

(No Model.)

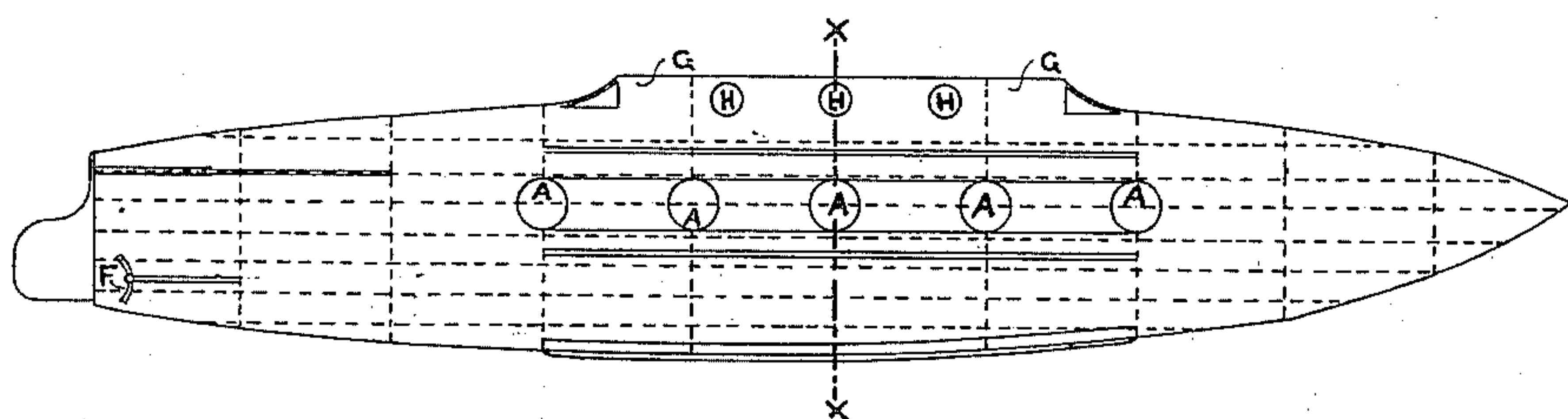
A. CAMPBELL & J. ASH.

SUBMARINE BOAT OR VESSEL.

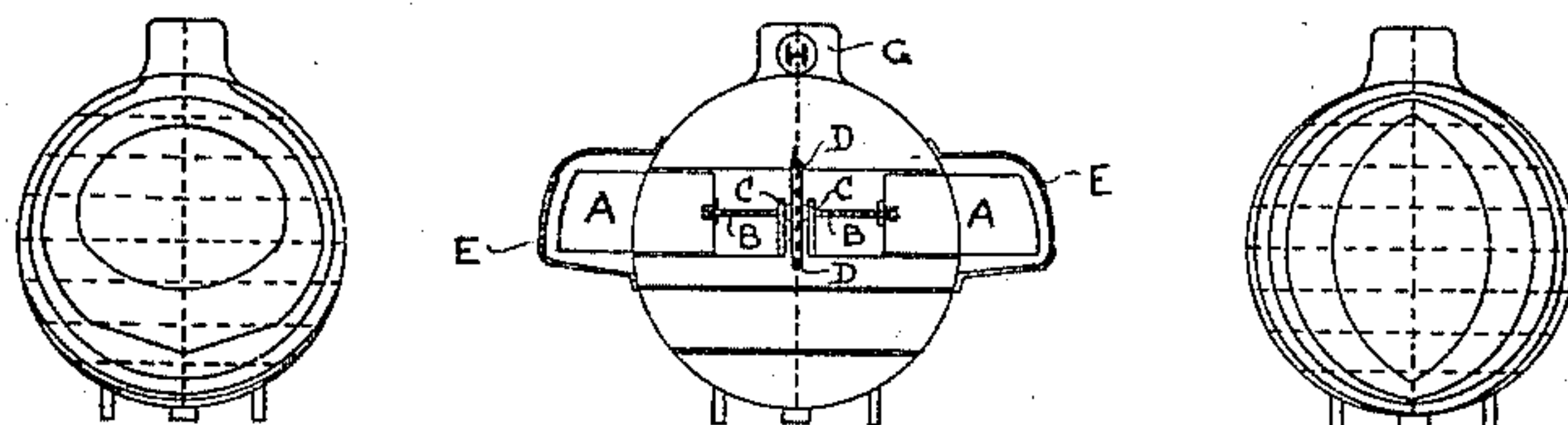
No. 344,718.

Patented June 29, 1886.

