

No. 713,454.

Patented Nov. 11, 1902.

F. A. KNAPP.
MARINE VESSEL.

(Application filed Jan. 11, 1902.)

(No Model.)

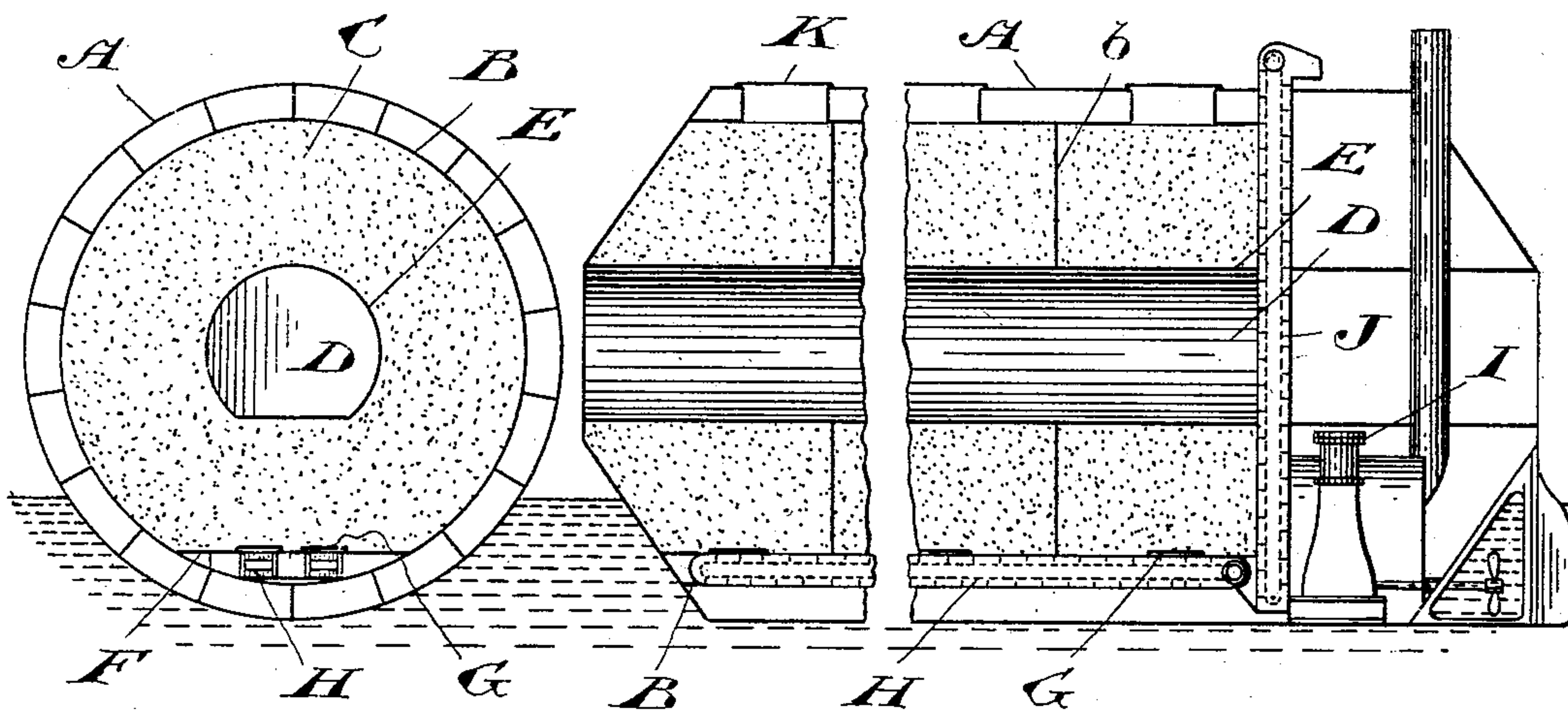


Fig. 1.

Fig. 2.

