

# Combating the Submarine by Electrical Means

By H. Winfield Secor

THE submarine has already shown its wonderful flexibility in manoeuvring under war conditions and it has kept inventors busy right along, who have endeavored to perfect some means, electrical or otherwise, to detect the presence of such a submerged war vessel even though it be several miles away from its intended

from the aeroplane; and it would not matter whether the torpedo exploded a couple of feet from the submarine or at a considerable distance from it, as the force of the explosion is transmitted through the water to a considerable distance, owing to the (practically) incompressibility of this liquid

We have all heard, probably more or less, about these torpedoes which can thus be controlled by radio waves of different frequency. In this connection a new suggestion is made as outlined at Figs. 1A and 1B, in the form of a radio controlled torpedo, carrying an aerial as observed, and also having its "head" fitted with a powerful electro-magnet. A scheme is suggested by the writer which, though theoretical in a way, might be applied under certain conditions for the protection of a warship, and also for the purpose of searching out a harbor, etc. This scheme would operate on the principle that, to begin with, we have a powerful wireless controlling station, either on board a dreadnaught, or on the harbor shore. Wirelessly controlled torpedoes of the type shown at Fig. 1A are then employed with the strong electro-magnets attached to them as aforementioned.

Referring to Fig 1B, it is seen how four zones (and of course more zones could be provided for) are covered at different times by wirelessly controlled torpedoes, sent out from properly devised and arranged torpedo discharging tubes. It is to be noted that when the radio torpedo A is at the point shown that its mate, say at B, is opposite it, but traveling in a different direction, and that when B has reached the point X the torpedo A will have reached the point X'. This holds good also for torpedoes C and D. Thus, by sending out these radio controlled torpedoes, which can be directed and made to go in any direction desired, they are caused to search out the water for several miles in the vicinity of the ship. It is proposed that a ship would carry a net, so as to be able to pick up its returning radio torpedo without danger to itself. Tests made about two years ago in the English navy with torpedo nets proved that torpedoes could be picked up very easily by allowing them to strike the net and then picking them up by means of grappling irons.

An electrical scheme (it is said) is being used in several navies for the detection of submarines or other vessels when several miles away, which involves the use of an extremely sensitive microphone submerged under water and pivotally mounted on the side of the war vessel or dreadnaught. This device is illustrated at Fig. 2. By suitably arranging the microphone M so as to be constantly and rapidly rotated about its axis, it is seen to cover a complete circle about the ship, as indicated by the dotted line A and B. By properly constructing the microphone M and a horn on same, it

seems possible that this method would allow of detecting the sound of the machinery, and especially the propeller, of the enemy's war vessel to within a single degree of the compass. Not only does this method seem undoubtedly feasible, but also, with the several types of amplifiers now available, it is a simple matter to hook up one of these with the circuits of the microphones M and to thereby increase the activity and usefulness of this arrangement. As submarine wireless telegraphic communication is carried on by sound vibrations transmitted through the water up to a number of miles, there is no reason why this scheme should not prove efficacious in every way. Of course, suitable telephone receivers or other indicating means are connected to the microphone circuits.

In this direction of scientific apparatus for the detection of the presence of a hostile warship in the neighborhood of a dreadnaught there is often brought up a more or less logical argument by many, viz., that, having obtained the information aforementioned as to the presence of a submarine, say, then what good is this information after it has been obtained? The answer to this argument would be, it seems, that if those on board the dreadnaught are duly apprised of the fact that a submarine lies within active range of them, then they will take all necessary precautions to ward off any attack by such a vessel. It is evident, of course, that this microphone scheme, for instance, of detecting the presence of a hostile vessel would do its duty, even though the submarine is cruising under water with its periscope out of sight; and if this or a similarly efficient arrangement is not utilized, then it is certainly impossible for those on the dreadnaught, under ordinary conditions, to know of the presence of such a boat.

The dream of a great many inventors in the wireless line, including Ulivi, of Italy, has been to utilize some special form of

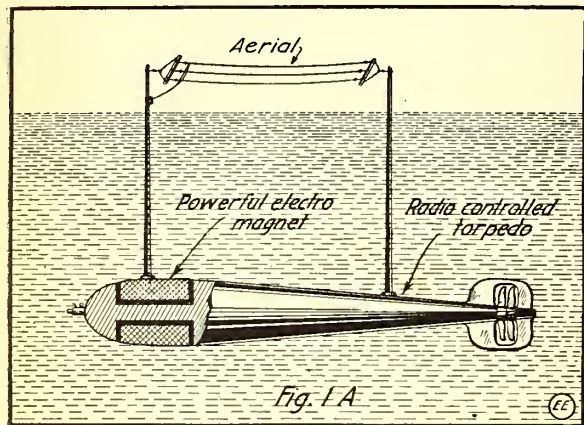


Fig. 1A. Wireless Directed Torpedo Carrying Powerful Magnetic "Head."

prey. A number of different schemes have been proposed and tried out in some instances, but without much success. In the present article some of these schemes will be considered briefly, and they include wireless and other diversified plans and arrangements.

