

C. J. F. M. LILLIEHOOK.
SHIP OR VESSEL.
APPLICATION FILED JUNE 9, 1904.

975,699.

Patented Nov. 15, 1910.

2 SHEETS-SHEET 1.

Fig. 1.

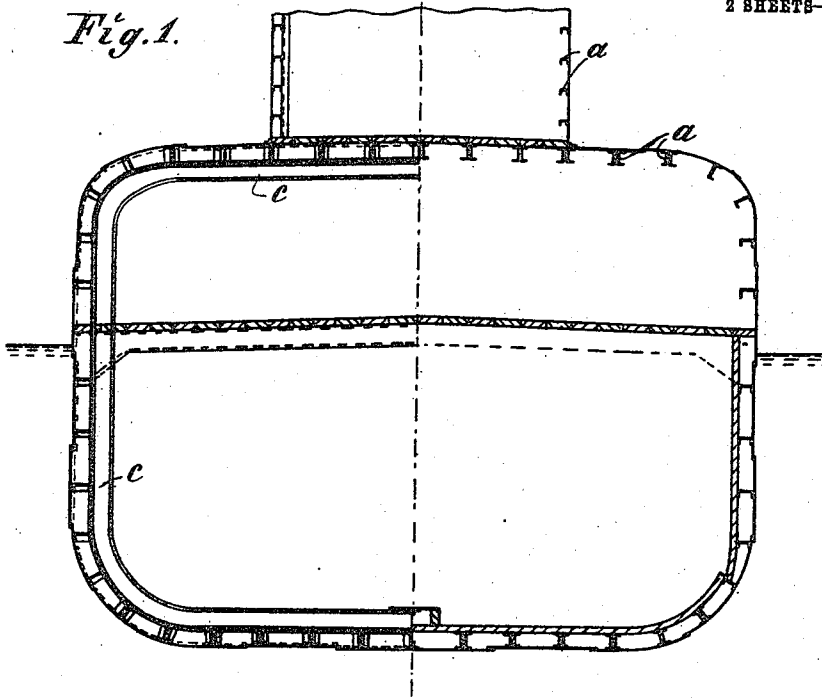
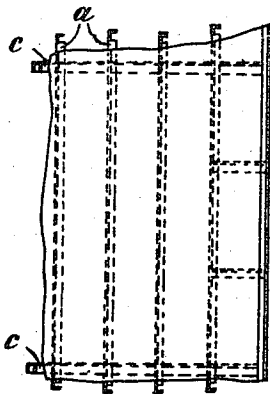


Fig. 3.



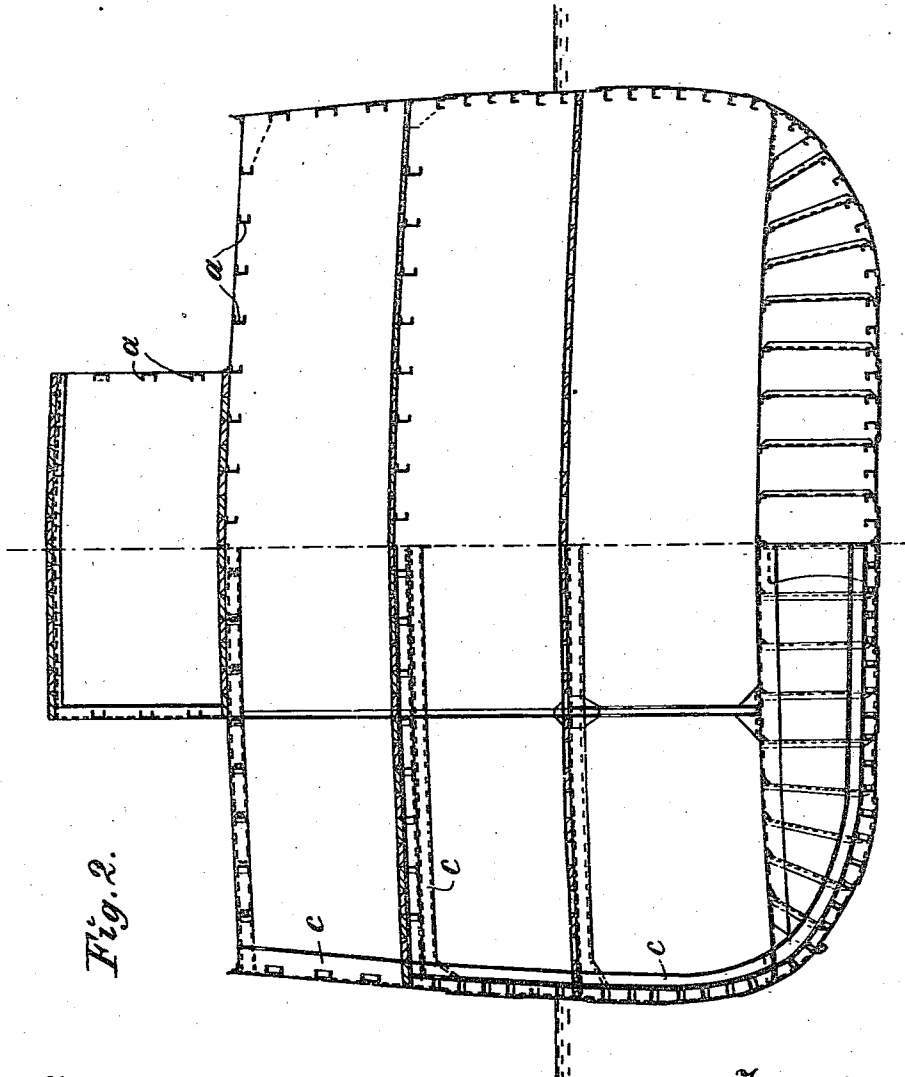
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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SHIP OR VESSEL.

