

Voices to Rescue of Stricken Submarines

Merciful New Invention of United States Navy Scientists Enables Two-Way Communication With Undersea Craft Stranded by Disaster on the Bottom of the Ocean.

BY NELL RAY CLARKE.

"HELLO! Hello, submarine commander of the S-8. How is it down on the bottom?"

The words were perfectly audible throughout the submarine and the men inside the hull stopped talking to listen. The words did not seem to be coming from any one spot that they could locate, but sounded as if they might have been coming from a radio loud-speaker hidden somewhere in the room.

The submarine commander, standing in the center of the room, did not move out of his tracks, but answered in a normal tone of voice:

"Hello, U. S. S. Falcon. I can hear you distinctly. Can you hear me?"

"Yes, sir, perfectly," the voice answered.

"Shall we proceed with some test signals?"

"Go ahead," the commander replied.

"Very good, sir. Can you hear these numbers? One, five, nine, eight, four, nineteen, twenty-eight, thirty-five * * * * * The commander jotted them down for further comparison to determine the accuracy of the transmission.

The man at the new submarine telephone on the mother ship above the submerged submarine completed the message, paused a moment and then put the mouthpiece of the newly perfected apparatus to his ear to listen to what was going on in the submarine.

The submarine commander took up the conversation. "I have recorded the numbers as you have called them. Suppose I call some numbers to see if you get them accurately. Seven, nine, fifteen * * * * *

And so the first actual two-way telephonic communication between a submerged submarine and a surface ship, similar in most details to the hundreds of conversations which go on over our local telephones, passed into history. The test of repeating numbers had been used because, over a telephone, numbers are the most difficult things to hear accurately, since no context supplies any word which might be indistinct, as so often happens in an ordinary conversation.

THIS new invention, recently perfected by the Navy Department, will enable persons aboard a rescuing vessel to communicate with men trapped in a submarine on the ocean floor within a very few minutes after the submarine has been located.

It possesses many interesting and valuable features. Every bit of the apparatus is carried on the surface vessel—nothing at all on the submarine. Conversations between those inside a sunken submarine and men on the rescue ship can begin as soon as a cable can be unwound from the ship to establish contact with the submerged craft.

To the general public its most valuable feature is undoubtedly its great humanitarian aspect. In the future men who are trapped in a disabled submarine will not have to wait until a diver can be sent down to them and then have to tap out their pitiful messages and pleas for help.

That tragic question of the men in the S-4: "Is there any hope?" retched the hearts of thousands of Americans. It had to be slowly and painfully tapped out against the walls of the imprisoning hull.

How pathetically meager were the simple questions and answers which passed before death claimed its victims!

It is hoped that no other crew will ever have to wait for the coming of death or for rescue without the encouraging voices of their fellow men to comfort and cheer them, for very soon the new telephone, with a few already planned minor improvements, will be installed on all submarine rescue vessels and ultimately upon all submarine tenders.

There is an instrument board, of course,

where the current is controlled, and the machinery by which the cable is operated. There is a motor generator, an amplifier, a reproducer and batteries. The hull of the submarine acts as a diaphragm and sound conductor to the reproducer.

At the end of the telephone cable—a strong cable many times larger than a telephone wire—there is a double diaphragm and a double electro-magnet, so that either side of the apparatus which comes in contact with the sunken vessel can convey the messages to and fro. It is watertight and is built to withstand the rough handling incident to lowering it to a submarine.

THE first crude forms of the instrument were tried out in the tanks at the navy yard in Washington, where the great depths and increased pressures of the ocean could be duplicated. The first developments required great lung power for communications to be established. Gradually, however, the instrument was refined until the more ordinary tones of the voice could be used.

It was subsequently tried out by divers and on various types of surface vessels and finally installed on the Falcon for tests between that ship and a submarine in actual operation.

Ultimately the telephone may be used as a method of official communication in case of war, but its main benefit will accrue from the possibility of getting in touch with the men inside a sunken submarine. First, it will enable those who are working above the wreck on the rescue ship to find out immediately whether or not there is life aboard the submarine—the only real reason for hurry in raising the submarine.

