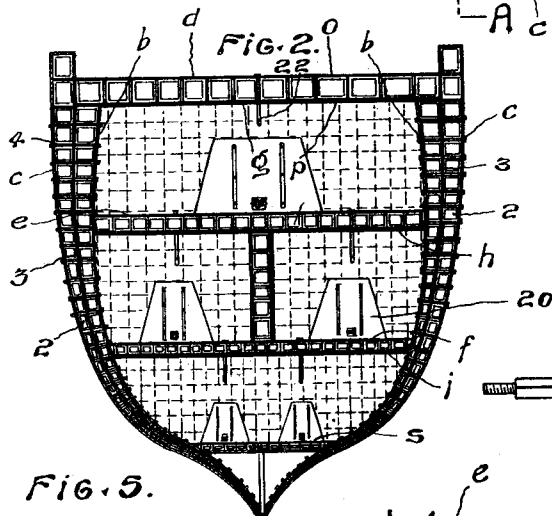
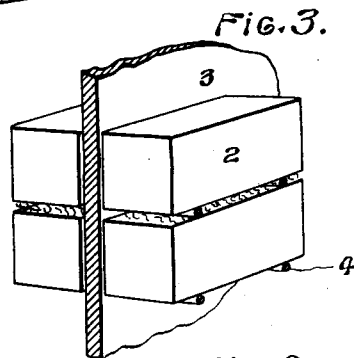
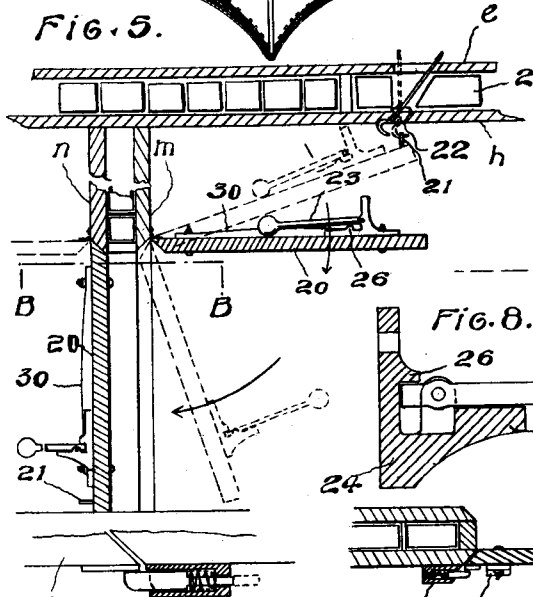
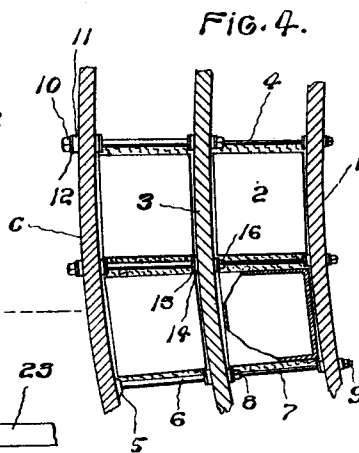
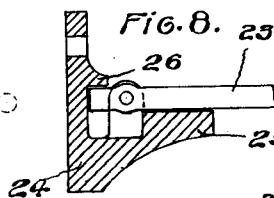
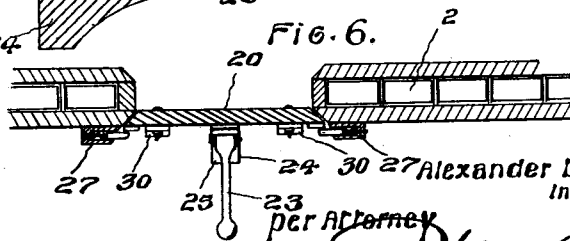


1,066,087.

[illegible]

20 FIG. 7. 27
witnesses:
Gordon Hooke
J. R. Kitz

Alexander Dingwall
Inventor.

per Attorney

Attorney
William P. H. Kent

UNITED STATES PATENT OFFICE.

