

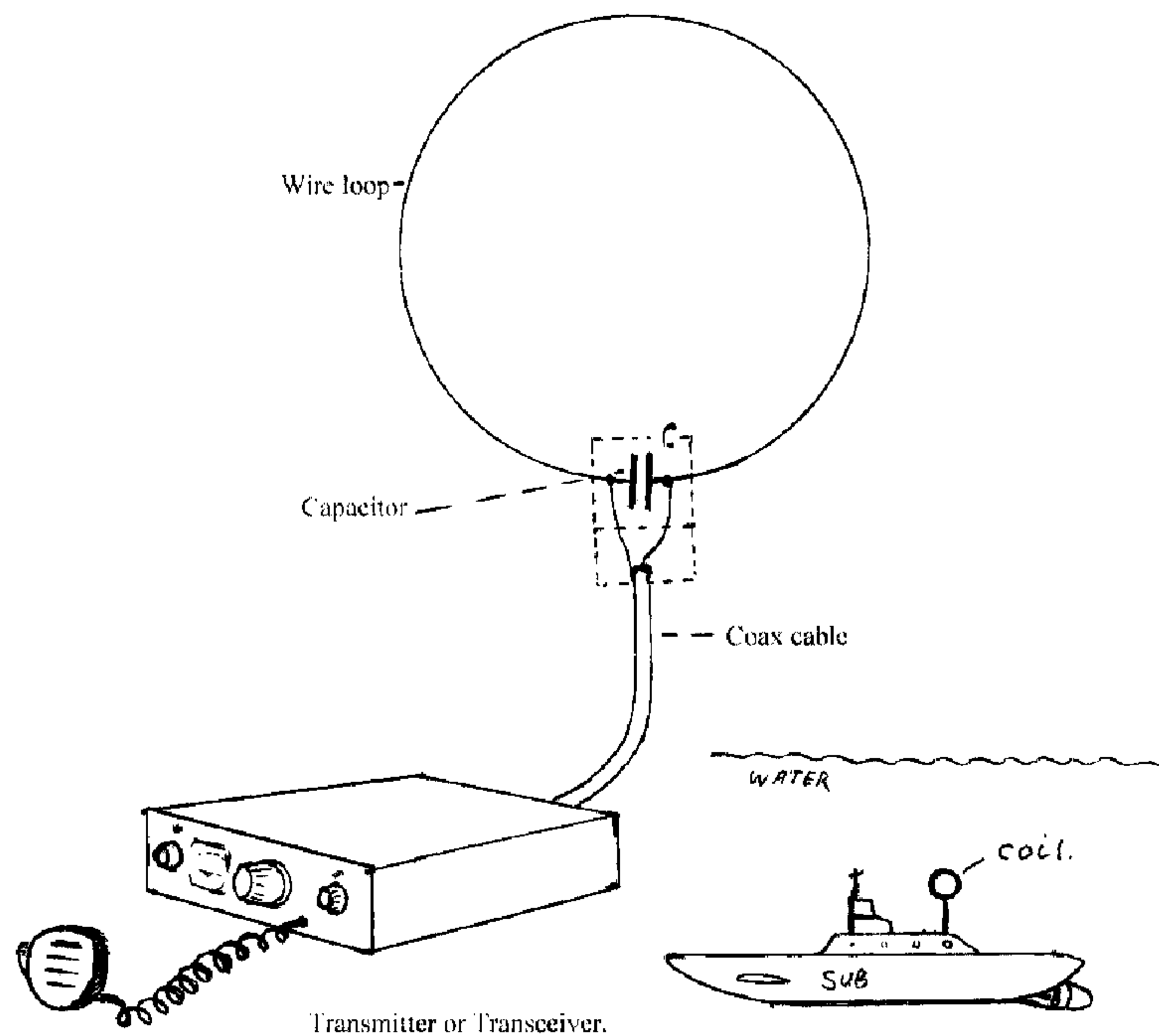


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(54) Titre : SYSTEME DE COMMUNICATIONS PAR CHAMPS MAGNETIQUES SOUS-MARINS  
(54) Title: UNDERWATER MAGNETIC FIELD COMMUNICATION SYSTEM

**Magnetic Field Transmission Communication System.**



The capacitor C is either tunable or has an additional tunable capacitor connected in parallel. Both the coil and capacitor have to be insulated from the water. The capacitor should be in a small container to prevent water from entering into it.