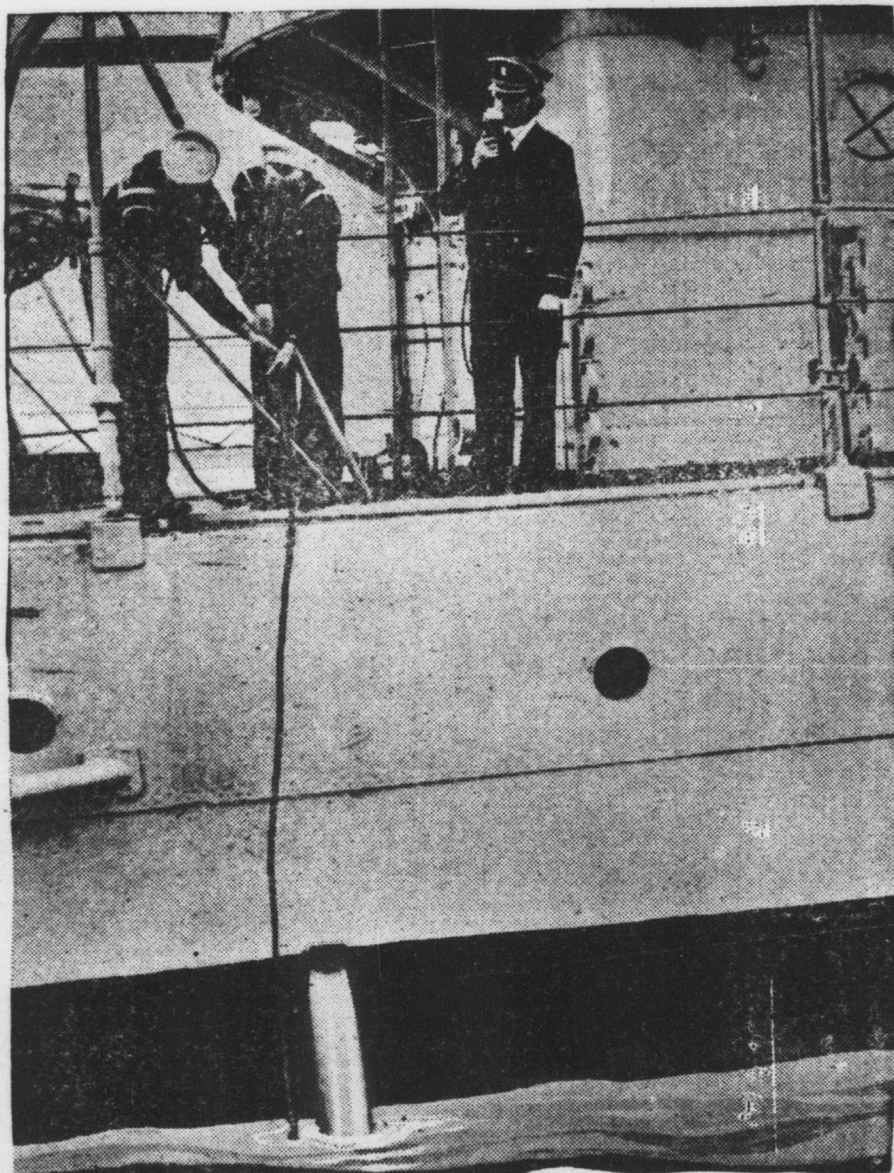
Once contact has been established, the main purpose of the telephone will be to keep those in the submarine apprised of what is being done to rescue them and to solicit their help if it is needed, but, above all, it will keep them hopeful. Also, suggestions may be conveyed to them concerning improvements that might be made in their conditions.

The main feature in any submarine rescue is time. Naval officers have repeatedly said that the element of time was the only thing that kept them from saving the members of the ill-fated S-4. The terrific gales which rocked the ocean made it impossible for the Falcon to maintain her position and for the divers to continue their work.

But plans and developments for the rescue of the crews of sunken submarines have now progressed so far that it is hoped the time needed will be appreciably shortened. In any rescue work the first step is, of course, to locate the sunken ship. Apparatus has been perfected both in the United States and by the navies of other countries of the world which will enable naval authorities to locate a sunken submarine in a very short period of time.

