

(No Model.)

3 Sheets—Sheet 1.

F. L. NORTON, Dec'd.

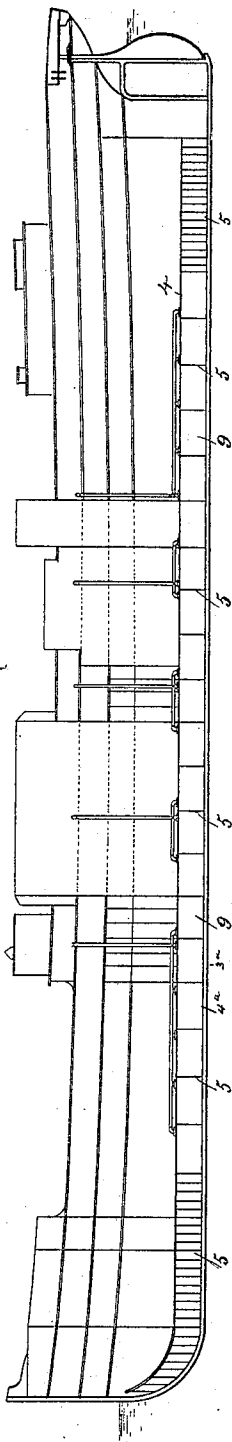
B. L. FAIRCHILD, Executor.

VESSEL.

No. 473,406.

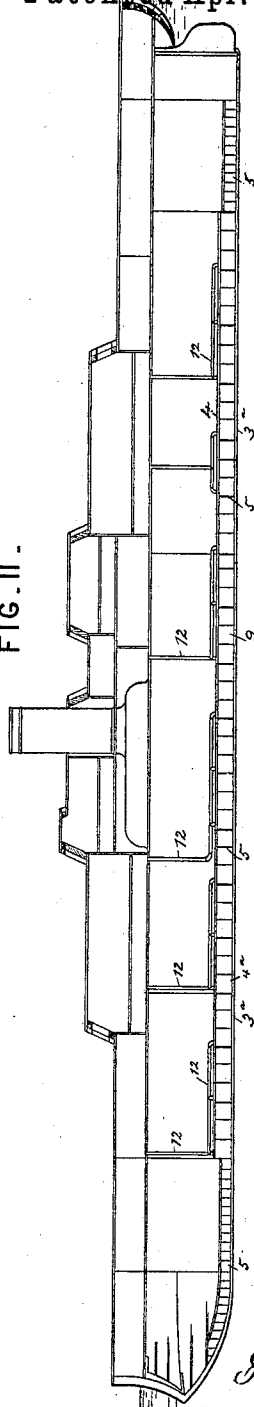
Patented Apr. 19, 1892.

FIG. I.



Attest:
Geo. T. Smallwood.
E. Arthur.

FIG. II.



Inventor:
Francis L. Norton.
By Knight Bros attys

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FIG. IV.

