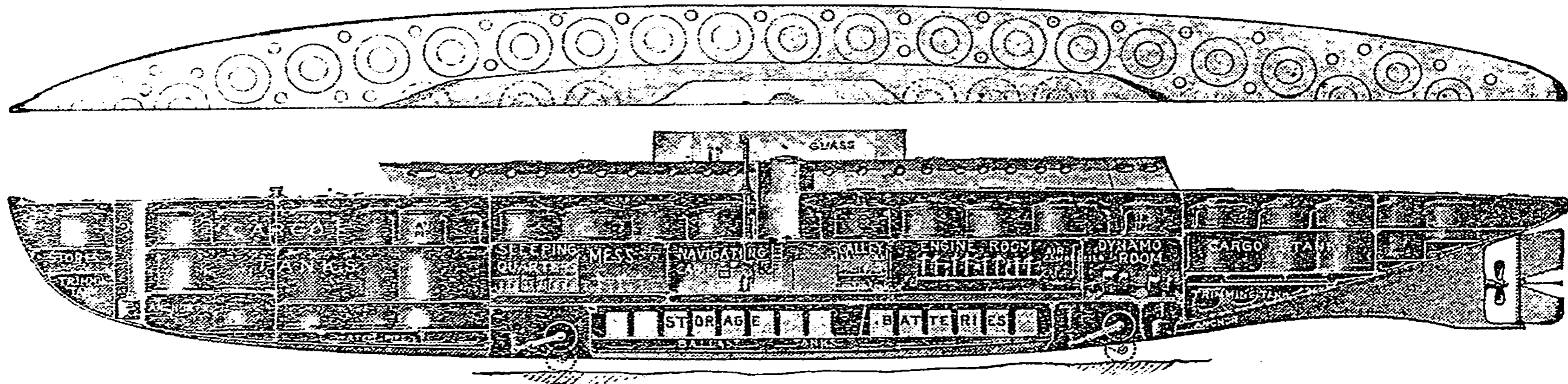


American Plans Cargo-Carrying Submersible



A SUBMARINE BLOCKADE RUNNER WHICH COULD CARRY \$1,000,000 WORTH OF CHEMICALS.

Submersible cargo ship designed by Simon Lake, the well-known American inventor. The cargo is stowed away in air-tight and water-tight cylindrical tanks. The quarters for the crew, engine room, &c., are contained in a water-tight cylindrical inner hull. When the vessel is to submerge, the entire space between the inner and outer hulls is flooded with sea water; when the vessel is to travel on the surface, the water is pumped out. The submarine boat has wheels, so that it can travel along the bottom of a dredged channel. (Courtesy of Popular Science Monthly.)

WHILE Germany can claim full credit for having built the first submarine cargo carrier with which to run the British blockade, plans for a craft of this type were drafted some months ago by Simon Lake, an American shipbuilder, who has designed and constructed a number of undersea boats for our navy. Mr. Lake's invention was probably inspired by the war situation. It is of particular interest at this time, in view of the fact that he is reported to be associated as engineer with a new corporation which may

absorb the company owning the German cargo submarine Deutschland and build larger vessels of her type.

Mr. Lake patented his vessel, and in the papers accompanying his patent said: "I provide an exceedingly novel construction of submarine or submergible boat particularly designed for carrying cargoes of various descriptions, and which will be found of inestimable advantage in supplying blockaded countries with foodstuffs or war materials during hostilities, and which may readily be submerged when upon the high seas in the event of interception by an enemy's fleet."

According to a description of Mr. Lake's boat, which appears in the August issue of the Popular Science Monthly, the vessel is utterly different from the familiar destroyer of naval vessels. Its external appearance is not so widely at variance with the accepted type, but its interior arrangements are "in every way remarkable."

Details of the vessel then follow:

To carry 5,000 tons at the surface the vessel must be extraordinarily buoyant. To attain that buoyancy is the chief problem of the designer of a cargo-carrying submarine. Let us see how Mr. Lake has solved this problem.

Mr. Lake's blockade runner consists of an outer hull and an inner hull. The outer hull resembles that of the ordinary surface vessel in all essentials. The inner hull is a long cylinder divided into compartments

to provide sleeping quarters, a mess room, a navigating cabin, a galley, an engine room and the like. The cylindrical inner hull is air-tight and water-tight.

The cargo is disposed in vertical tanks between the outer and inner hulls. The cargo tanks are air-tight and water-tight and are filled from the top. Air-tight and water-tight closures are provided.

The spaces formed between the outer hull and the inner hull are to be filled with sea water when the vessel is to be submerged. When the vessel is to rise the sea water is pumped out. When the vessel is submerged the cargo-carrying tanks are entirely surrounded by water.

