# New Electrical Ideas on Submarines and Torpedoes

THE busy war inventors have been bombarding the Patent Office at Washington with hundreds and even thousands of more or less ingenious ideas on improvements in submarine warfare. Some of the latest endeavors of Yankee inventors in this branch of naval science are here illustrated and described.

The first idea represents what its inventor —August S. Trautman—prefers to call "a submarine safety and observation device." His invention purports to provide a combined life-saving and observation chamber which is normally housed within a suitable compartment on board the submarine. When the submarine happens to become disabled thru a naval engagement or otherwise, or in the event that the commanding officer should want to ascertain whether any enemy war vessels were in the immediate neighborhood before rising to the surface, it then becomes possible to have an observation officer enter the buoy chamber shown, thru suitable water-tight doors; when the buoy chamber is opened to the water the buoy then rises to the surface.

The buoy is at all times under control by the submarine by means of a steel cable attached at one end to the bottom of the buoyant chamber and at the other end to a motor-driven windlass on board the submarine. A telephone and electric light cable is also unreeled with the buoy as it rises to the surface, so that the observation officer can at all times communicate directly with the submarine commander below.

As the inventor points out, his device can be made large enough to hold several men instead of but one, for the purpose of saving the crew's lives, and it is not at all difficult to arrange the apparatus so that the life-saving buoy could be hauled down to the submarine several times in order to remove all of the crew in case of disaster. The buoy could be designed sufficiently strong and provided with a sufficient length of cable to enable it to rise thru a depth of water of two hundred to three hundred feet.

As the illustration shows, the observation buoy is fitted with telephone and electric light as well as one or more rapid firing guns, photograph apparatus, binoculars, etc. The floating compartment is provided with suitable gyroscopic apparatus driven by an electric motor for the purpose of stabilizing it, and there is also provided a means whereby the center of gravity of the buoy can be changed by shifting a weight whenever the gyroscope might prove inactive. There is furthermore a propelling mechanism driven by a motor and so designed as to cause the buoy with its occupant to be propelled in a body of water and beneath the surface thereof, and to be guided according to the desires of the operator. The cover of the buoy may be camouflaged so as not to become readily detected by the enemy.

An oxygen tank is fitted within the buoy for the purpose of supplying the observer with oxygen during the time that he is confined therein, and also a reserve tank is provided in the container whereby air from the outside may be collected and accumulated. A motor-driven pump is provided to operate the auxiliary air apparatus. The buoy can be made to describe a circular path by means of a suitable rudder provided at the base of the structure.

The second idea here illustrated is that of an electrically operated *Dirigible Torpedo*, its inventor being James M. Seymour, Jr. Mr. Seymour provides considerable food for thought in his novel invention which comprises a cigar-shaped steel hull, the interior of which is subdivided into a number of separate chambers, each one of which is adapted to house the various electrical and other apparatus necessary for controlling the torpedo. This steel hull is normally submerged beneath the surface of the water, and supported at this depth by means of a surface float which carries visible identifying means, such as colored flags or disks in the day time, and signal lights flashed intermittently at night.

In brief, Mr. Seymour's electrically controlled dirigible torpedo is of the self-propelled type, being provided with a special internal combustion engine adapted to run on a fuel consisting of hydrogen and oxygen. The engine is provided with an electric self-starter, and the motor for this apparatus may operate when the torpedo is under way as a dynamo, supplying current for charging storage batteries, etc. Fuel for operating the engine is contained in a suitable storage tank in the torpedo hull, and also the supply of gases ready for mixture to produce the fuel for the engine.