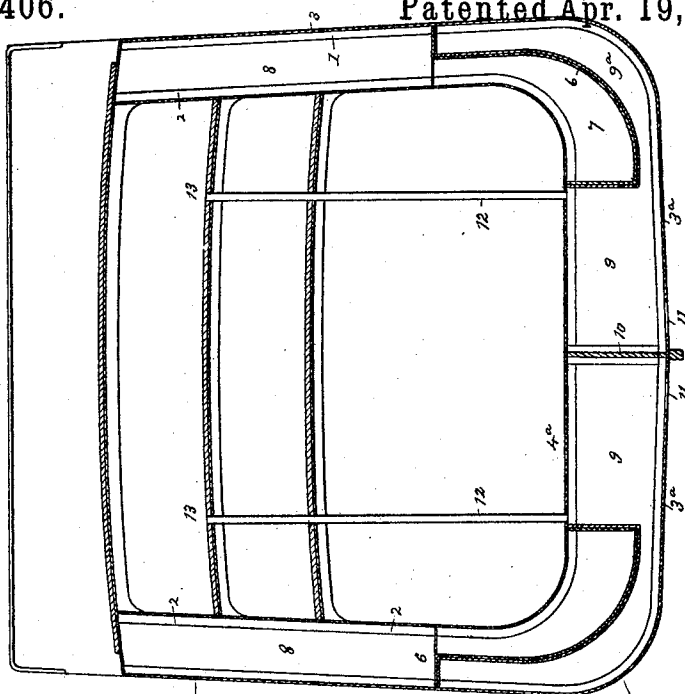
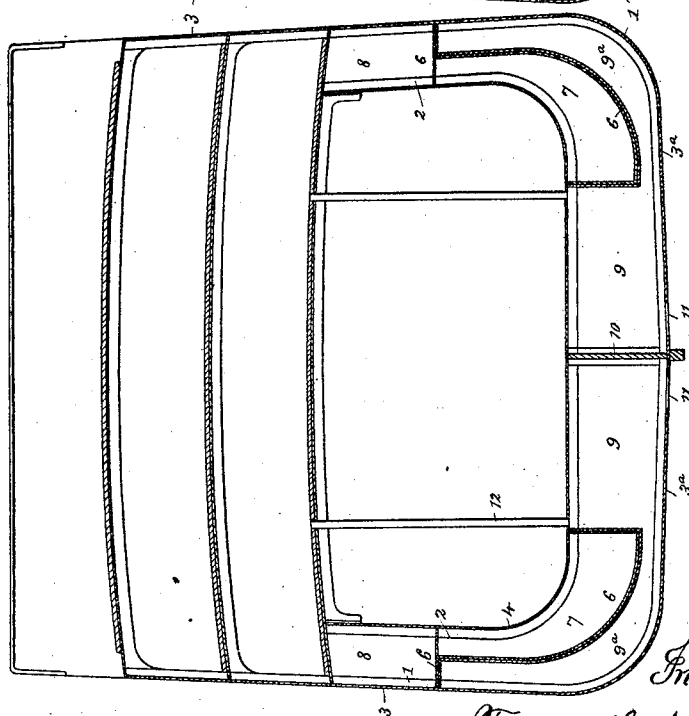


FIG. III.



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3 Sheets—Sheet 3.

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FIG. V.

