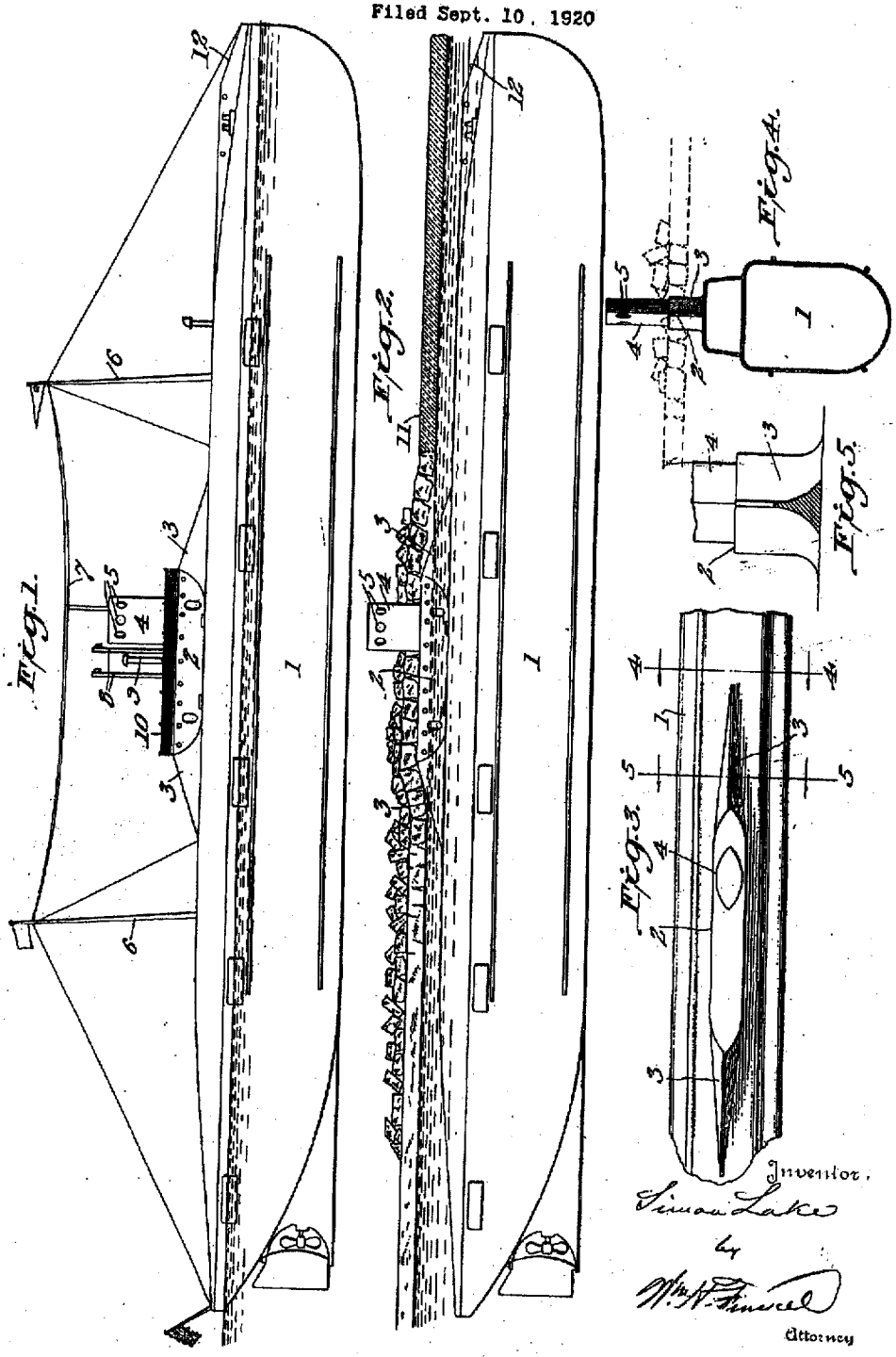
July 1, 1924.

1,500,000

S. LAKE

SUBMERSIBLE VESSEL FOR NAVIGATION UNDER ICE

Filed Sept. 10, 1920



Inventor,
Simon Lake

Attorney

Patented July 1, 1924. 1,500,000

UNITED STATES PATENT OFFICE.

SIMON LAKE, OF MILFORD, CONNECTICUT.

SUBMERSIBLE VESSEL FOR NAVIGATION UNDER ICE.

Application filed September 10, 1920. Serial No. 409,371.

To all whom it may concern:

Be it known that I, SIMON LAKE, a citizen of the United States, residing at Milford, in the county of New Haven and State of Connecticut, have invented a certain new and useful Improvement in Submersible Vessels for Navigation Under Ice, of which the following is a full, clear, and exact description.

This invention relates broadly to submarine or submersible vessels, and more particularly to such vessels adapted for navigation under fields of ice.

One object of the invention is to provide a submersible cargo-carrying vessel, suitable for transportation of goods in extreme northern latitudes where, for a large portion of the year, the water is covered with a sheet of ice of such thickness and strength as to make navigation with ordinary surface vessels impossible.

