

Fog Warning by Radiophone

By GEORGE HOLMES

WHETHER for business or pleasure there is not one of us who would not enjoy an ocean trip to chase away our cares and worries.

Those of us fortunate to share such a luxury certainly enjoy the bright sunny decks, the beautiful skies and the fine sea air.

This is only one side tho for there are often days and nights, even weeks when storms are raging or heavy misty fogs set in, wherefore it becomes necessary for the passengers to amuse themselves indoors, in the salon, at the piano or in the smoking room swapping stories and playing cards.

ship, passengers travel with a really wonderful sense of safety compared to the olden days.

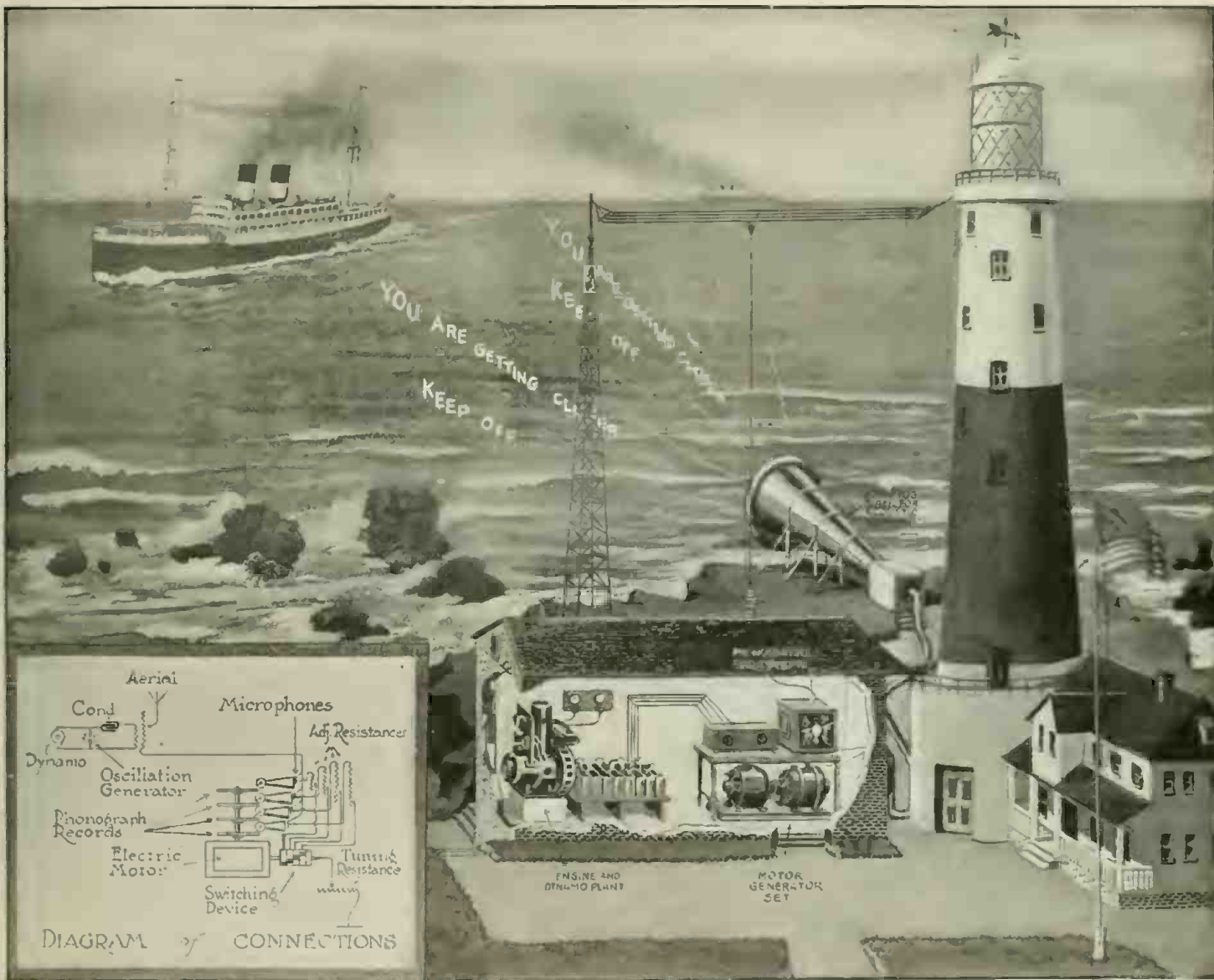
Lately a very important development in the line of radio has come to the aid of the lighthouse crews to assist in warning ships of dangerous shoals and rocks. We are indebted to the well-known radio inventor Dr. Lee de Forest, for this latest application of Radio. A short official description is given in a recent Hydrographic Bulletin issued by the U. S. Naval Hydrographic Office.