975,699.

Specification of Letters Patent.

Patented Nov. 15, 1910.

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To all whom it may concern:

Be it known that I, CARL JOHAN FREDRIK MALCOLM LILLIEHÖÖK, a subject of the King of Sweden, and resident of Stockholm, Sweden, have invented new and useful Improvements in Ships or Vessels, of which the following is a specification, reference being had to the drawings accompanying and forming a part hereof.

This invention relates to improvements in ships or vessels.

With the present method of building ships or vessels with transverse frames and a small number of longitudinal girders or beams in the bottom, and sometimes also in the sides, a comparatively greater strength is obtained athwartship than in the longitudinal direction. As, however, it is well known, that the greatest strains are the bending-strains in a vertical plane in the longitudinal direction of the vessel, it will easily be seen that the longitudinal beams in the sides only imperfectly contribute to increase the vessel's power of resistance against such strains, hence, with the usual method, especially in larger vessels, it is necessary to make use of a strongly built deck, or decks, without, however, obtaining the desired solidity and strength.

The object of the present invention is to provide a lighter, cheaper, and stronger construction of the various parts in ships or vessels, by making better use of the building material.

The invention consists in the combinations, arrangements and construction of parts hereinafter described and claimed.

In the accompanying drawings I have shown two ships or vessels embodying my invention. Figures 1 and 2 are cross-sections thereof. The left halves of the figures are sections showing the transverse frames or beams *c*, and the right halves are sections between them showing the longitudinal framing. Fig. 3 is a detail.

In the sections the bottom and sides are built of continuous longitudinal frames and in Fig. 2 is shown a double bottom. The transverse strength is obtained by bulkheads, diagonals, and strong transverse-frames or beams *c*, consisting, preferably, of single or double U-irons, angles, or other suitable shapes, placed on the inner side of the former and at a suitable distance from each

other in accordance with the strength required.

When the room between the decks does not admit continuous transverse beams under the longitudinal beams, the former may be made intercostal. When an iron deck is not used, plates are secured to the transverse-beams, and in these plates the deck-planks are secured. The deck is laid in the usual manner with stringers along the sides and the transverse-beams are secured to them and to the underlying beams or to the sides of the vessel by means of knee-plates, welded knees or otherwise as most convenient. The stringer-plates are supported by knee-plates fastened to the side where necessary, see Fig. 3, which shows a detail of an iron or steel deck. These knee-plates may also support the outermost longitudinal beam, see Fig. 2.

The beams are supported in the usual manner between the decks and the bottom of the vessel by stanchions or pillars, which may also support the longitudinal beams, or by means of diagonal-stays.

In order to be able to lay the deck-planks in a longitudinal direction, when an iron deck is not used, tie-plates are fitted to run athwart the ship, between the transverse beams, from stringer to stringer plate; they may also be placed diagonally, and the deck may be laid in sections, if desired.

As it is principally the beams in the bottom and in the upper decks, which are situated far from the neutral axis, that contribute to the strength of the vessel in the longitudinal direction, the beams of the middle-deck or lower deck may be placed athwart the ship in the usual manner, see Figs. 1 and 2, and the frames could, therefore, also be of the usual transverse type.

By means of this construction the shell-plating or the hull will be stronger for breaking or shearing stresses, as a less number of rivet-holes are required to fasten the plates at the longitudinal frames or beams and the holes are not made in a transverse section as in the frames in the old system.

Having now described my invention and construction, what I claim as new and desire to secure by Letters Patent is:

1. A metal ship constructed with a plurality of continuous longitudinal beams directly attached to the deck plating, and a

plurality of cross-beams disposed under the inner edges of the longitudinal deck beams; substantially as described.

5 2. A metal ship constructed with a plurality of continuous longitudinal beams directly attached to the deck plating, and a plurality of cross beams disposed under the inner edges of the longitudinal deck beams; the upper longitudinal beams of the vessel
10 being in preponderant number in relation to the cross beams, substantially as described.

15 3. A metal ship constructed of longitudinal metal beams at the deck, sides, and bottom, to one edge of which the plating is connected, and transverse beams, the longitudinal

nal beams being in a preponderant number 20 in relation to the cross beams, and the latter being placed at great distances from each other, said longitudinal beams being connected to said cross beams and to the skin of the ship. 25

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CARL JOHAN FREDRIK

MALCOLM LILLIEHÖÖK.

Witnesses:

GERDA LINDKIRST,

JOHN DELMAR.