Electric Submarine Forts to Destroy Submarines

A NOVEL method of destroying the stealthy submarine is here illustrated and described. It is the invention of Mr. H. Hartman, a consulting engineer of New York City, whose Submarine Camera, Electric Speaking Clock, Automatic Electric Light Buoy, Automobile Direction Signal, *et cetera*, have been described and illustrated in previous numbers of THE ELECTRICAL EXPERIMENTER.

The present invention relates to a Submarine Exploration Device which originally has been intended only for the purpose of conducting submarine exploration and salvage operations at such depths of the sea which are beyond the reach of a diver, but this device can also be adapted successfully for warfare against enemy submarines and especially for the protection of entrances to harbors, rivers, bays and more or less narrow water-ways as well as for the defense of vital parts of the coast.

This device, on which the U. S. Patent Office has granted letters patent to Mr. H. Hartman, consists mainly of a vertically arranged strong steel cylinder of 25" to 30" inner diameter which can be closed water-tight at the top, providing sufficient room for an operator and also containing within special compartments a powerful electric search-light, a storage battery, a photographic camera, the appliances necessary for the absorption of the carbon dioxid exhaled by the operator as well as for supplying the oxygen required to revitalize the air within the operator's chamber, and a number of instruments like water-pressure gage, volt and ammeters, switches, telephone, etc.

Attached below the main cylinder is an auxiliary casing, closed watertight and containing a second storage battery for the purpose of overcoming the buoyancy of the main body. This auxiliary casing can be dropt at will by the operator in case of emergency; for instance, if the wire rope from which the whole device is lowered into the water should break, in which case the main body would rise by buoyancy to the surface of the water.

Furthermore, there is provided at the rear of the main cylinder an electrically operated screw propeller which will rotate the whole suspended (or anchored) unit round its vertical axis if desired by the operator. The main cylinder is divided into three separate compartments as is shown in the picture. The lowermost compartment contains a storage battery of high capacity and sufficient evacuated space to take up any gas which the battery may develop during its discharge action.

Hermetically sealed from this compartment follows the operator's chamber in which a man may comfortably ride on an elastic saddle and observe the surrounding waters thru a system of heavy lenses which are set carefully and watertight into the steel cylinder. To illuminate the water a very powerful electric searchlight is arranged within the next or top compartment, which in its turn is also divided from the operator's chamber by a water-tight partition, so that no water can enter the same in case that the large lens thru which the light is projected into the water should break under the high pressure prevailing at great depths. The water-tight cover of the main cylinder contains a special cooling arrangement which is required, as otherwise the heat emanating from the light projector would rise to a dangerous degree, which could cause the bursting of the large lens; nevertheless the same is protected by an inner circle of transparent mica with small openings thru which the heated nitrogen gas, filling this compartment, may only gradually and slowly circulate before striking the large lens which is cooled from outside by the icy waters of the depth.

The operator can not only swing the light projector under different angles by means of electro-magnets but also rotate the whole device slowly round its vertical axis and incline the same to a certain degree and observe the surrounding water in every direction. A telephone connection, whose insulated conductors are embedded into the core of the wire rope from which the device is suspended into the water, permits the operator to remain in constant communication with his mother ship and to report at once everything he sees and also to direct salvage operations, when so used. The submarine fort can also be anchored as shown, the top cable running to a submerged buoy. A string of these forts could be placed across the entrance of a harbor or bay.