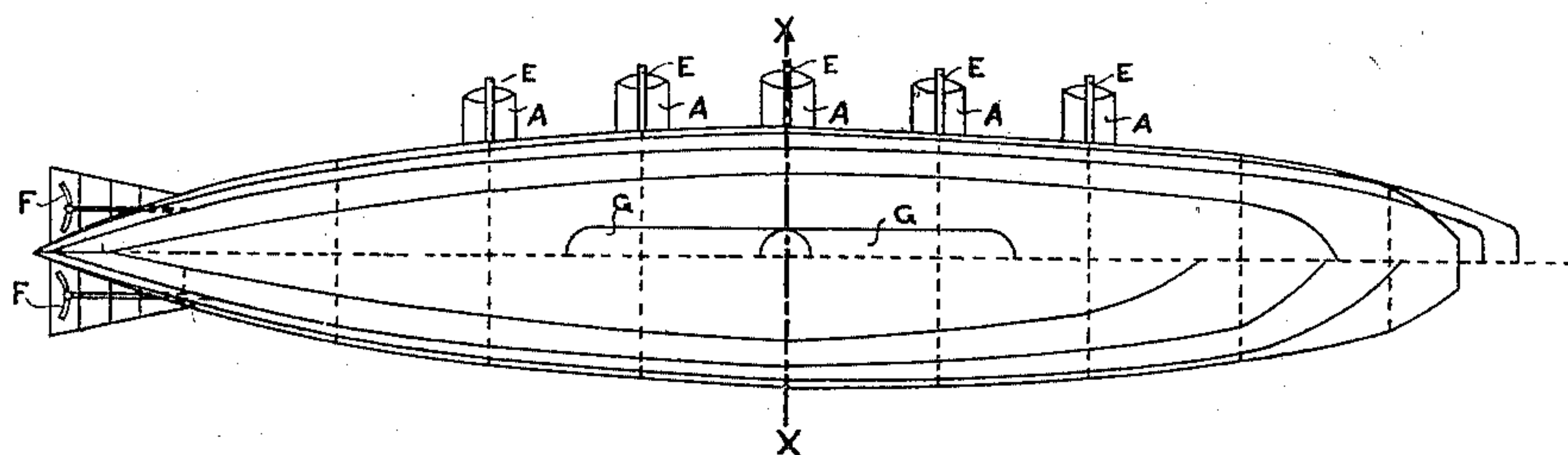
— FIG. 1 —



— FIG. 3 —



— FIG. 2 —



— WITNESSES —

Stephen Edward Gurney
115 Cannon Street, London.
William Anderson Smith
23 Parleigh Road, London W.

— INVENTORS —

A. Campbell
James Ash

UNITED STATES PATENT OFFICE.

ANDREW CAMPBELL AND JAMES ASH, OF LOWER CLAPTON, COUNTY OF MIDDLESEX, ENGLAND.

SUBMARINE BOAT OR VESSEL.

SPECIFICATION forming part of Letters Patent No. 344,718, dated June 29, 1886.

Application filed September 1, 1885. Serial No. 175,872. (No model.) Patented in England December 21, 1884, No. 16,915; in France July 8, 1885, No. 170,041; in Belgium July 9, 1885, No. 69,543, and in Italy September 30, 1885, No. 18,666.

To all whom it may concern:

Be it known that we, ANDREW CAMPBELL, gentleman, and JAMES ASH, naval architect, subjects of the Queen of Great Britain, and residing at Lower Clapton, in the county of Middlesex and Kingdom of Great Britain, have invented certain new and useful Improvements in Submarine Boats or Vessels, (for which we have obtained Letters Patent in Great Britain, dated December 24, 1884, No. 16,915; in France, dated July 8, 1885, No. 170,041; in Belgium, dated July 9, 1885, No. 69,543, and in Italy, dated September 30, 1885, No. 18,666;) and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to boats or vessels so adapted and fitted that they may be raised or lowered to any required depth and be propelled in any required direction, either upon or beneath the surface of the water, and more especially to the means for sinking such boats or vessels to the required depth below the surface and for raising them to the surface, or to any required position below the same.

In the drawings hereto annexed, Figure 1 is an elevation of a submarine boat or vessel constructed in accordance with our invention. Fig. 2 is a plan of the same, and Fig. 3 a transverse section on line *x x* of Figs. 1 and 2.

In carrying our invention into effect we employ any required number of displacement-chambers, A, arranged and adapted so as to slide water-tight, after the manner of a telescope, outward or inward through stuffing-boxes or other suitable jointings in the sides or other parts of the boats or vessels. These displacement-chambers A may be of any suitable shape, but preferably cylindrical and closed at both ends. They are furnished with mechanical, hydraulic, or other appliances whereby any one or more of them can be thrust outward from the inside of the boat or vessel, so as to increase the buoyancy thereof, giving it a tendency to rise in the water, or be drawn inward, so as to decrease the buoyancy and give the boat or vessel a tendency to sink.

When the displacement-chambers are placed

at the sides of the boat or vessel, we prefer to arrange them one opposite the other at each side in symmetrical positions, as shown in Figs. 2 and 3 of the drawings, and to arrange the appliances for forcing them outward or drawing them inward in such manner that when any one displacement-chamber on one side of the boat or vessel is moved inward or outward the corresponding displacement-chamber on the other side of the boat or vessel is moved inward or outward also, and to the same extent. By this means the boat or vessel is kept balanced laterally.