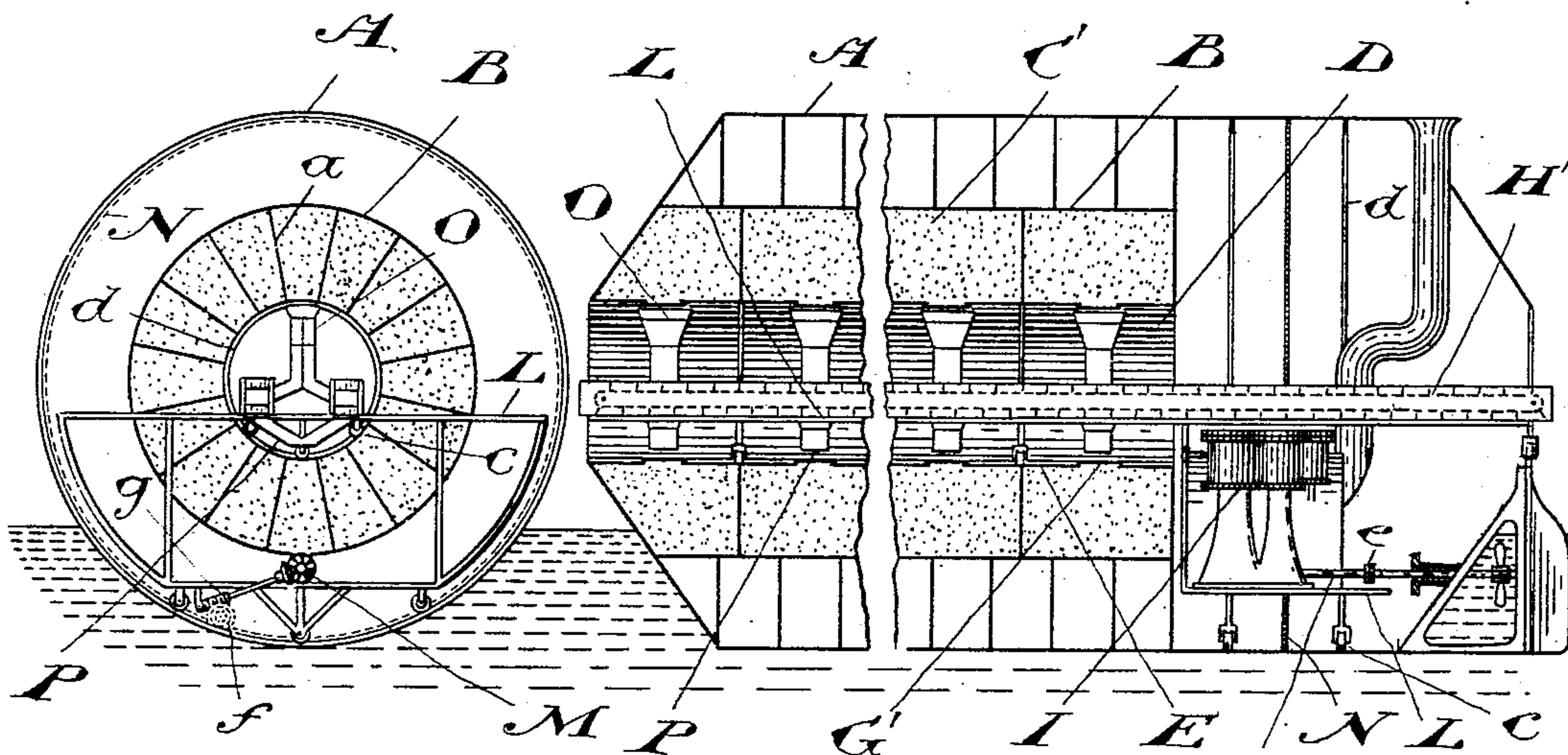


Fig. 3.

Fig. 4.

Witnesses

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FREDERICK A. KNAPP, OF PRESCOTT, CANADA.

MARINE VESSEL.

SPECIFICATION forming part of Letters Patent No. 713,454, dated November 11, 1902.

Application filed January 11, 1902. Serial No. 89,343. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK A. KNAPP, of the town of Prescott, in the county of Grenville, Province of Ontario, Canada, have invented certain new and useful Improvements in Marine Vessels, of which the following is a specification.

The object of my invention is to devise a cargo vessel which may be very cheaply built, which is of a strong form, and hence may be light in construction and owing to the consequent saving of weight of great carrying capacity on a given draft of water, and in which loading and unloading facilities are provided which will reduce the cost of handling to a minimum; and it consists, essentially, of a vessel of tubular form provided with a cargo-compartment having an endless conveyer therein adapted to convey the cargo to an elevator, substantially as hereinafter more specifically described and then definitely claimed.