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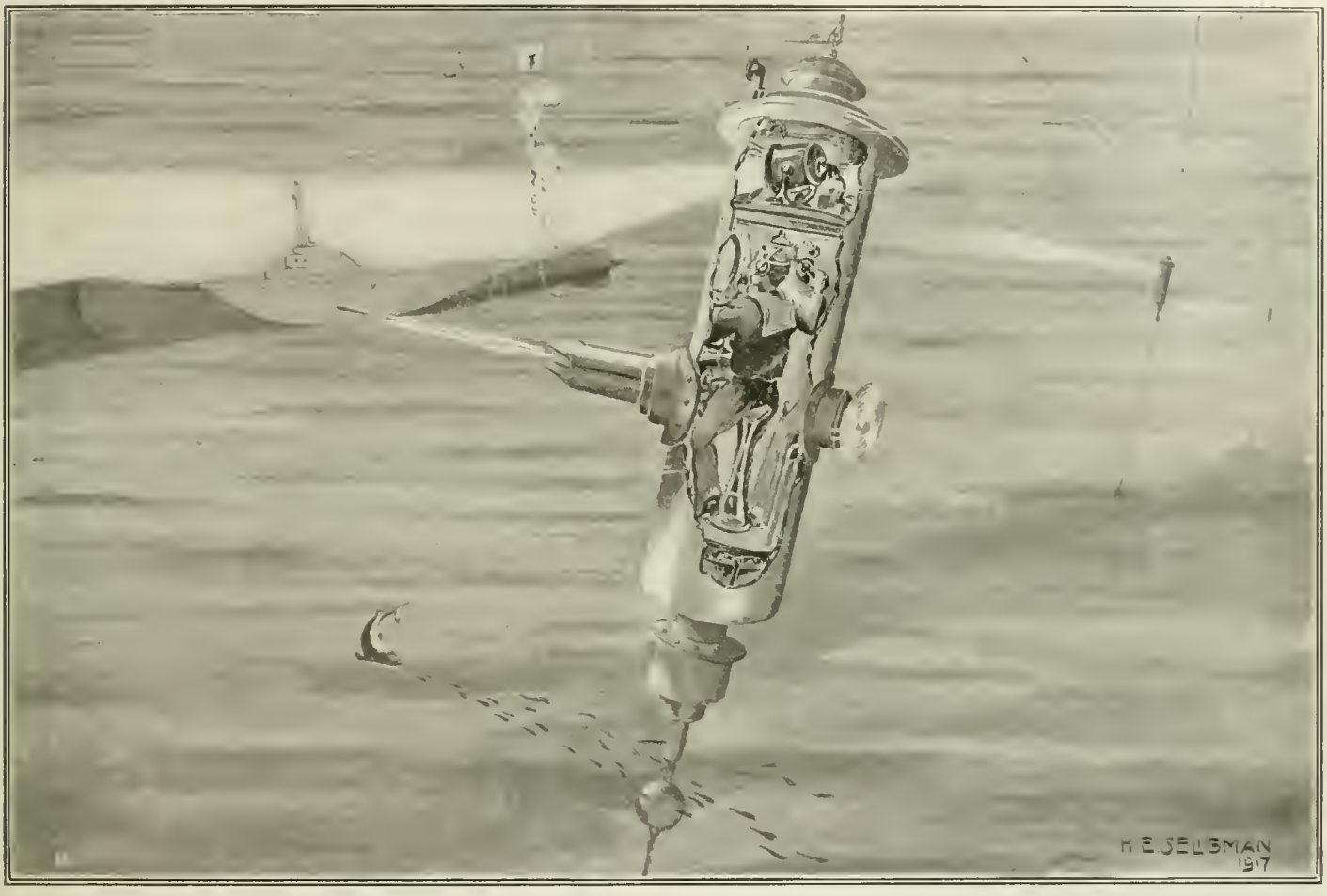

"Why Not Mine Harbor Approaches and Other Shallow Waters with a Series of Submarine Forts Like Those Here Shown?" Asks a New York Inventor. They Would Carry Powerful Sub-sea Searchlights, Microphones, Telephone (Connecting with Shore Station), and Special Torpedo Tubes for Torpedoing the Enemy Submarines, Should They Come Within Range.

TESLA'S VIEWS ON ELECTRICITY AND THE WAR.

