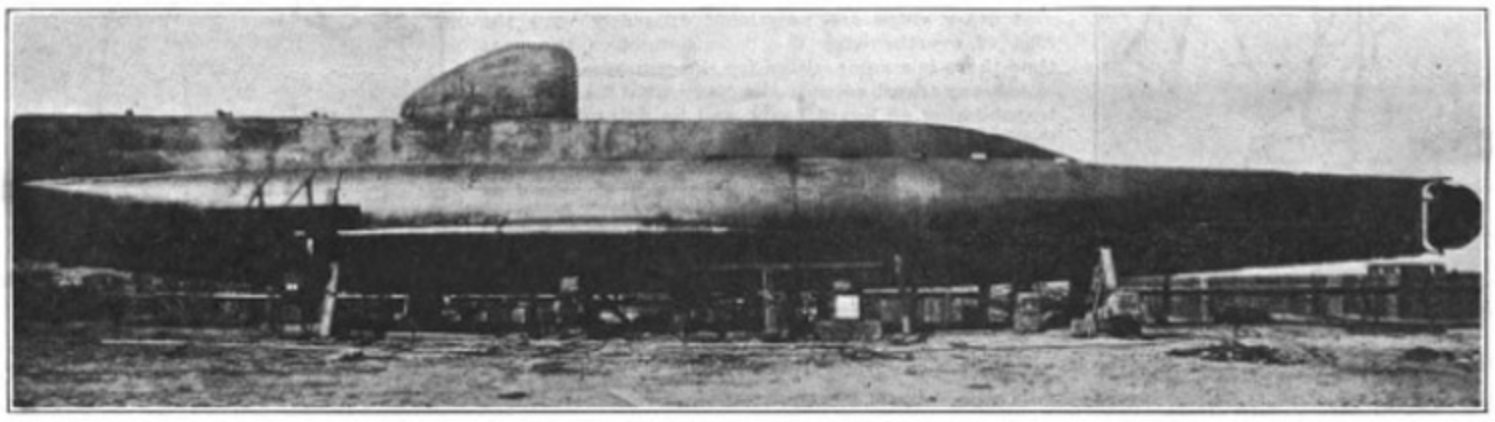
ARMY AND NAVY REGISTER

15 CENTS A COPY.
THREE DOLLARS A YEAR.

Washington, D. C., September 2, 1916

Vol. LX, No. 1885



THE L. A. SUBMARINE BOAT IN DRYDOCK.

THE NEFF SYSTEM OF SUBMARINE PROPULSION.

A feature of the naval program that is attracting much attention is the appropriation of $250,000 for a submarine equipped with the "Neff system of submarine propulsion."

It is generally known that submarine boats have two different power units—the internal-combustion or heavy-oil engines for surface cruising and the electric-storage battery and motor equipment for submerged navigation. As the space in a submarine is necessarily very limited, each of these units of power encroach one on the other, resulting in a compromise in space and weight occupied by each, much to the detriment and loss of efficiency in both systems. In addition, the storage batteries have proven very dangerous, inefficient, and expensive; and the unanimous opinion of submarine builders and experts is that wherever you can do away with the storage-battery equipment, you add greatly to the safety, efficiency, reliability, economy of operation, and durability of submarines.

With such improvements in view the Neff system of submarine propulsion was evolved with the idea of developing a single or unit power and propelling plant for use on all types of submarines for both surface and submerged navigation.

This system is based upon the experimental work of the L. A. Submarine Boat Co., of Long Beach, Cal., which company constructed a 75-foot model for trial purposes; and the complete system is the result of uniting a number of improvements with the original features of this experimental boat in an endeavor to produce a successful flexible unit propelling plant suitable for naval purposes.