ALEXANDER DINGWALL, OF MONTREAL, QUEBEC, CANADA.

VESSEL.

1,066,087.

Specification of Letters Patent.

Patented July 1, 1913.

Application filed September 13, 1912. Serial No. 720,178.

To all whom it may concern:

Be it known that I, ALEXANDER DINGWALL, residing at 324 Lagauchetiere street, city of Montreal, Province of Quebec, Dominion of Canada, a subject of the King of Great Britain, have invented certain new and useful Improvements in Vessels; and I do hereby declare that the following is a full, clear, and exact description thereof.

10 My invention relates particularly to vessels for transporting passengers, freight and live stock, and it has for its object to reduce the danger of the vessel sinking when its hull is punctured or otherwise damaged.

15 The invention may be said briefly to consist of an interlining or filling for the walls of the hull, decks and bulkheads consisting of a multiplicity of individual air-tight compartments increasing in capacity from the keel to the gunwale; and it further consists of the structural features, and combinations and particular arrangements of parts hereinafter described and pointed out in the claims. For full comprehension, however, 25 of my invention reference must be had to the accompanying drawings forming a part of this specification in which similar reference characters indicate the same parts, and wherein:

30 Figure 1 is a deck view partly broken away of an ocean going vessel containing my invention; Fig. 2 is a transverse vertical sectional view thereof taken on line A A Fig. 1; Fig. 3 is a detail perspective view of several of the air tight compartments; Fig. 4 is a detail horizontal sectional view taken through the hull; Fig. 5 is a detail longitudinal vertical sectional view taken through one of the bulkheads and illustrating particularly the doors in the bulkhead and the manner of supporting and releasing the same, one door being shown closed, and the other in the act of closing, and in dotted lines indicated in supported position and 45 just about to close; Fig. 6 is a horizontal sectional view of a bulkhead taken on line B B Fig. 5; Fig. 7 is a detail sectional view of a means for locking the bulkhead doors automatically; Fig. 8 is a detail view of a bracket for supporting the weight by which the door is forced to closed position; and Fig. 9 is a detail elevation of one of the bolts by which the air compartments are supported and the three walls of the hull 55 braced.

The frame of the vessel is constructed and

the inner and outer walls *b* and *c* respectively of the hull are set in place, the decks *d*, *e*, and *f* laid and the ceilings *g*, *h*, *i* and *s* hung all in the usual way. During this 60 building operation I locate within the space between the inner and outer walls *b* and *c* of the hull and commencing at the keel, a middle wall 3 and within each of the spaces divided by this middle wall a series of inde- 65 pendent and comparatively flat hermetically sealed air-tight compartments 2 consisting preferably of sheet metal. Above this series a second series of compartments of slightly greater capacity is located and other series 70 progressively increasing in capacity are added as the building progresses, the compartments of largest capacity being at the gunwale. (See Fig. 2.) In this manner the entire hull is made to incase within its walls 75 a multiplicity of hermetically sealed compartments distinct from each other and increasing upwardly in relative buoyance owing to their difference in capacity.

The bulkheads comprise fore and aft walls 80 *m* and *n* between which are located the individual hermetically sealed air-tight compartments 2; and the decks consist of deck boards *o* and ceiling boards *p* between which the compartments are located, the ceiling boards 85 retaining the compartments in place.

In order to prevent displacement of the compartments within the spaces containing them they are preferably rigidly held by tamping a suitable filling between the com- 90 partments and the walls of the spaces in which they are located.