The first real test of this apparatus is now taking place at Point Judith Light

regulating it; also connecting posts for aerial and ground wires. On the side of the cabinet is a small door which gives access to the mechanism inside.

All the working parts are mounted inside the cabinet, including a motor-driven phonograph speaking directly into a microphone. The arrangement of the cylindrical records is such that they repeat automatically, the saffire needle being set back to the beginning each time after it has traveled the length of the record. Each record has an average life of about 60,000 repetitions.

The fundamental idea of this method of radiating fog warning signals, by varying



The U. S. Government is Now Trying Out the New de Forest Radiophone Fog Warning Device Here Illustrated. By This System of Warnings it is Possible to Radiate Either Wireless Telephone Signals or Acoustic Signals, the Latter Being Reproduced From a Phonograph, Amplified With Audlons, and Propagated Thru the Air From the Regular Fog Siren Horns as Shown. Each Warning Extends For a Certain Predetermined Range.

And—Oh, yes, . . . leaning over the rail for "enlightment"?

At such times as these the grizzled sea captain must worry, for on him rests the responsibility of bringing his ship and passengers safely thru the storm.

Of recent years, inventors have constantly sought to make navigation less hazardous and each year sees new improvements along these lines. What with submarine signals, automatic engine-room signals, searchlights and wireless to keep in touch with the world and safeguard the

(near Narragansett Pier) and is arranged on a very compact scale so that it can be attended to by the regular lighthouse keeper and assistant. A regulation gasoline engine connected with a 36 volt direct-current generator and storage batteries is used to supply the energy, to which is coupled a motor-generator set which operates the transmitting apparatus.

This apparatus is entirely enclosed in a very small cabinet measuring but 18x18x18 inches. On the front of the cabinet is the Oscillation bulb and necessary switches for

quantity with ranges or power, was covered in a U. S. patent issued to Dr. de Forest in 1916, number 1,183,802, on an application filed in 1908.

In the circuit diagram may be seen the relative layout of the various horns, microphones, and the commutator arrangement which permits the proper sentence to be sent in its turn.

Several other modifications of the underlying principles may also be utilized as

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approximately how many electrons there are in the nucleus but it told us *exactly* how many there are, and the result checked too with the number obtained by the foregoing approximate method. This brings me to the recent discoveries in the field of X-rays, and I will call the seventh of the modern advances the discovery of the nature of X-rays, which was virtually made by Barkla in 1904. For Barkla and others had proved that there are two types of X-rays, first, X-rays which consist in simple ether pulses pushed off from an electron when it changes its speed; and second so-called characteristic X-rays which are formed thus. When the electrons bump into a target they set something in the target into vibration, and this something sends off perfectly definite characteristic X-rays, which are like monochromatic light. So, we have two types of X-rays, pulse X-rays, like white light, and monochromatic X-rays, like monochromatic light, such as mercury gives rise to. That is the seventh of our great modern discoveries and it must be credited chiefly to Barkla.

FOG WARNING BY RADIOPHONE.

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described in Dr. de Forest's patent. The transmitting apparatus is so arranged that speech can be sent out from the large fog horns as also musical notes, bell signals, et cetera; on the same prearranged schedule as the radio signals. In this scheme the phonograph with records containing speech is coupled to a microphonic arrangement and the speech is intensified by means of amplifiers and the sound waves sent out thru the fog horns, thereby enabling the captain or other officer to hear the same without the aid of wireless apparatus.