Upon completion of this boat in the summer of 1913 Secretary Daniels appointed a trial board to conduct tests and report upon its operation, practical advantages, and adaptability for service requirements. The character of success attained by this experimental boat is indicated by the following paragraphs from the trial board's report:

"As a result of the runs made the board considers that the ventilation of the oil engines, while submerged, both at rest and under way, was satisfactorily demonstrated. The ventilation of the boat under all conditions was found to be excellent. The action of the propellers as located on either side near the bow was shown to improve control of boat, and this will no doubt lessen the tendency of the boat to dive at higher speeds. It was noted that during the run very little manipulation of the diving rudder was necessary to maintain control of the boat, and, further, when the boat was trimmed by the head the action of the propellers while going ahead overcame the trim and brought her up by the head to a marked degree."

"The board believes that the method of propulsion employed, including the location of the propellers, is capable of producing much higher speeds than has been heretofore practicable with other types of submarines, especially under submerged conditions."

"The distinctive features of this type of submarine are the elimination of the storage battery for propulsion, the location of propellers forward, and the improved ventilation. In the experimental boat all these features were satisfactorily demonstrated, but otherwise the boat is in an experimental state and not suited at present for naval purposes."

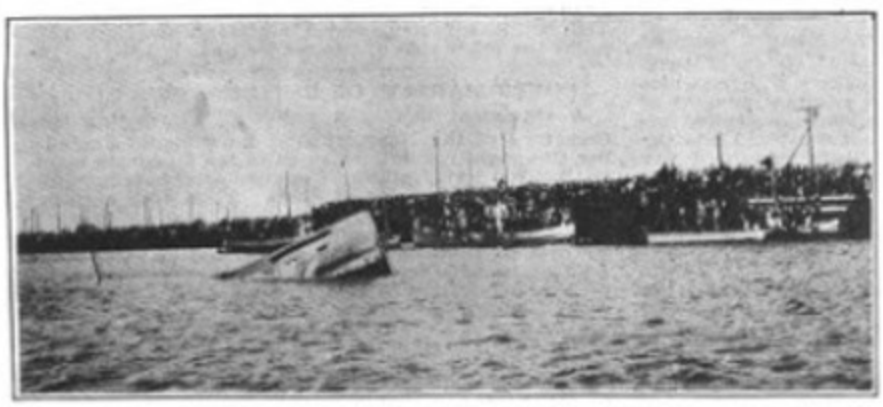
The builders of this vessel did not design it for naval purposes, but simply to demonstrate the special features of propulsion, as it contained no provision for the quartering of a crew or their subsistence, no torpedo tubes or other armament, and no facilities for extended cruising. Nevertheless, it was the first successful attempt to provide the much desired unit or single power plant for submarines, and with the improvements that have been made, coupled with the assistance of experienced engineers and builders, it is not unreasonable to expect practical success in the ultimate development of this idea.

In general, the operation of the system consists in carrying large quantities of compressed air in high-pressure air flasks, which air is released through reducing valves to the low-pressure service air tanks. This air in turn is superheated, and the stored energy is used to drive the exhausters, which pump the products of combustion overboard against the outside head of water. The air is then filtered, muffled, and distributed throughout the vessel and to the engines by special means, providing complete ventilation for the crew and air to support combustion in the engines. The products of combustion or exhaust gases are carried from the cylinders of the engine through the exhaust manifolds to a system of condensing tubes outside of the hull, where the expanded gases are cooled and condensed. These products are then drawn inboard by the mechanical exhausters and are next pumped overboard through special devices for breaking up and absorbing the remaining bubbles of exhaust gases.

Every unit that goes to make up the propelling plant has been successful, and no objections have been made to the mechanics of the system. The air compressors are the same as are used on board battleships and destroyers; the air flasks are standard and the same as are now used in the service, which is also true of the fittings and auxiliary equipment. The exhausters are practical machines, and use is made of any successful engine suitable for submarines. Practically few changes are made in the interior of the boat; the hull and operating devices are the same, and, as stated, it is a flexible plant for use on all types of submarines.

The advantages claimed for this method of propulsion are:

1. The elimination of the dangerous, troublesome,



The L. A. Submarine Boat Coming to Surface Before a Large Crowd at Long Beach, Cal., After Thirty-Six Hours' Submergence.

On the Surface.