One of the latest wireless torpedo schemes has been evolved by a Mr. Gardiner, of Fleetwood, England, and our front cover depicts his scheme in a graphic manner. Simply explained, his arrangement is as follows

An aeroplane, it has been found, can see a submarine when submerged even 150 feet below the surface of the water. It carries a powerful wireless set, and its means of destruction, as regards a submarine cruising under water constitutes a powerful torpedo which propels itself under water and is subject to the wireless control of the man in the aeroplane. The wirelessly controlled torpedo in this case is suspended by proper wires or cables from a non-sinkable float, the latter carrying suitable antennae to pick up the wireless control waves as sent out from the aeroplane flying overhead.

This idea of Mr. Gardiner's has been very favorably received in England, and it is said that it will shortly be tried out by the English Admiralty. This scheme seems to hold good promise, as is evident in view of the known facts in the case, viz., that it is possible for an aeroplane scout to see a submerged submarine boat many feet under the water, and also that there are successful wirelessly controlled torpedoes existing at this time. Therefore, this invention seems indeed practical, and when the aeroplane scout spots a submarine coming along under the water, he sends out a proper wireless control wave, which causes the non-sinkable float and its attached torpedo to proceed directly toward the submarine. Also it is possible to control by wireless waves suitable mechanisms, such as take-up drums, on the torpedo, so as to cause same to rise or descend. Ballast tanks might be thus controlled for the purpose. The explosion of the torpedo could be, firstly, by concussive contact in the usual manner, or, secondly, it could be exploded by wireless means

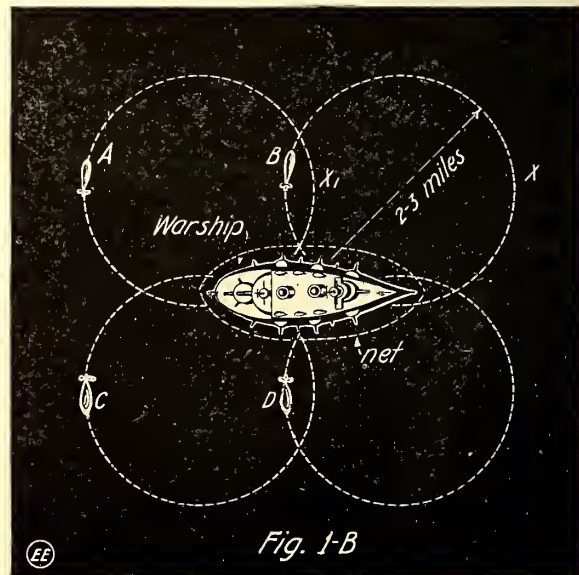


Fig. 1B. Scheme for Protecting "Dreadnaught" from Submarine with Several Radio Directive (Scouting) Torpedoes.

wireless ray or wave which could be directed toward a submarine or war vessel of any type, and that would cause the powder magazines of same to explode, thereby destroying the hostile vessel.

Ulivi's scheme was demonstrated, it is



claimed, before bona fide naval authorities of several foreign governments, but it has since been stated in several instances that the tests were a hoax and, moreover, that he could not produce the effect he claimed to have achieved with the apparatus employed. Several of the best radio authorities and scientists in this country and abroad have since gone on record as stating that it is indeed very doubtful if there ever

rheumatism treated by driving a 10 per cent. solution of sodium salicylate directly into the joints with the electric current. The effect was found to be superior to that with internal administration of the drug.

Excellent results in the treatment of chronic nose and ear disease and sinusitis are reported by Friel. A 1 per cent. solution of zinc sulphate, with a current of two or three milliamperes, was used at a 10-minute sitting and repeated at eight of 10-day intervals. Sometimes a single sitting completed the cure.

About half of the cases of sinusitis thus treated were cured and a large proportion of the middle-ear cases. Kowarschik says the eye and ear affections seem to offer a specially favorable field for diathermy, as also malignant growths of all kinds.

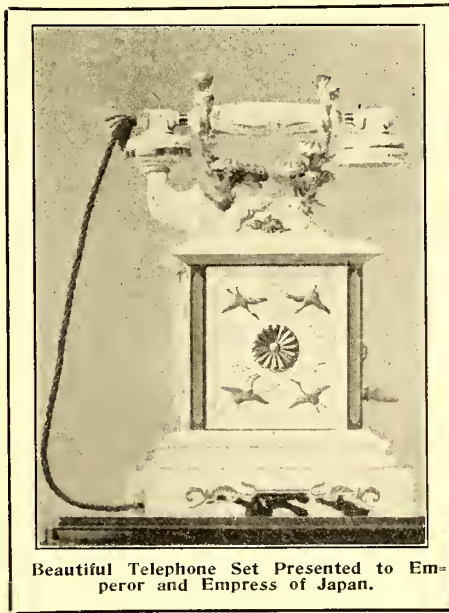
**RADIO TIME SIGNALS SENT 4,250 MILES.**

The wireless signals sent out by the United States Naval Observatory at Washington have been caught as far away as a point 600 miles north of Rio de Janeiro, which is 4,250 miles from the Government station. Watchmakers, jewelers and colleges throughout the country have installed apparatus for catching the signals. In the past year the daily error in transmission ranged from .055 second to .36 second, due to a change of rate in the standard sidereal clock in consequence of overhauling.