(57) **Abrégé/Abstract:**

I feel there is a need for submarines to communicate effectively with other submarines ships and airplanes. The same invention can also be used for trapped miners to communicate with their rescuers. If for a moment we oversimplify it, the invention is basically a

**(57) Abrégé(suite)/Abstract(continued):**

radio transmitting and receiving antenna system that works under water as well as above it and attaches to standard radio transmitting and receiving equipment. Its purpose is primarily that submarines can communicate with other submarines, even robot submarines, ships, as well as aircraft flying overhead or even land based stations. Whether the submarine is submerged or surfaced should make no difference in transmission or reception of radio signals except for a slight difference in the tuning of the transmitting system. The system also works underground up to a point depending on the distance and radio frequency used. This is basically in a nutshell what it's all about. Unlike other systems in use at present, which work on sound which is plagued by echoes, or the electrical conductivity of water that limits its use to water only, or in some cases in one way transmission only, my system has no such obstacles and even can be used for TV transmission.

**Abstract****What is its purpose of my invention?**

I feel there is a need for submarines to communicate effectively with other submarines, ships and airplanes. The same invention can also be used for trapped miners to communicate with their rescuers.

If for a moment we oversimplify it, the invention is basically a radio transmitting and receiving antenna system that works under water as well as above it and attaches to standard radio transmitting and receiving equipment. Its purpose is primarily that submarines can communicate with other submarines, even robot submarines, ships, as well as aircraft flying overhead or even land based stations.

Whether the submarine is submerged or surfaced should make no difference in transmission or reception of radio signals except for a slight difference in the tuning of the transmitting system. The system also works underground up to a point depending on the distance and radio frequency used. This is basically in a nutshell what it's all about.

Unlike other systems in use at present, which work on sound which is plagued by echoes, or the electrical conductivity of water that limits its use to water only, or in some cases in one way transmission only, my system has no such obstacles and even can be used for TV transmission.

## **Disclosure**

### **How does the magnetic field transmission system work?**

Although any other name could have been used, magnetic field transmission simply implies transmitting with a magnetic field instead of an electromagnetic wave. The build up of the magnetic field is not subject to the speed of light as a wave is, but depending on the circumstance in general is faster or higher, in other words it is not directly linked to the speed of light, but depends on the speed with which the magnetic force lines build up and it can as a result also penetrate substances like water.

A simple way to explain how the system works, is to compare it to an electrical transformer, or better yet a transformer with the iron core left out, in other words an air core transformer. The more the primary winding and secondary winding are spread apart or separated from each other, the less energy is transferred to the secondary winding. However one has to keep in mind that we are not interested in how much energy can be transferred, only over what distance an intelligent signal can be transmitted in this manner.

Basically the transmitting coil acts as the primary winding and the receiving coil acts as the secondary winding. In simple terms, the principle is the same as used in an electrical transformer, the transmitting coil generates a magnetic field which in turn induces an emf (electromotive force) in the receiving coil, in other words the alternating magnetic field is turned back into an electrical current again which carries the information.

From a scientific point of view the principle in itself is nothing new and is used in various ways, except that I have made use of this well known principle and developed a communication system for submarines which as yet has not been made use of by others.

**Claims.**

**“The embodiment of the invention in which an exclusive property or privilege is claimed are defined as follows.”**

**Description of the device.**

The device is an electrically ( plastic or rubber) insulated metal ring of copper or aluminum ( Drawing Fig 1.) which is open ended one side and has an electrical capacitor connected across the ends of the metal ring. It has also a short wire connected to each end of the ring which then feeds to a coax cable or conventional radio transmitter output circuit directly. (The radio transmitter is not part of my invention, only the device is my invention , which like an antenna attaches to the transmitter.)

For best results I have found that the coil should be approximately between 1/30 to 1/40 of the wavelength of the transmitter frequency. An exact size is not critical since it is compensated for by the capacitor.