This dirigible torpedo is intended to be controlled thru a fine electric cable connecting it with a war vessel operating in the vicinity. The cable being of small size is stored in the hull of the torpedo, and is wound in an ingenious manner so as to be released rapidly and easily and without danger of knotting. The inventor's design enables a very small insulated electric cable to be used for this purpose (with its consequent high electrical resistance) for the reason that he uses a sensitive galvanometer relay, which can be actuated by relatively weak electric currents coming thru the cable. The front end of the torpedo hull contains the high explosive gun-cotton or other charge, which can be detonated at any desired moment by simply pressing a button on the torpedo boat destroyer or other vessel controlling the torpedo. It may be a surprise to the reader to learn that this small yet destructive war device may have a field of action as great as ten to twenty miles, this being the radius over which the torpedo can be sent, and a sufficient length of patrol cable carried therein for the purpose, the inventor claims. When the torpedo is placed over the side of the war vessel, the engine self-starter motor is set in motion by means of a pull cable running up to the top float and fastened to a button thereon.

The third electrical idea is an interesting *Cable-Cutting Shears*, intended to be mounted on the bow of a submarine or similar vessel. As is well known, it is a slow job for mine-sweepers to trawl along thru considerable areas, feeling their way and cutting loose the submerged but firmly anchored mines. The contrivance here suggested by Mr. Johan E. Johannessen would seem to offer some worthwhile ideas in this direction. His electrically operated mine-cable shears are intended to be secured to the bow of a submarine, and also the vessel so fitted with this device is provided with a suitable observation port or window and an adjustable and fairly powerful electric searchlight as in the illustration. In this way the submarine can make considerable speed in cutting the submerged mine-cables, and the shears are provided with large horn-shaped guides which serve to force the cables toward the cutting blades of the shears. When in action these steel blades are rapidly oscillated in the same manner as a pair of scissors, by means of an electric motor located within the submarine. The motor is connected to a shaft attached to the cam actuating the shear blades thru a water-tight stuffing box.

As the mine cables are cut and the mines float to the surface, they can be picked up by any vessel adapted for the purpose, and working in conjunction with the submarine or submarines. The operation is best carried out at night of course. The ends of the cable shear guide-horns are provided with electric lights to enable the operator to guide his boat more quickly in the proper direction to encircle the cable and cut it.

The operator is provided with loud speaking telephone equipment, signal lamps, etc., as well as electric controller for the shear motor, so that he has very accurate control of the apparatus, and also the movements of the underwater craft. He can thus instantly give orders to the helmsman to change the direction of the submarine, etc. The cable-cutting shears are designed by the inventor, so that they can be readily bolted to the bow of the submarine and quickly removed as soon as the cable-cutting operations are completed.

## WHY THE ELECTRIC GUN WILL NEVER BE A SUCCESS.

By Harry A. Dey, E. E.

Every few years a new inventor springs upon the public our old acquaintance, the electric gun, which has so many good talking points. An electrical engineer of our acquaintance, was one of the inventors. He did not, however, place it before the public. He went ahead and spent a few of his own dollars, and soon became convinced of its impracticability. This was nearly thirty years ago when the dynamite gun ship VESUVIUS was first constructed. Our electrical friend got to thinking how nicely electricity, by means of a long solenoid barrel, could throw that charge of dynamite without danger of the shock blowing up the gun. He made some experiments, actually building one of one inch bore, and followed this up by experimenting with the pulling power of solenoids. If the solenoid experiments had been made first, the gun would not have been built; for he found that 25 pounds per square inch was about the best pull that he could expect, and the VESUVIUS required 600 pounds per square inch to toss its bomb a mile or two over the hills. He threw up his hands in disgust at himself for not beginning his experiments at the other end of the line. If he had started out by investigating the power required on the VESUVIUS he would have gone no further, for he well knew that this was from 3 to 4 times as much as an electro-magnet would pull when in actual contact, which is impossible in any moving device; the pulling power dropping very rapidly upon the insertion of any air gap. The best that could be expected from any gun of this type, even if made of an impractical length, would be to use as a substitute for hand throwing of bombs from trench to trench when they are within a female baseball pitcher's range.

An electric magnet weighing only seven pounds that will lift fifteen times its own weight has recently been invented. It is intended for use in machine shops.