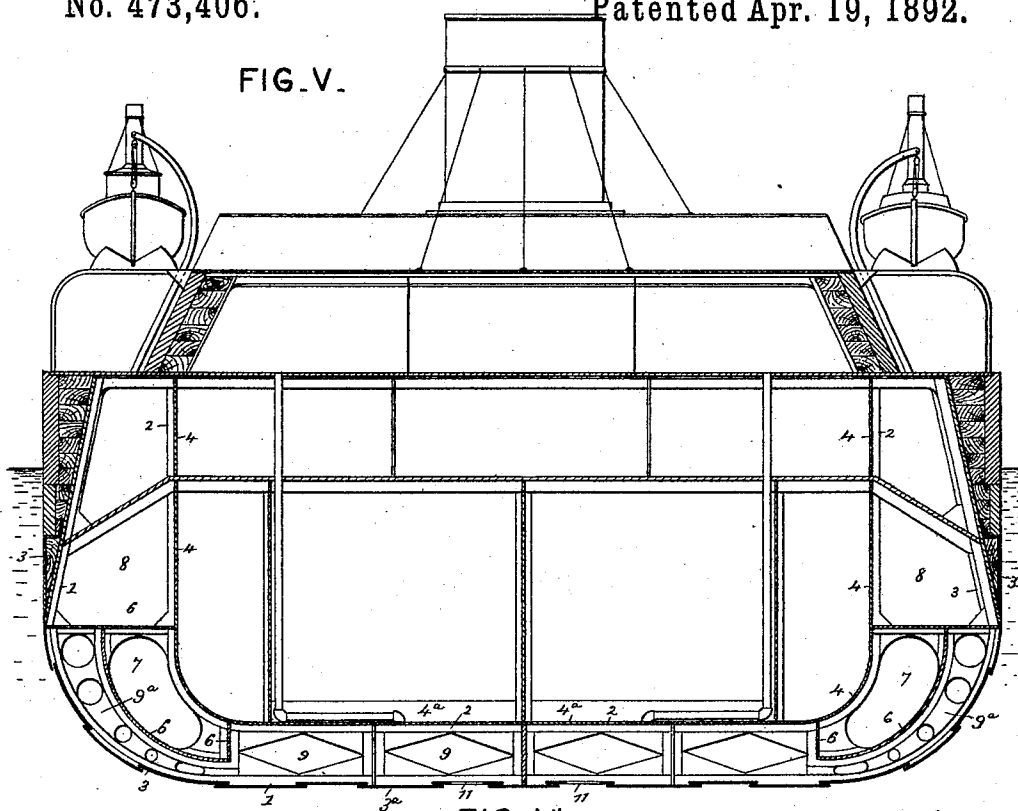
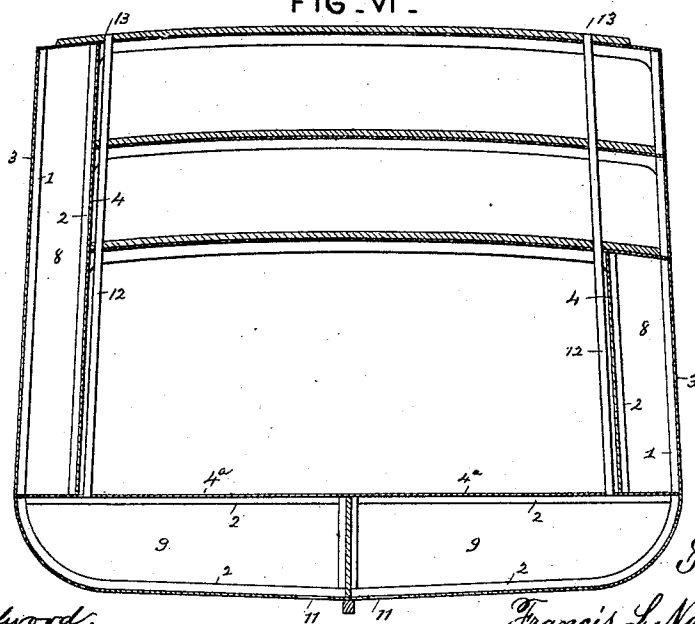


FIG. VI.



Attest.

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C. Arthur.

Inventor:

Francis L. Norton.

By *Knight*

UNITED STATES PATENT OFFICE.

FRANCIS L. NORTON, OF NEW YORK, N. Y.; BEN L. FAIRCHILD EXECUTOR
OF SAID FRANCIS L. NORTON, DECEASED.

VESSEL.

SPECIFICATION forming part of Letters Patent No. 473,406, dated April 19, 1892.

Application filed June 14, 1889. Serial No. 314,248. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS LAY NORTON, a citizen of the United States, and a resident of the city, county, and State of New York, have
5 invented certain new and useful Improvements in the Construction of Vessels, of which the following is a specification.

The invention has for its object improvements in the construction of yachts, merchant
10 vessels, and vessels of war, in order to render them safer, to decrease and minimize the danger of their foundering at sea from any damage to their hulls from collision or otherwise, and to increase their stability, buoyancy, and
15 speed.

In the accompanying drawings, Figure I is a vertical longitudinal section of a passenger-ship embodying my invention. Fig. II is a vertical longitudinal section of a war-ship embodying my invention. Fig. III is a transverse section, on a larger scale, of a passenger-ship constructed with a double frame and skin terminating at the main deck. Fig. IV is a transverse section of a passenger-ship, showing the double frame and skin extending to the upper deck. Fig. V is a transverse section of the war-ship, also on a larger scale. Fig. VI is a transverse section of a vessel, showing a modification hereinafter described.