The observatory is seeking an appropriation from Congress for more efficient sending apparatus, declaring that the increased use of the signal for astronomical and other purposes requires a higher degree of precision.

**ELABORATE JAPANESE TELEPHONE SET.**

The illustration here portrays a very beautiful and odd telephone desk set, deco-



Beautiful Telephone Set Presented to Emperor and Empress of Japan.

rated with ivory, gold and silver, and which cost about \$3,500 to build. This set is illustrated by courtesy of the Western Electric Co.

This very elaborate telephone instrument was presented to the Emperor and Empress of Japan at the time of their marriage.

Some of the Japanese telephones are works of art, but in America we are content to have one standard of finish for our telephones, which makes for maximum efficiency as to talking qualities as well as wearing qualities.

**RUBBER PRODUCED ARTIFICIALLY BY ELECTRICITY.**

By Frank C. Perkins.

Our illustration shows the electrical equipment by means of which a Cleveland doctor believes rubber can be produced



Electrical Apparatus with Which It Is Claimed Substitute for Rubber Has Been Made.

artificially, the chief ingredient of the product being coal tar.

Dr. Lyman A. Noble, an electro-therapist, has declared he has discovered a formula by which a substitute combining all the qualities of natural rubber can be produced. For nearly a year Dr. Noble has been experimenting with ingredients and processes for the production of artificial rubber.

In the process he uses a high frequency electric current. In his first experiments he sought to produce rubber by evaporating the liquid combination of ingredients. This did not produce the desired result, and in addition to the evaporation process he conceived the idea of submitting the liquid to the high frequency current for an extended time—six hours—and the result was obtained.

It is stated that from 200,000 to 500,000 volts of electricity of high frequency is necessary to produce the rubber. With a current of 1,000,000 volts the time would be greatly cut down, he states.

The various ingredients are mixed, by secret formula, into a liquid which, under heat, is evaporated down to one-quarter of its original mass. When it has reached a consistency of a thick syrup the mass is placed in a metal retort and connected with a high frequency electrical machine used by Dr. Noble, and the retort forms one pole while the other pole is suspended in the liquid. The current is turned off after six hours; the retort contains a black, spongy substance with all the qualities, it is claimed, of natural rubber. A series of tests show that the product resists both wear and punctures to a greater degree than regular rubber.

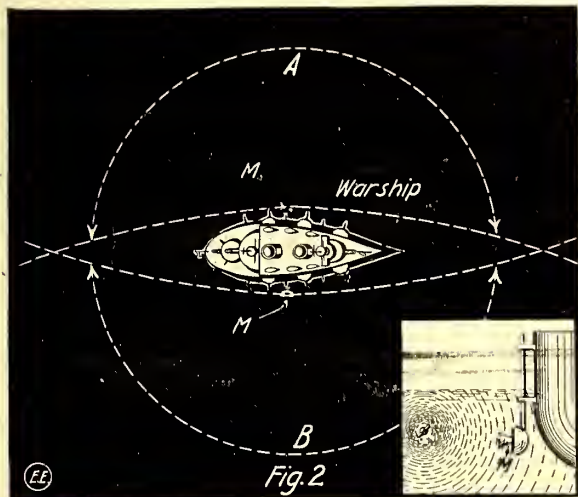


Fig. 2. Super-Sensitive Microphone Picks Up Sound of Submarine's Propeller and Machinery. Note Sound Waves (in Insert) Striking Microphone.

will be such a "wireless ray" perfected which would explode a submarine or the powder magazine in a dreadnaught. This seems, in the writer's opinion, to be the conclusion, reached in any event along this line of research, as in all cases the explosive is encased in metallic shells which are highly impervious to radio waves. Even if such waves do induce (as we know they can) minutely small local currents inside of the metallic shell encasing such explosives, they, as tests have often demonstrated, circulate around the shell and in some rare cases do produce a small spark between two sections of such encased metallic shells where they are not joined together firmly and metallicly.

However, and even though this effect is possible, it should be remembered that at a distance of a few miles, even, the energy so produced and localized in a metallic body or shell by wireless waves radiated from a central station is very small. Undoubtedly, from what has been published of Ulivi's work, this effect is what he intended to utilize in his marvelous ray that would blow up all the battleships in the world. If Ulivi had succeeded in his arrangements and apparatus they would undoubtedly have been employed long ago. So there are still good opportunities for some bright genius to bring forth a successful combatant for the modern terror of the seas, "the invisible submarine."

**ON CURING ILLS BY ELECTRICITY.**

A distinguished European physician, Kowarschik, declares that we are entering on a new era in the field of electrotherapy, as the mechanical technic has been so perfected, while our knowledge of the biologic and therapeutic action of electricity has been deepened in recent years.

The theory of electrons and ions has provided a scientific basis for therapeutic action, a basis more solidly planted, he insists, than we have for the action of most of our drugs. Among the favorable accounts of ion treatment published recently is that of Aufaure with acute and sub-acute articular