It is obvious that ice may be more easily broken by pressure applied from beneath than from above as is the case in the use of surface vessels, because the air above offers less resistance than the water and, therefore, another object of the invention is to provide a vessel of the type above mentioned with means whereby in addition to its ability to travel under ice, it is capable of rising to the surface and crushing its way through ice of moderate thickness but of such thickness as would prohibit the use of a surface vessel of ordinary construction, and continuing its course upon the surface by plowing its way through the ice field.

The invention consists in a submarine or submersible vessel provided on its upper deck with a superstructure of substantially ordinary construction but having at its forward and after ends ice breaking and crushing plows, and provided also with a plow-shaped telescoping steersman's station and air intake, all as I will proceed now to explain and finally claim.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a side elevation of a vessel showing the device of my invention, said vessel being shown in condition for surface navigation. Fig. 2 shows the same vessel submerged and crushing its way through a field of ice. Fig. 3 is a fragmentary plan view showing the general outline of the superstructure with its plows and steersman's station. Fig. 4 is a diagrammatic section of the vessel taken in the plane of line 4—4, Fig. 3 and showing in dotted lines the ice field being crushed. Fig. 5 is a fragmentary sectional elevation taken in the plane of line 5—5, Fig. 3, and showing the general plow-like surface contour of the ice crushing plows.

The vessel comprises a hull 1 provided with a superstructure 2 having extending from it fore and aft the plows 3 and provided slightly forward of its amidships portion with a telescoping steersman's station and air intake 4, of such shape as to enable it to throw aside obstructions, such as the ice crushed by the plows 3, and provided with observation ports 5 through which a view may be had in all directions.

In Fig. 1 the vessel is shown as provided with masts 6 for supporting the wireless apparatus 7, and it is also provided with the usual periscopes 8 and breathing tube 9 and a suitable railing 10, the masts, periscopes, breathing tube and railing being of telescoping or folding construction so as to be stowed out of the way when the vessel is to be navigated below the surface.

In operating submerged, the vessel will be given sufficient positive buoyancy to raise its superstructure through the ice indicated at 11, the forward or backward motion of the vessel bringing the plows in contact with the ice and causing them to crush it and raise it and turn it back upon the field in much the same manner as a plow turns back earth out of a furrow, thereby cutting a lane through the ice field through which the superstructure and the steersman's station mounted thereon may pass.

Where ice is encountered of such thickness that the vessel cannot force its way upward through it, or cannot plow its way through from the outside edge of the field or floe, the steersman's station may be telescoped to a position flush with the upper surface of the superstructure and the vessel may proceed along under the ice, sufficient buoyancy being given it to keep the upper surface of the superstructure in contact with the under surface of the ice field, and any irregularities on the under surface of the ice field will be first encountered by the shelving prow 12 of the vessel, which will cause it to ride smoothly under such projection, and the projection will then come in contact with the forward plow 3 which will cause the vessel again to ride under such projection, it being obvious

that there will be no obstruction projecting above the upper deck of the vessel or its superstructure upon which such a projection on the under surface of the ice field could catch and foul, but the whole upper surface of the vessel will present a smooth series of sloping rises which will easily ride past any obstruction.

I have shown no specific means for telescoping or lowering and raising the steersman's station and other devices which are adapted to be lowered from and raised to their above-board position, as this forms no part of my invention and may be done in a number of well-known ways.

It is to be understood that I do not consider my invention as limited to the particular details of construction herein shown and described, as it is obvious that various changes may be made without departing from the spirit of the invention and the scope of the following claims.

What I claim is:—

1. In a submersible vessel, a hull, a superstructure mounted thereon and extending above the upper surface thereof, and a plow extending from said superstructure.

2. In a submersible vessel, a hull, a superstructure mounted thereon, and ice-breaking plows extending fore and aft from said superstructure.

3. In a submersible vessel, a hull, a superstructure mounted thereon, ice breaking plows extending from said superstructure, and a steersman's station mounted in said superstructure.

4. In a submersible vessel, a hull, a deck, a superstructure extending above said deck, and a plow connected with said superstructure and extending forwardly thereof, the forward end of said plow being flush with said deck and its after end being flush with the upper surface of said superstructure.

5. In a submersible vessel, a hull, a deck, a superstructure mounted upon and extending above said deck and provided with plows extending fore and aft, the portions of said plows adjacent said superstructure being flush with the upper surface of said superstructure, said plows being inclined fore and aft from said superstructure to said deck.

6. In a submersible vessel, a hull, a superstructure provided with a steersman's station, a plow extending from said superstructure and adapted to break an ice sheet covering the water navigated, said steersman's station being of substantially cigar-shape and adapted to turn aside ice broken by said plow to facilitate the passage of the vessel through the thus broken ice.

7. In a submersible vessel, a hull, a deck, and a plow rising above the plane of said deck and adapted to break ice covering the water to be navigated by said vessel.

In testimony whereof I have hereunto set my hand this 7th day of September, A. D. 1920.

SIMON LAKE.