



Diagrammatic View of a One-Man Submarine and Portrait of Its Inventor, Thomas J. Moriarty.

One-Man Submarine Invention of an American

Tiny Torpedo Boat, Said to be Used by German Raider, Was Anticipated by the Ingenious Craft of Thomas J. Moriarty

ACCORDING to a recent cable dispatch from Rio de Janeiro, the German raider is accompanied by three small submarines of an entirely new design and not over twenty feet in length. Members of the crews of ships sunk by the raider, who have been held prisoners aboard her, are quoted as saying that the submarines constantly leave the mother ship and reappear after short intervals, apparently doing scout duty.

Thomas J. Moriarty, for years a mechanical expert in the employ of the Government at the Torpedo Station of the United States Navy, at Newport, R. I., obtained some time ago letters patent on a one-man submarine, asserted to be suitable for service on shipboard as well as from shore, its exclusive function being the locating and destroying of submarine mines. Among the special features of this boat are the automatic contrivances said to insure safety and the simplicity of construction in comparison with other devices costing many times as much to build.

Mr. Moriarty was long ago impressed with the idea that the only way by which to make the action of the torpedo actually certain was to put an experienced operator inside it; for, while its automatic machinery operates with almost human intelligence, there is no certainty that it will on long ranges do exactly what is required of it. From the idea of putting a man inside it to that of placing a man outside it the transition was easy; and it then became a question to give him a safe shelter, means of locomotion, of submerging, and of discharging the projectile.

To accomplish these essentials he has devised a cigar-shaped boat of bronze plates, about 10 feet long, 3 feet deep, and 5 feet wide. Beneath this is suspended the Whitehead torpedo in a frame from which it is propelled by compressed air when the operator has approached near the mark. A general idea of its ap-

pearance and functions can be derived from the accompanying illustration.

Let it be supposed, for example, that a trip is to be made in the boat. Before launching it into the water, the latch, holding closed the hatch, is sprung and this cover with its conning tower is opened by powerful springs, the hatch sliding beneath the casing of the hull. This gives an entrance of about three feet square to the interior. The hatches of thick glass are opened, and the engine, specially devised for propelling the boat, is adjusted.

These stern hatches are then closed. By means of a connection with the engine the air tank in the bottom of the boat is filled with compressed air to a great pressure. A light is placed on the bottom of the boat forward behind the slanting observation tube. The Whitehead torpedo is slipped into the casing beneath the boat, and the circular yoke is revolved down over its nose until the point slips between the blades of the small front propeller, thus preventing its turning, as the propeller actuates the firing mechanism after the projectile is discharged. If this point were not provided the propeller would turn with the first movement of the boat and the firing mechanism of the torpedo would be released and thus entail a premature explosion if the nose should strike any object in the water while carried by the boat.

The operator then dons a vest made of two thicknesses of air-tight material, to which is attached a small mouth tube by which it is inflated. This inflated vest serves as a padding for the body while the man is in the boat and also as a life preserver in an emergency. The operator enters the cockpit, lies down on the cradle, astride of its support. Padded prongs on the cradle curve over his shoulders to hold him in place and provide a purchase for his arms when operating the levers before him. The boat is then put into the water. He slides a movable weight along a bar running fore and aft, until the boat sits level, bow and stern. He lowers his head and closes the hatch, gaskets making the joints with the hull watertight. He then turns the hand wheel beneath him, thus admitting

water to the submersion tank in the bottom of the boat, until the vessel sinks to the level of the base of the conning tower.

Lifting his head into the conning tower, he may then see through the glass front the course before him. By means of reflectors in front of him he sees whether the machinery behind him is properly adjusted, and, if so, pulls a lever blowing the whistle on the forward mast, which is sounded by compressed air from the air tank.

Grasping the hand levers and placing his feet on the treadles, he gives the propeller shaft a few turns and thus starts the engine connected therewith, the gases of combustion from the machine passing through the exhaust. Air is admitted through the rear mast also and circulates throughout the boat. This air tube is, however, automatically closed when the boat is beneath the surface of the water and the conning tower completely covered by means of a hydrostatic piston, open to the water at the bottom of the boat, the pressure of the water at the increased depth forcing up the piston, which actuates a lever to force a valve over the air-tube opening, thus preventing the entry of water through it.

The same motion of the piston operates levers connected to a valve in the compressed-air tank, opening it and thus allowing a fine stream of air to issue therefrom into the boat, and supplying the operator with fresh air. As the boat again reaches the surface, the pressure on the hydrostatic piston is released because there is less depth of water and the air tube is again opened and the air tank valve closed. An exhaust valve through the hull of the boat regulates the pressure within.

The boat is now under way. Glancing down through the slanting observation tube that extends through the top and bottom of the boat, its ends being covered with plate-glass, the operator sees that the nose of the torpedo is properly held by the point, before mentioned, and also any obstructions that might lie beneath him. In the night time the light placed just behind it, shining through the lens in the bottom of the boat upon the head of the torpedo, will, according to the in-

ventor, fully illuminate its surrounding also. A signal light is also carried on the forward mast for use under certain conditions. He steers the boat by means of the lever before him attached to the rudder.

The conning tower being not much larger than a bucket, is well-nigh invisible on the water's surface to observers on shipboard, and this fact permits, it is asserted, a close approach to them. As he nears the hostile ships, he pulls a lever, shutting off the engine. He lifts a lever in front of him, which turns upward four fins, one being on either quarter of the vessel, bow and stern. The action of these fins is to pull the boat downward, because of the pressure of the water on them while the boat is under way. Moving the lever downward depresses these fins, on the other hand, and causes the boat to rise from the same reason.

Accordingly, says the inventor, the faster the speed the quicker the vessel rises and sinks. The operator then grasps the handles of the propeller shaft, places his feet on the pedals, and moves forward under his own power until he is within short torpedo range of the hostile ship.

He stops and swiftly turns the hand wheel before him. Its bevel gear revolves upward the circular yoke on the nose of the war-head of the torpedo until the point, formerly resting on its propeller, strikes a rod projecting through the bottom of the boat. This rod in turn connects with a valve in the compressed air tank which discharges air into the cylinder fastened to the bottom of the boat.

The compressed air forces out a piston in this cylinder. To the exterior of this piston is attached a finger resting behind a projection on the top of the torpedo. The effect of the impulse is violently to thrust out the torpedo from its casing, a "T" slot on the top of it holding it in line, in the direction of the hostile ship. As the torpedo leaves the casing, the piston finger just mentioned trips a "dog" on the top of the torpedo that sets in motion the propelling mechanism of the projectile, and it starts off under its own power for the mark.