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"At the time of those tests I succeeded in producing the most powerful X-rays ever seen. I could stand at a distance of 100 feet from the X-ray apparatus and see the bones of the hand clearly with the aid of a fluoroscope screen; and I could have easily seen them at a distance several times this by utilizing suitable power. In fact, I could not then procure X-ray generators to handle even a small fraction of the power I had available. But I now have apparatus designed whereby this tremendous energy of hundreds of kilowatts can be successfully transformed into X-rays."

"Could these ultra-powerful and unusually penetrating X-rays be used to locate or destroy a submarine with?" I interjected.

"Now we are coming to the method of locating such hidden metal masses as submarines by an *electric ray,*" replied the electrical wizard. "That is the thing which seems to hold great promises. If we can shoot out a concentrated ray comprising a stream of minute electric charges vibrating electrically at tremendous frequency, say millions of cycles per second, and then intercept this ray, after it has been reflected by a submarine hull for example, and cause this intercepted ray to illuminate a fluorescent screen (similar to the X-ray method) on the same or another ship, then our problem of locating the hidden submarine will have been solved.

"This electric ray would necessarily have to have an oscillation wave length extremely short and here is where the great problem presents itself; *i.e.,* to be able to develop a sufficiently short wave length and a large amount of power, say several hundred thousand or even several thousand horse-power. I have produced oscillators having a wave length of but a *few millimeters.*

"Suppose, for example, that a vessel is fitted with such an electric ray projector. The average ship has available from say 10,000 to 15,000 H.P. The exploring ray could be flashed out intermittently and thus it would be possible to hurl forth a very formidable beam of pulsating electric energy, involving a discharge of hundreds of thousands of horse-power. The electric energy would be taken from the ship's plant for a fraction of a minute only, being absorbed at a tremendous rate by suitable condensers and other apparatus, from which it could be liberated at any rate desired.

"Imagine that the ray has been shot out and that in sweeping thru the water it encounters the hull of a submarine. What happens? Just this:—The ray would be reflected, and by an appropriate device we would intercept and translate this reflected ray, as for instance by allowing the ray to impinge on a phosphorescent screen, acting in a similar way to the X-ray screen. The ray would be *invisible* to the unaided eye. The reflected ray could be firstly, intercepted by the one or more ships in the fleet; or secondly, it would be possible for the ship originating the ray to intercept the refracted portion by sending out the ray intermittently and also by taking advantage of what is known as the *after-glow effect,* which means that the ray would affect the registering screen an appreciable time after its origination. This would be necessary to allow the ship to move forward sufficiently to get within range of the reflected ray from the submarine, as the reflection would not be in the same direction as the originating ray.

"To make this clearer, consider that a concentrated ray from a searchlight is thrown on a balloon at night. When the spot of light strikes the balloon, the latter at once becomes visible from many different angles. The same effect would be created with the electric ray if properly applied. When the ray struck the rough hull of a submarine it would be reflected, but not in a centrated beam—it would spread out; which is just what we want. Suppose several vessels are steaming along in company; it thus becomes evident that several of them will intercept the reflected ray and accordingly be warned of the presence of the submarine or submarines. The vessels would at once lower their nets, if so equipt, order their gun crews to quarters and double the look-out watch. The important thing to know is that submarines are present. Forewarned is forearmed!

"The Teutons are clever, you know; very, very clever, but we shall beat them," said Dr. Tesla confidently. [*It may be of interest to our readers to know that several important electrical war schemes will shortly be laid before the War and Navy Departments by Dr. Tesla, the details of which we naturally cannot now publish.*]

BLINDING THE SUBMARINE.

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foredoomed to failure. To counteract strong sunlight on a silvery dazzling ocean requires a very strong light as every sailor knows. Also if the periscope is two or more miles off, a small searchlight would hardly be noticed by the U-boat commander, even if trained full on him. For that reason only a very powerful light will do. Perhaps large parabolic mirrors to reflect the sunlight could be used with fair cloudless skies, for there is no stronger and more blinding light than sunlight. On a clear day this would be perhaps preferable to using electric searchlights. At any rate the plan is not an expensive one and is certainly worth trying, foolish and idiotic as it may appear at first.