In order to further obviate the danger of the chambers falling from place in the event of the chambers beneath them being displaced, each is independently supported by bolts 4. These bolts project through the inner and middle walls of the hull and those below the water line are carried at their outer ends in seats 5 formed upon the inner 100 side of the outer wall of the hull the portion 6 of their length between the outer and middle walls being of square cross-section and the remainder rounded as at 7 and having screw-threaded portions 8 and 9. The 105 bolts above the water line penetrate the outer wall and are screw-threaded and have nuts 10 screwed thereon and comparatively soft packing washers 11 and metal clamping washers 12 between the nuts and inner wall 110 of the hull. To steady the bolts in place and at the same time brace and strengthen

the hull the rounded portions thereof are screw-threaded in positions contiguous to the middle wall, and their inner ends are diminished to form shoulders bearing
 5 against the inner wall with the inner ends projecting through and screw-threaded. Comparatively soft packing washers 14 and metal clamping washers 15 are located between the shoulders of the bolts and the
 10 outer sides of the walls, and the opposite side of the walls and nuts 16 screwed upon the bolts.

The advantage of my invention is that the greater buoyancy being at the top of
 15 the hull there will be a tendency of the vessel to always maintain a perpendicular position when submerged or partially submerged and consequently to right itself, the effect being that the rolling of the vessel
 20 will in a measure be corrected; and in the event of capsizing and sinking below the surface will rise again with gunwale uppermost.

Another important advantage is that the
 25 vessel will remain unsinkable even if a hole is made in her side sufficiently large and enough compartments are destroyed to permit her to fill with water. In such an event the vessel will lie partially submerged and
 30 right side up until the hole is mended and the water is dislodged.

In order to increase the proportion of buoyancy at the top of the vessel I provide
 35 openings in the bulkheads for communication between different parts of the vessel by doorways downwardly increasing in width, the effect being that there will be more buoyancy in the upper part of the bulkhead than in the lower owing to the portion
 40 cut away by the greater width of the lower portion of the doorway.

To prevent flooding of other parts of the vessel in the event of an inward rush of water, doors 20 are hinged at their upper
 45 ends to the respective walls of each bulkhead and each door is provided with an eye 21 engaged by the bent lower end of a lever 22 projecting upwardly through the deck above. Each door carries also a
 50 weighted arm 23 hinged to a bracket 24 having a rest or stop 25 to sustain the arm out of contact with the lower deck when the door is closed, and a ledge 26 beneath which the tail of the bar engages simultaneously
 55 with its engagement with the stop 25. The frame of each door carries two pairs of spring locks 27, a pair at each side of the door opening, adapted to yield and permit

the door to freely pass but spring into position and lock it when closed. Under normal conditions these doors are suspended
 60 by the hooks 22, the weighted arms lying upon the doors, and when occasion requires the hooks may be detached from the doors and the latter allowed to fall. During
 65 the fall of the doors the weighted arms are swung out from the doors by gravity until stopped by the rest or stop 25 and ledge 26. The inertia of the weighted arms thus accelerates the fall of the doors and causes
 70 them to be driven tightly into the doorways. In order to make the doors fit the door jambs more perfectly and to enhance the tightness of the joints, the edges of the doors and the jambs are correspondingly
 75 beveled and the jambs are furnished with gaskets.

The doors are prevented from sagging or warping while supported by the hooks, by a pair of stiffening ribs 30 and 31 heavy
 80 at the middle and tapering to each end located near each side of the door and bolted in place through holes in the ribs and door, the holes being packed by packing and clamping washers.
 85

If desired, without departing from the spirit of this invention, the triple walls may be used without the air compartments.

What I claim is as follows:—

1. In a vessel, a multiplicity of air tight
 90 compartments within the walls of the vessel and of progressively increasing capacity from the keel to the gunwale.

2. In a vessel comprising a hull, decks, and bulk-heads, a multiplicity of individual
 95 air tight compartments within the walls of the said members of the vessel, the compartments within the walls of the hull being of progressively increasing capacity from the keel to gunwale.
 100

3. In a vessel, a multiplicity of air tight compartments within the walls of the vessel and of progressively increasing capacity from the keel to the gunwale, and bolts penetrating the walls beneath the air tight
 105 compartments for the purpose of supporting the latter independently of the compartments beneath them.

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

ALEXANDER DINGWALL.

Witnesses:

E. R. PITTS,
 GORDON G. COOKE.