One means for forcing out and drawing in the displacement-chambers is illustrated in Fig. 3, in which B represents a shaft turning in a fixed bearing, C. This shaft has a right-handed screw-thread formed at one end and a left-handed screw-thread formed at the other end. The screw-threads on the shaft B take into suitable screw-threads formed in the inner ends of the displacement-chambers A, or in nuts secured thereto. D is a spoke wheel secured on the shaft B, and by which the said shaft B may be turned in either direction. On turning the shaft B in one direction by the spoke wheel D, the displacement-chambers A are forced outward by the action of the screws, and on turning the shaft B in the other direction the displacement-chambers A are drawn inward by the screws.

It is obvious that if the displacement-chambers A are too large to be operated by hand-power applied to a spoke wheel the wheel D may be arranged as a toothed wheel or a worm-wheel, and be operated by suitable toothed or worm gearing, and that the mechanical or other appliances for operating the displacement-chambers may be varied in a great variety of ways, to suit various circumstances.

It will be readily understood that by forcing out or drawing in any particular displacement chamber or chambers any particular "trim" can be given to the boat or vessel—that is to say, the stem or the stern may be raised or lowered at pleasure—so that when the propeller (which may be the ordinary screw or screws, as shown at F in Figs. 1 and 2, or any other suitable propeller) is set in motion the boat or vessel may be driven in an oblique direction, upward or

downward; or, if the boat or vessel is kept on an even keel, the propeller will move her horizontally forward or backward.

The boat or vessel may be of any suitable shape—such as, for example, that known as the “cigar shape,” illustrated in the drawings—properly ballasted to prevent its turning over; and it may be provided with a turret, conning-tower, or dome, G, provided with glass bull’s-eyes H, for electric lights or for lookout purposes. The displacement-chambers may be protected, when thrust out, by guards E, secured to the boat or vessel over and around the openings through which the displacement-chambers pass, it being understood that the said guards are perforated or otherwise open for the entry of water into them.

The motive power employed may be electricity, compressed air, or other powers suitable for use under water.

In some cases it may be desired to form an egress and ingress opening in the boat or vessel, whereby a diver can leave the same and return thereto while the boat or vessel is submerged. This we effect by means of a chamber furnished with an inner and an outer water-tight door, somewhat like the arrangement used for the introduction and withdrawal of workmen to and from the high-pressure pneumatic caissons now employed in the construction of the piers of bridges and in other submarine operations, but furnished with proper connections for the air-pipes for the supply of air to the diver while he is absent from the boat or vessel. The method of operating with this device is as follows: The outer door next the sea being shut, the inner one is opened, and the diver passes from the interior of the boat or vessel into the chamber, and his helmet is connected by a suitable length of tube with the air-supply pipe, which passes water-tight through some part of the chamber, and is connected to the air-pumps or other source of compressed air. The inner water-tight door is then closed and water admitted from the outside, so as to fill the chamber containing the diver. The outer door is then opened, and the diver can pass out of the boat or vessel in order to fix a torpedo or perform any other operation required, after which he re-enters the chamber, the outer door is closed, and the water run out from the chamber into the bilge or into another receptacle, from whence it may be pumped out into the sea. The inner door is then opened,

and the diver returns into the interior of the boat or vessel.

We do not claim, generally, devices for raising or lowering submerged boats in the water, as we are aware that devices for those purposes are already known; nor do we claim the means described for enabling a diver to leave and re-enter a submerged vessel, as we have reason to believe that such means have before been proposed or used.

We claim—

1. In a submarine boat or vessel, the combination, with water-tight openings in its sides or other parts of the structure, of water-tight displacement-chambers moving inward and outward through such openings, and means, substantially as described, for operating and controlling said displacement-chambers, whereby the buoyancy of said boat or vessel may be increased or decreased at pleasure, substantially as hereinbefore described.

2. In a submarine boat or vessel, the combination, with recesses therein, of the displacement-chambers moving in the same, screw-threaded shafts turning in suitable bearings, the screw-threads on said shafts taking into screw-threads formed in the inner ends of said displacement-chambers, and a wheel for turning said shaft for the purpose of forcing said chambers inward or outward, substantially as set forth.

3. In a submarine boat or vessel, the combination, with recesses therein, of the displacement-chambers moving in the same, provided with screw-tapped recesses in their inner ends, a right-and-left-screw-threaded shaft turning in suitable bearings, the threads on said shaft taking into the threads of said screw-tapped recesses, and means for turning said shaft, substantially as and for the purpose specified.

4. The combination, with the displacement-chambers of a submarine boat or vessel and the recesses in which they move, of guards arranged on and attached to the outside of said vessel, for the purpose of protecting said displacement-chambers, substantially as set forth.

ANDREW CAMPBELL.
JAMES ASH.

Witnesses:

STEPHEN EDWARD GUNYON,
115 Cannon Street, London.

WILLIAM ANDERSON SMITH,
23 Farleigh Road, London, N.