However, most of our everyday, mechanical reasoning is faulty. For thousands of centuries people fled in terror from lightning. No "sane" person up to Benjamin Franklin's time could have been induced to remain in a house where there was a good chance for lightning to strike. Most preposterous of all, no one would have been crazy enough to deliberately seek shelter in a house where he knew in advance that the lightning would strike, nine chances out of ten. The idea, of standing right under the lightning for protection!! Nevertheless people got over their foolish notions when Benjamin Franklin began sticking lightning rods on their houses. Today the lightning-rod protected skyscraper is hit frequently by thunderbolts, and people are so used to it that they much rather stay in a skyscraper than venture into the open during an electric storm. It is safer right under the lightning.

It is just so with the searchlight plan outlined above. Its very *apparent* danger is its safety. Think it over.

WOMEN RADIO OPERATORS TO AID UNCLE SAM.

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charge of the Western Union's branch in the Leader-News building is supervising instructor in the telegraph room, and a real efficient pedagog she is, too.

Applicants for membership are required to give their vocation, their own and parents' nationality, their residence in the city, and education. The application blank states, however, that the applicant incurs no obligation. There is no expense whatever attached to the training. If women are placed thru their training in railroad service, it will doubtless require that they leave the city and take up work in small railroad stations. At least, that will be where the shortage of men employees will be most felt. Mr. Newman expects to have at least one hundred telegraph operators and a score of wireless operators qualified to take positions at the expiration of the present terms.

ELECTRIC SUBMARINE FORTS TO DESTROY SUBMARINES.

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Ordinarily the device would be lowered into the sea from on board of a suitable vessel after the storage batteries are charged, the operator took his seat and the cylinder has been closed carefully watertight from outside. Suspended from a wire rope the steel unit would slowly descend to the bottom of the sea and the operator would himself feel nothing of the ever-increasing pressure of the water, but could comfortably observe his surroundings by turning on the light projector and rotating the device round its vertical axis. Through the telephone he would at all times remain in direct contact with the vessel, could at any moment stop the lowering of the device, the shock of which when striking the ground would be absorbed by a shock absorber arranged at the bottom of the device and ending in a ball, and arrived near a sunken vessel he could conduct and direct by means of the telephone any possible salvage operations.

For military purposes, however, this device can be adapted to contain at the same point in place of the camera a special arrangement of short torpedo tubes, each of which contains a special short-range torpedo which can be discharged at any moment by the operator simply by pressing a corresponding electric button, as soon as he detects a passing submarine and has his device adjusted in the right direction.

For such protective and defensive purposes the inventor believes that a number of such cylinders submerged across a given water-way, across the entrance to the harbor of New York, for instance, would doom to destruction any enemy submarine which would attempt to pass thru submerged. Each device could be connected to a floating buoy and anchored from the bottom of the bay from a special heavy casing which would contain an electrically operated drum upon which sufficient cable would be wound to allow the operator to rise to the surface and which would be controlled by the operator thru a special switch. Thus the operator could constantly oscillate slowly up and down under the water and rise every twelve hours at a certain time to the surface. A small vessel could at the same hour pass from one buoy to the other, open the cylinder as soon as its top would appear above water, let the operator out and another take his place. Where it is possible the electric current necessary could be supplied by an electric cable running from shore to all anchors and up into the devices in place of the storage batteries and also telephone connections could be established in the same way between all cylinders submerged and a coast station (fort) so that the operators could report at once everything of importance.

"Submarine chasers may be of great value," says Mr. Hartman, "but they have to limit their field mainly to the surface of the water as they cannot see a submarine which is running submerged at a certain depth; especially at night-time. It is more easy for a submarine commander to see the shadow of any dangerous small craft from below the water thru special lenses than to see the submarine at a certain depth."