One could define the device as an underwater antenna system, however one has to keep in mind that regular transmitting and receiving antennas do not work under water and this is basically where the similarity ends.

A regular transmitting antenna generates an electromagnetic wave which propagates with the speed of light and is composed of a magnetic field and an electrostatic field. Theoretically an electromagnetic wave continues on forever except that its intensity drops below the noise level where it cannot be detected any more.

My device generates a pure magnetic field only and as a result is not subject to the same principles such as the speed of light. Furthermore it suppresses the electrical component which is necessary to generate a standard radio wave. In general the system can be mounted with an appropriate support structure almost any place sufficiently far enough away from the ship's hull

**What makes the transmitting device work under water?**

From a theoretical point of view a magnetic field whether continuous or alternating is not governed by the same principles as a wave is. The build up of a magnetic field could be considered instantaneous, but it is nevertheless subject to the impedance of the coil, or in this case the coil and capacitor which so to speak governs its speed.

Furthermore the magnetic field lines always form a closed circuit, regardless how far they reach, they must always return to their point of origin. Near the coil the magnetic lines of force are very densely packed, but the farther away we move from the coil the less dense the field lines become.

It is a well known fact that the Earth's magnetic field penetrates water, earth or soil and even rock. Likewise an alternating field even at the radio frequency range also penetrates water and so forth. Metals and electrically conductive materials cannot be penetrated by alternating magnetic fields because an opposing current is set up that prevents penetration.

My experiments have shown very good results in water, salt water has only shown a slight attenuation of the signal.

## **On what grounds do I call it an invention, when it's nothing more than a coil of wire and a capacitor ?**

Unfortunately this may be a decision which I have no control over, but let me start out by saying that an invention is not rated by how complex it is, but rather on what it does. There are no underwater radio antennas that I know of, even so, my system could also be rejected on the assumption that there is insufficient proof that it really works.

But let me say in my own defense, if I were to put the transmitting system into a black box so to speak and give a demonstration, everyone seeing it would definitely call it an invention, because there is nothing on the market like it. However the moment I open the box there is this big disappointment and someone will say "You mean this capacitor and piece of wire is your invention? So which part did you really invent the capacitor or piece of wire?" My answer would have to be: neither, it's only the way they are hooked together the size of the capacitor and the proper diameter of the coil.

To give an example, the telescope was invented by a young boy who one day exclaimed, "If I hold these two lenses like this it brings the church steeple closer." Hans Lippershee examined this very closely and as a result the telescope was invented. We may give Galileo the credit for inventing the telescope, but the credit should go to the boy, even though he did not grind a lens much less invented the glass lens. The way the two are put together is what makes the invention.

To give an other example a tuned electrical line can be nothing more than a bent piece of wire or metal strip on a circuit board, yet it controls the frequency of an oscillator or acts as a tuned circuit to select the frequency of a radio receiver. Even though it is nothing more than a bent piece of wire it is still an invention since it replaces the common resonant circuit.

In my case we could simply call the wire loop and capacitor a regular resonant circuit and not regard it as an invention at all, however we have to keep in mind that almost any length of wire with the proper capacitor will transmit a signal when hooked up to a radio transmitter, but unless it is the proper size it will not efficiently generate a pure magnetic field that sufficiently penetrates water. The invention basically lies in the length of wire and the way it is used, but most of all it lies in the idea to make use of magnetism instead of a regular radio wave. For example the Marconi or Hertz antenna are nothing more than wires of proper length, yet they have been patented.