In carrying my invention into effect I construct the vessel with two distinct frames 1 2 and with a double skin 3 4. The space between these two skins or frames for the whole or greater part of the vessel's length, commencing from amidships and extending to or
35 toward each end, I subdivide by means of transverse and longitudinal bulk-heads 5 6, forming thereby a number of separate water-tight cells or compartments 7 8. I also construct my vessel with a double bottom 3^a 4^a, subdivided into numerous compartments or cells, forming thereby a number of water-ballast chambers 9. I also provide my vessel with a center keelson 10, running from stem to
45 stern and made water-tight in the double bottom and of sufficient height to support the floor of the inner bottom 4^a. All floors I construct solid and water-tight between every two or more frames, as may be desirable. All
50 bulk-head plates are properly stiffened and made carefully water-tight, whereby in the

event of injury to the outer skin or frames the vessel would, when constructed as herein described, still have a sufficient buoyancy for safety, and these frames and skins or plank-
55 ings are also connected together in a water-tight manner at their upper parts by covering-plates, in order to prevent the entrance of water between the same.

The vessel may be constructed upon any
60 model selected by the designers. The water-ballast chambers 9 may be formed with comparatively narrow arms 9^a, extending to a greater or less distance around the bends of the vessel outside the close air-cells 7, or the
65 said water-ballast chambers may be formed straight across the vessel from frame to frame, as illustrated in Fig. VI, without the rising arm 9^a, as above described.

To render the water-ballast system auto-
70 matic, I provide external openings 11 in the bottom in line with and close to the keel on each side. There may be one or more of such longitudinal openings into each ballast-chamber. These openings vary from six to eighteen
75 inches in transverse width, or thereabout, according to the size of the vessel. I connect with the top plate of each of the said ballast-chambers an air-pipe 12, which passes up vertically and is connected with an air-valve 13,
80 placed above the water-line, for the escape of the air which is in the chambers when the water enters, thereby enabling such ballast-chambers to immediately receive their water-
85 ballast and preventing any reflux of air into the chambers or consequent escape of water therefrom. The frames and plating forming the top of these ballast-chambers must be made carefully water-tight and of sufficient
90 strength to support and float the vessel. The openings in the bottoms of these ballast-chambers are, except in very small vessels, of sufficient size to be used as man-holes and entered for the purposes of cleaning and
95 painting.

A vessel so constructed will on being
launched into the water receive her water-bal-
last through the openings 11 into the cham-
bers 9 9^a of her double bottom, the air dis-
placed from the chambers 9 escaping through
100 the valve-guarded pipes 12, while that which is imprisoned within the rising arms 9^a is com-

pressed in the upper extremities thereof, forming air-cushions.

My improved automatic water-ballast system greatly augments the stability and sea-
5 buoyancy of the vessel, and as she floats upon her inner bottom the friction of the water upon her outer bottom will be greatly diminished and she will secure additional speed. The double-compartment frames and skins
10 will afford ample protection to her buoyancy in case of damage from collision or otherwise and render her practically non-sinkable. A war-ship so constructed with the water-ballast chambers in her double bottom will have an
15 additional security against the explosive force of torpedoes, as the water lying between the two skins operates as a cushion for the protection of the inner bottom, even should the outer bottom be largely torn or blown out.
20 In constructing passenger-ships I preferably end the double frame or hull at the main deck, as shown in Fig. III. This affords ample room in the lower hold for the carriage of machinery, coal-bunkers, &c., while leaving
25 the entire decked-in space or spaces above the main deck for the accommodation of passengers and other requirements. In all other

respects I construct my vessel as shown and delineated in the drawings or approximately thereto. The essential peculiarities of this 30 form of construction extend only to the double frames and plankings and skins, in combination with the cellular bottom and water-ballast chambers.

Having thus described my invention, the 35 following is what I claim as new therein and desire to secure by Letters Patent:

The vessel constructed with the outer skin and the inner skin, the space between the two skins being subdivided by means of trans- 40 verse and longitudinal bulk-heads arranged about midships and extending toward each end, and with the center keelson extending from stem to stern and forming the support for the floor of the inner bottom, the 45 valved air-pipes communicating with the air-compartments and the bottom water-inlets, all constructed and arranged substantially as set forth.

FRANCIS L. NORTON.

Witnesses:

OCTAVIUS KNIGHT,
EMMA ARTHUR.