The first thing to be done after the rescue ship anchors over the spot will be to send down the telephone to find out how many men are alive inside the ship. It has been estimated that at the very longest, telephone communications with the new device may be established in three minutes. Even if the telephone apparatus struck a portion of the wreckage of the disabled submarine at some distance from the compartments in which men were shut, any sound within the hull would be picked up by the telephone. If there was knocking or any faint noises that might indicate life in a part of the submarine remote from the point of contact, the current to the electro-magnets could easily be switched off, the contact thereby broken, and the apparatus shifted to another part of the vessel to make communications more distinct and satisfactory.

It has been estimated that the telephonic cable line to a sunken submarine will be good down to a depth of at least 200 feet and possibly farther, although even the newest and



most improved types of submarines will not hold together much below 250 feet. In all probability, the new telephone will be efficient to any depth which the submarine will sink and still remain intact.

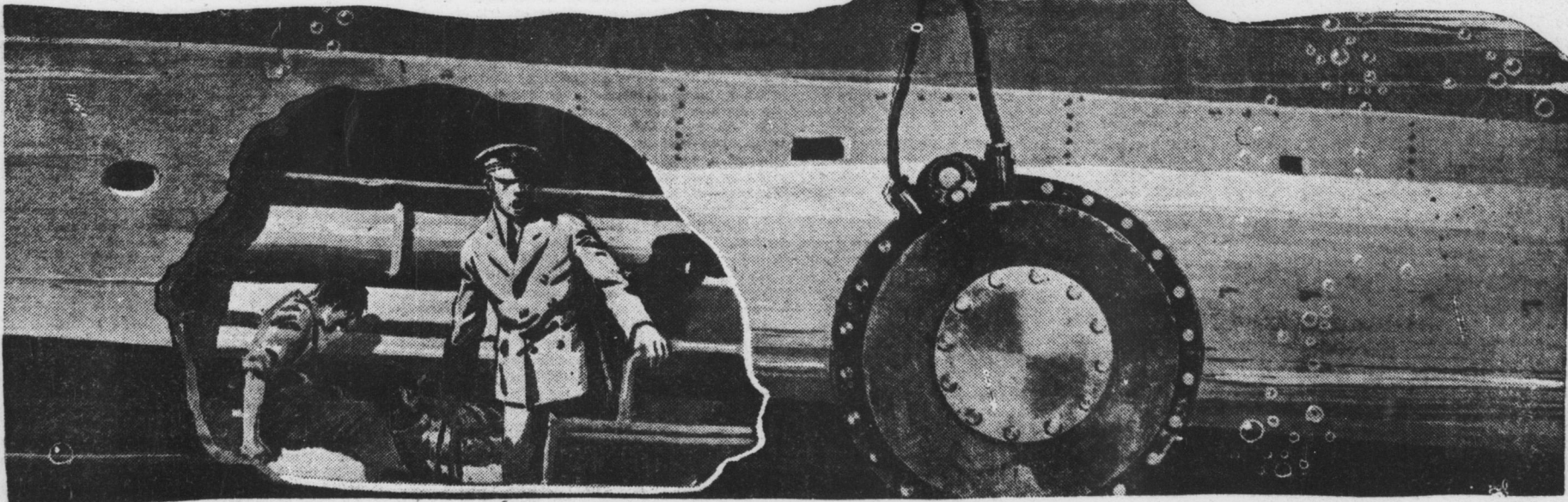
THE apparatus was designed and built at the navy yard at Washington in co-operation with the engineering department of the Navy. A civilian employee had the idea for the telephone, but because of the many disappointments and obstacles which he encountered from time to time, he had almost given up hope of perfecting his instrument. He was coaxed and encouraged by Navy officers in the engineering department, who felt that there was great merit in the device if it could be developed.

It is an interesting fact that out of the welter of outcries and recriminations and suggestions following the dread disaster of the S-4, the few devices which have proved of real value in submarine rescue work have been developments of the Navy itself rather than of outside experimenters who have been so anxious to help mitigate the dangers and sufferings connected with the submarine disasters.

Two of the most important of these are a specially constructed diving bell and the lung. Recently the crew of the rebuilt S-4 was brought from a depth of 70 feet to the surface of the Gulf of Mexico in a diving bell, a test which the Navy Department officially regards as "most satisfactory."

The diving bell, because of its great weight, cannot be carried on the submarine. So far two types of bells have been developed—the open type, having a capacity of about 14 persons, and the closed type, which accommodates a smaller number.

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Communication with a submerged vessel by telephone has recently been made possible by the development of a combination receiver and transmitter.