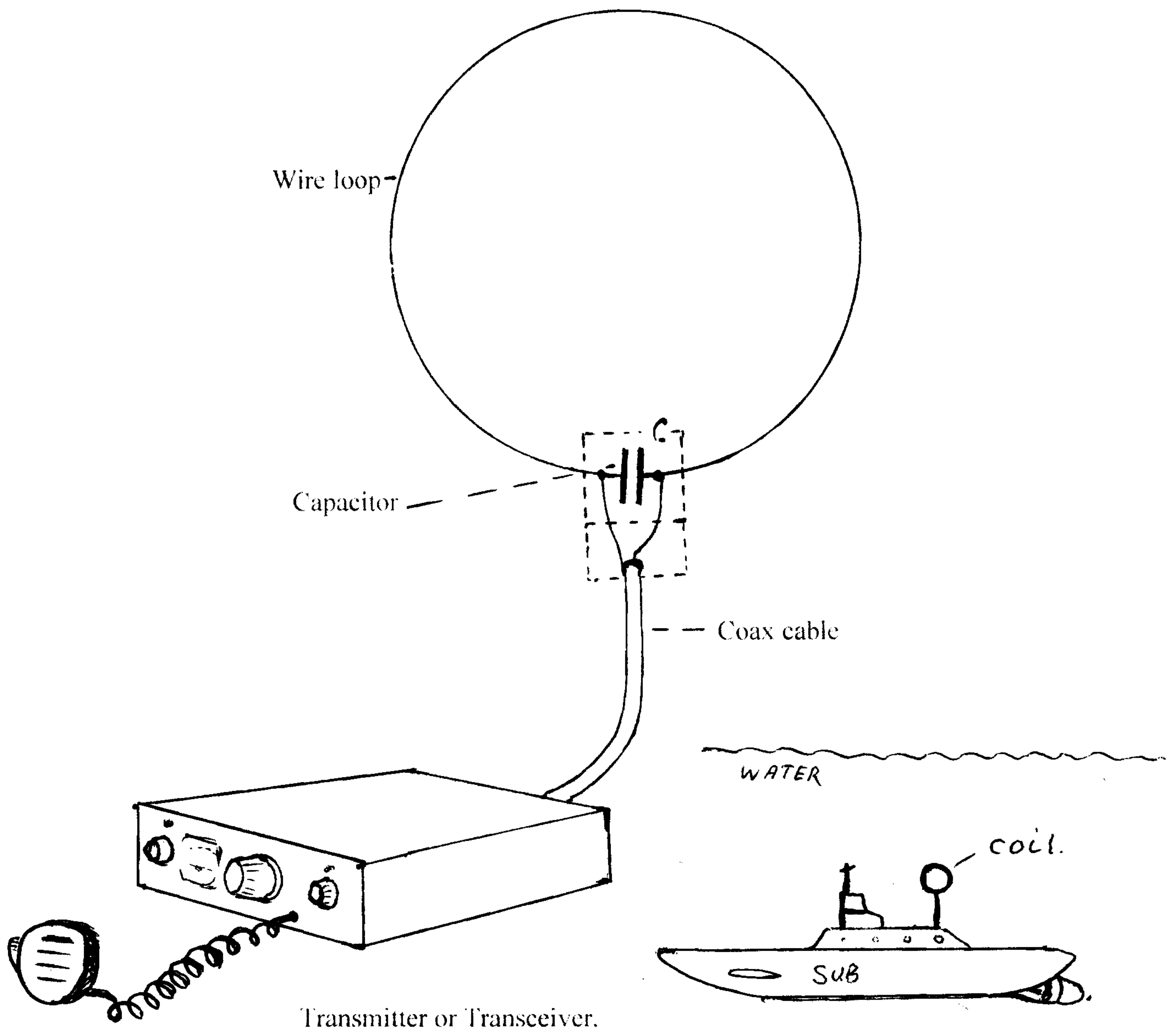
When reviewing my application I hope you take into consideration the good it can do or the lives it can save in the future. I also hope that you do not judge it on the basis that the individual parts do not make an invention, but on the fact that when all the individual parts come properly together nothing of this kind exists as yet, and that is what makes it an invention

I believe that the public and our armed forces need this invention. I do not have the means to develop my invention on a large scale such as communicating with submarines on the bottom of the ocean. I have tried to approach several people, but so far everything I said has fallen on deaf ears. I am not interested in any financial gain, but without a patent I cannot bring the idea to life.