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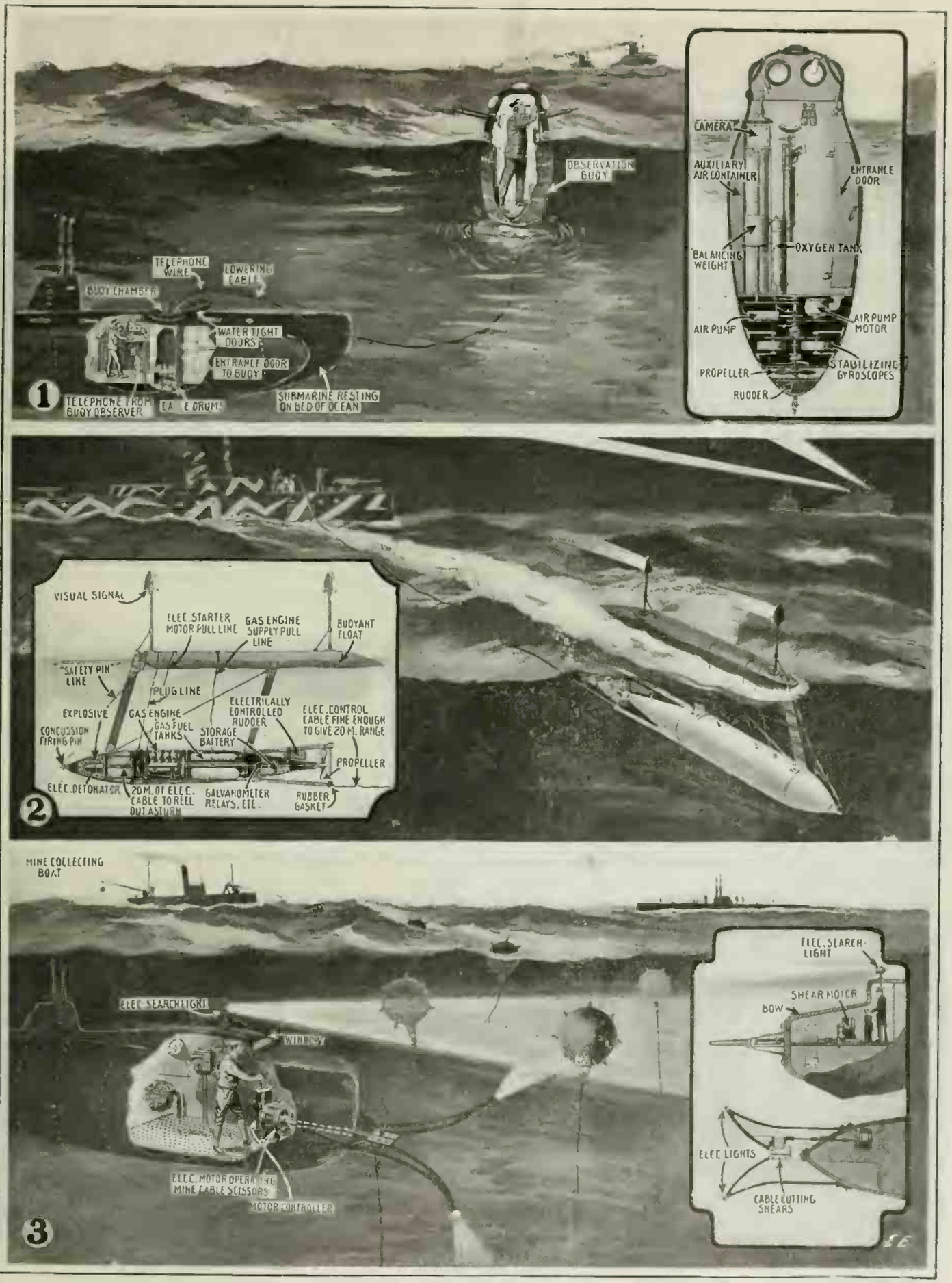




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