the human voice has been carried from New Brunswick, N. J., to Paris, and to Honolulu.

Commander Wood, assistant director of naval communications, stated late this afternoon that a one-way conversation has been maintained between the naval wireless tower at New Brunswick and the steamship George Washington at Brest, France, but said that so far responses to the messages have not been obtained by wireless telephone.

The fact that it has not been possible to receive the responses was said to have been because there are not in France or England sufficiently powerful sending equipment to carry the vocal waves. The wireless conversations have been regarded as a novelty and an interesting experiment. It was said at the Navy Department, but as they lack both military value and possible commercial prospects the necessary equipment has not been installed abroad.

Secretary Daniels maintained a wireless telephone conversation with President Wilson on the latter's voyage to France until the George Washington was about 800 miles out from Hoboken. Beyond that distance only one way messages were possible, although the Navy Department since has been informed that the wireless operators aboard the vessel received the signals continuously until they reached Brest. Previously Secretary Daniels had exchanged vocal messages with a naval aviator who was flying 125 miles distant from Washington, and conversations took place between the navy head and ship commanders at Hampton Roads.

**The Alexanderson Phone.**

Last Saturday, Dr. Ernest F. W. Alexanderson, inventor of the apparatus which made possible the sending of wireless telephone messages by the Navy Department from New Brunswick, to President Wilson on board the George Washington at Brest, France, a distance of 3200 miles, described the experiments which led up to his record breaking feat.

Dr. Alexanderson, who is consulting engineer for the General Electric Company, was working on his apparatus at the New Brunswick wireless station, where the General Electric system had been installed when the navy department took charge of it during the war. Completed Since Armistice.

For a time his experiments there were held up, the General Electric system being used solely for the transmission of war and navy department wireless telegraph messages to France, but after the signing of the armistice he was able to resume his work and he was ready when President Wilson returned from France on his first trip to test his devices for transmitting wireless telephone messages.

"We have no reason to believe that 3200 miles is the greatest distance we can now send messages," said Dr. Alexanderson, "but at present we have no other means of making a greater test. The receiving apparatus on President Wilson's ship is the only one that can be used at present. We expect to make longer tests soon."

A feature of the apparatus is that it can be used for either wireless telephone or telegraph messages without alterations. This is impossible with other instruments.

There are three features of the Alexanderson apparatus, the high frequency alternator the magnetic amplifier and the multiple tuned antennae. From the mechanical and electrical standpoint, the large high frequency alternator is the

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