The one big feature of the Point Judith Light equipment is that when a ship is within a range of eight miles of the lighthouse, it will hear the following words flashed by wireless every five seconds—"Point Judith Light"; and after every third repetition the warning—"You are getting closer; keep off," is sent out with a limit of range of about two miles. These signals will be sent out during fog, mist, rain, and falling snow.

When sent out by radio the signals can be heard with any suitable or well-known wireless telegraphic, or wireless telephonic receiving apparatus which may be employed to receive, detect, or reproduce the emitted or radiated signals. Crystal detectors may be used. The signals are sent out on a wave length continuously varied between 550 and 650 meters.

If the apparatus is equipt for musical note signals these will be received by a ship at sea; for instance, suppose the ship receives the note corresponding to middle "C"; then it will be known that the lighthouse is four miles away.

If both the middle "C" and the "E" notes are heard, then it will be known that the distance between the ship and lighthouse is only three miles. If the middle "C," "E" and "G," are detected at the receiving station, the distance is two miles, and if all four notes are heard then the distance away is one mile or less, and so on for any other pre-arrangement and adjustment of the apparatus.

This invention is bound to be a great help to all mariners and the system is a direct innovation over any that have heretofore been tried. Doubtless many disasters and wrecks will be avoided and in general to make navigation safer, altho probably it will not have as good a chance to demonstrate its great possibilities till after the war is over.

Every important lighthouse and light ship on the U. S. coasts will be fitted with this new Radiophone fog signal, as conditions permit the work to be carried on.

HOW AURORA BOREALIS AFFECTS TELEGRAPH AND CABLE LINES.

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appear to be due to abnormal earth currents induced in our globe, and which currents cutting across such lines, induce in them powerful transient currents of short duration.

On October 31, 1903, aurora borealis disturbances affected telegraph and telephone lines extending between Chicago and the eastern cities. On telegraph wires, without regular battery being applied at terminal offices, grounded lines showed a potential of 425 volts positive, varying to 225 volts negative; the disturbance continuing between 12:15 a. m., and 9:15 a. m.

Measurements were made with ordinary direct current voltmeters. The voltage readings were not constant or steady. The positive indication, for instance, would, during a period of 3 or 4 minutes, swing backward and forward in degrees between 200 and 425 volts. Once, however, the needle of the reversely connected voltmeter indicated negative potential; the potential increased rapidly up to 225 volts; varying then, between 100 and 225 volts negative.

The ohmic resistance of the lines was about 2,000 ohms; grounded at Chicago and Pittsburgh, Pa., and at Chicago and Buffalo, N. Y. This and the following report are presented thru the courtesy of Mr. Donald McNicol, assistant electrical engineer, Postal Telegraph Cable Company, who has given this subject much study.

With reference to earth currents and cables, the writer (Mr. McNicol) may be permitted to quote extracts from his official report of 1892, in connection with the trans-Atlantic determination of longitude. At that time there were ten cables across the Atlantic, but when earth currents set in they are not all equally disturbed; in fact, it happens that some of the cables are not affected at all. The French cable from Brest, France, to St. Pierre, Miquelon Island, (near New Foundland), seems to be disturbed the most, and again the disturbances are felt to a greater extent at St. Pierre than at Brest. It often happens that St. Pierre can send messages to Brest, but cannot receive any.

Long cables seem to be more affected than short ones, and, furthermore, the abnormal earth currents appear to travel mostly from east to west. When the aurora is visible, it is quite certain that earth currents will show themselves. Thunderstorms and they, however, do not seem to be so closely related, if, at all.

During the past season (1892), on July 16th, there was a remarkable disturbance noticed at Canso, Nova Scotia, stopping all work completely. The greatest "kick," as it is called, was given at 12:20 p. m., eastern standard time, or 5:20, Greenwich mean time. Some weeks afterwards reports came in the technical journals, from Brest, Malta, Cairo, Madras and east to Singapore of a similar disturbance on that day. Cairo, Egypt, fortunately stated the time, and from it, it was found to have been simultaneous with that of Canso.

On August 24 (1892), strong earth currents set in at Canso, and at the time there was a marked auroral display. The southern cable (Commercial Cable Company) was far more affected than the northern one. As most of the companies have two cables, they can generally get rid of the effects of earth currents by looping the



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