“The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:”

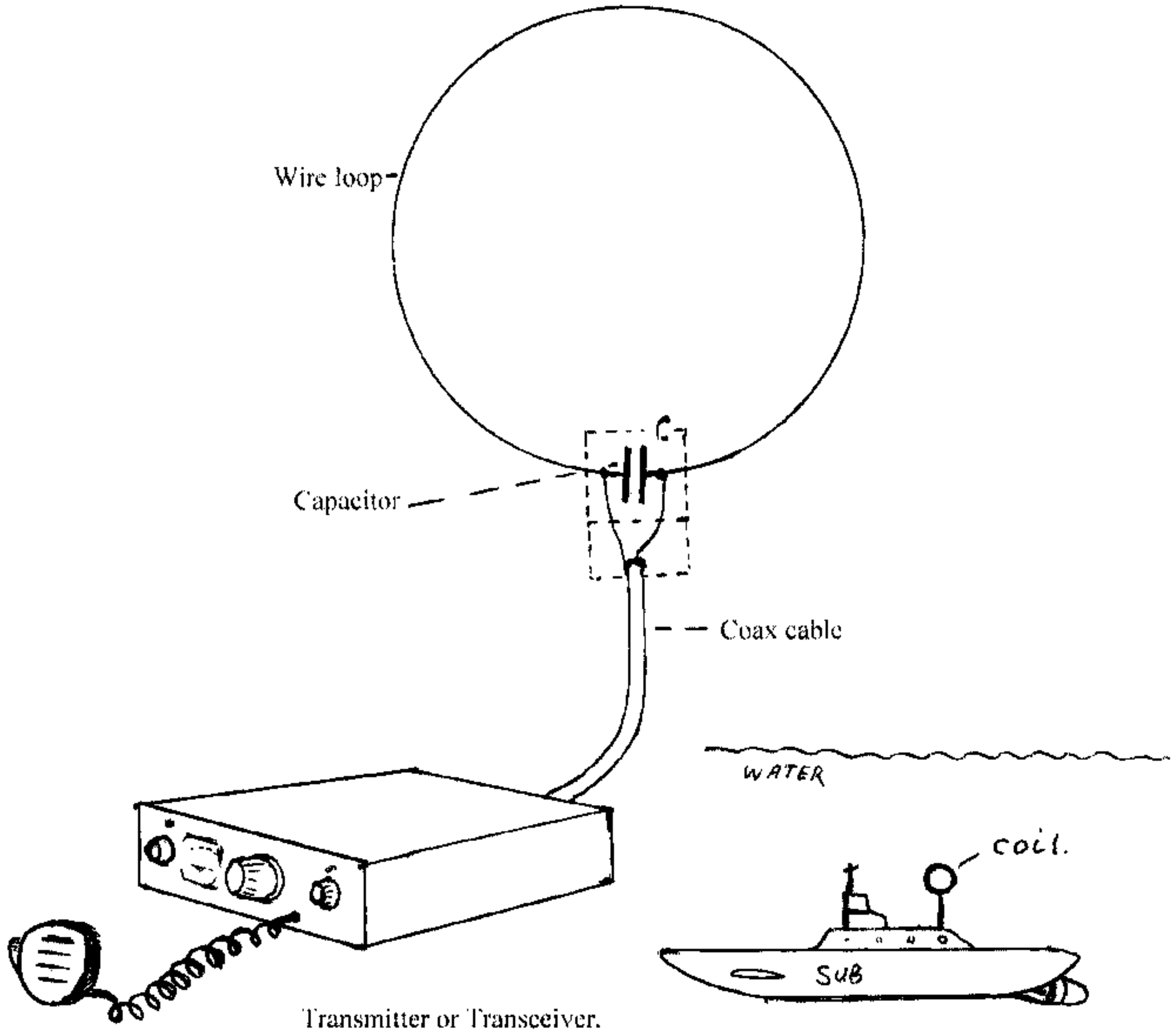
1. A device which enables submarines when fully submerged to communicate with others, using conventional radio communications equipment, such as a regular CB radio transceiver in conjunction with said device comprising a single wire loop coil antenna, a tuning capacitor connected in parallel with the coil antenna, both linked to the transceiver with a coax cable.
2. The device as described in Claim 1, when properly hooked up to regular radio communications equipment and electrically insulated from the water will transmit an alternating magnetic field through the water which can be received by an identical system when switched to the receive mode.
3. The device defined in Claim 1 and Claim 2 is based on the principle that electrically generated alternating magnetic fields penetrate water.

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