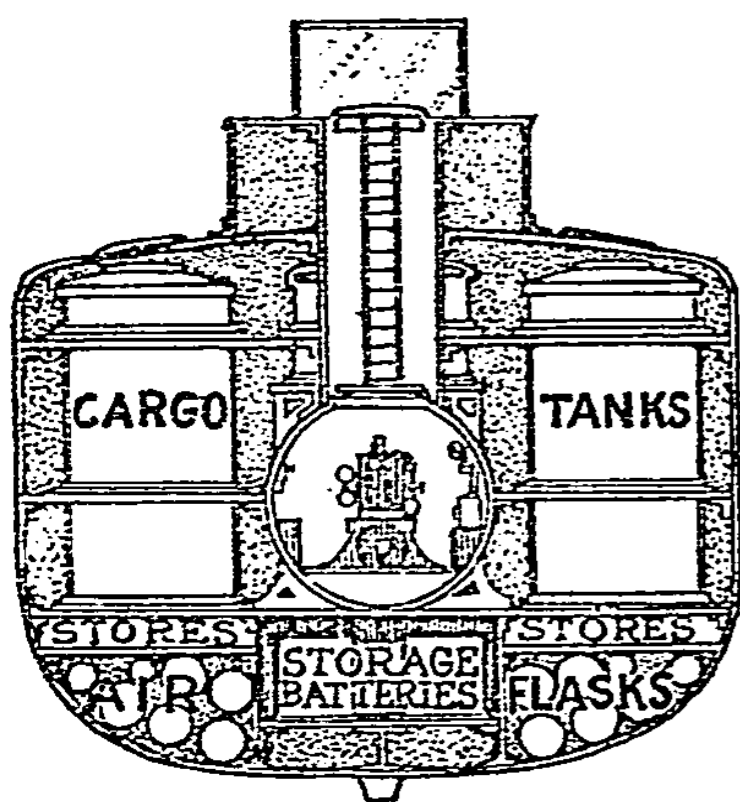
The inner hull is pressure-resisting, the outer hull nonpressure-resisting. The water-tight cargo tanks are obviously set in compartments which may be regarded as water-ballast compartments. These are filled during submergence and are emptied when desired by means of compressed air which is blown from bottles located in the lower part of the hold. As the water is ejected the space will be replaced by air of such pressure as to equalize the external pressure and thus prevent the collapse of the outer hull. Indeed, water is freely used so that the outer nonresisting hull may stand up.

Another feature of the Lake boat is the provision of wheels which, it is said, will enable the submarine to travel on the bottom of a dredged channel, and possibly on ocean and river beds. One of the chief problems in connection with large submarines concerns the engine power, and on this point the article says:

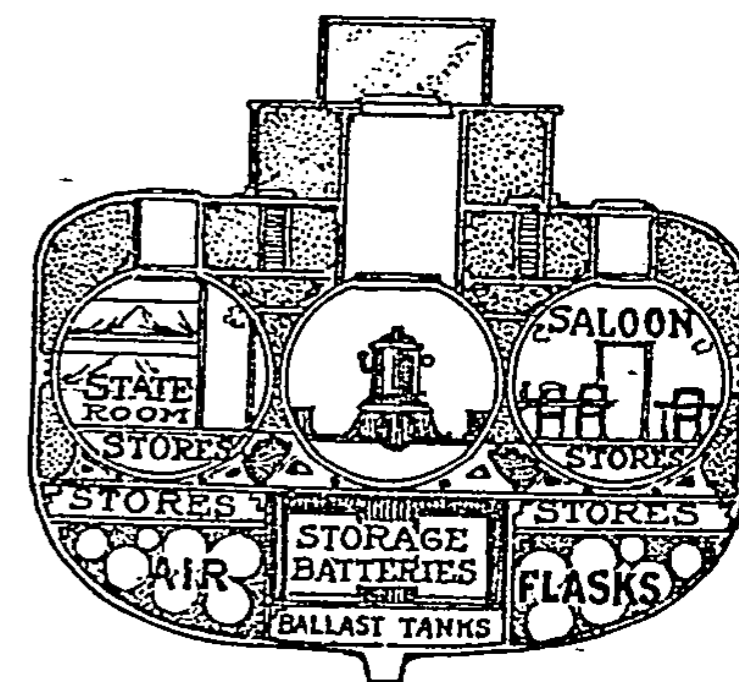
The practical limit of size as yet attained in big submarine engines, or rather in oil

engines suitable for submarine purposes, lies somewhere in the neighborhood of 200 horse power per cylinder. The Germans are now building submarine torpedo boats about 220 feet long, propelled by twin-screw engines aggregating 2,400 horse power and giving a surface speed of seventeen knots.

A submarine somewhat bigger, requiring 3,000 horse power to develop a surface speed that will enable her to be of any practical use, will need three engines with six cylinders each. Now, for a vessel 400 feet long a very powerful set of propelling machines will be required. Oil engines are out of the question. Steam engines must be employed. And the use of steam engines means the solving of the very difficult problem of insulating the generating apparatus so that the crew will not be parboiled.



Cross-section of Submersible Cargo Boat.



Cross-section of Submersible Passenger Boat.