Figure 1 is a cross-sectional elevation of my improved vessel. Fig. 2 is a longitudinal section of the same, parts being broken out to shorten the drawing. Fig. 3 is a cross-sectional elevation of a modification of my vessel, and Fig. 4 a longitudinal section of the same broken away in a manner similar to Fig. 2.

In the drawings like letters of reference indicate corresponding parts in the different figures.

My vessel is preferably shaped as a cylindrical tube, though polygonal or other practically cylindrical forms might be adopted for the cross-section. The hull comprises an outer skin A and an inner skin B, inclosing an air-space, which not only contributes to the safety of the vessel, but prevents the heating of the cargo when the vessel is used as a grain-boat. Within the inner skin are located one or more compartments C, forming the cargo-space.

In Fig. 1 a single annular compartment is formed surrounding the central package-freight compartment D, formed by the tube E, extending from end to end of the vessel.

In Fig. 3 instead of a single annular cargo-compartment I show the space between the inner skin and the tube E divided by radial bulkheads or partitions *a* into a number of

longitudinal compartments shaped in cross-section as segments of an annulus.

In each form of vessel the cargo compartment or compartments run from end to end of the vessel and are preferably divided into sections by means of transverse bulkheads *b*.

In Figs. 1 and 2 I show at the bottom of the cargo-compartment a false bottom or partition F, having a series of doors G formed therein. Two series of doors, side by side, are shown in Fig. 1, and beneath each series is located an endless conveyer H, which may be operated in any suitable manner from the engine I, located at one end of the boat. The doors G may be operated by hand or in any suitable manner to allow the contents of the cargo-compartment to drop by gravity into the endless conveyer, by means of which they are moved to the elevator J, which will be driven in any suitable manner. This elevator will raise the grain or other cargo to any desired point of discharge. Grain or other loose cargo is introduced into the cargo-compartments through suitable openings in the skins of the vessel at the top. These openings are closed by the hatches K, and suitable provision is of course made to prevent cargo falling between the skins of the vessel. The engine operates a propeller in the ordinary manner, the vessel being provided with suitable boiler, rudder, and other necessary machinery and accommodation. The central compartment of the vessel gives suitable accommodation for package-freight. This compartment lends itself readily to water-tight bulkheading and has sufficient capacity to float the vessel and cargo, if the need arises.

From the description given it will be seen that a vessel such as described may be very cheaply built, owing to the cylindrical tubular form, no less than three substantially concentric tubes being used, suitably connected and braced. This form is also very strong, and hence great saving in material is gained over vessels of ordinary construction. This means that the vessel will possess great carrying capacity on a given draft of water.

As the cargo when being loaded requires no handling, manual labor in loading is almost entirely dispensed with, the grain being led from chutes or cars directly into the hatches

and allowed to fill up the compartments by gravity. In unloading also a very great saving will be effected, as the vessel uses its own power and its own crew in unloading, which the conveying and elevating apparatus is sufficient to effect very rapidly and cheaply.

The form shown in Figs. 3 and 4 is intended particularly for vessels of larger construction than that shown in Figs. 1 and 2. The same tubular form and double-skin construction is found, but the conveyers *H'* are located in the central compartment *D*, and the whole vessel is rotated to bring the compartments *C'* over or under the conveyers, according as any particular compartment is to be filled or emptied. The conveyers are carried on a platform *L*, provided with guide-wheels *c*, adapted to run on the circular tracks *d*. This platform is extended down into a large compartment at the stern of the vessel, in which the engine and boilers are located, similar guide-wheels and tracks being here found. The shaft *M* of the engine is preferably provided with a coupling *e*, by means of which it may be disconnected or connected, as required. This may be of any form suitable. *N* is a circular rack secured to the outer skin of the vessel and having a pinion *f* meshing therewith. This pinion is secured to a worm-wheel engaged by the worm *g*, formed on a shaft driven by suitable bevel-gearing from the shaft *M*. When the shaft *N* is uncoupled, the gearing just described may be operated to bring any desired compartment above or below the elevators. Of course the gearing must be made in such a manner that it may be given a driving connection with the engine-shaft or released at will. The conveyers *H'* are provided with spouts *O*, adapted to receive grain, and spouts *P*, adapted to discharge grain. In this form of vessel the tube *E* is equivalent to the false bottom or the partition *F* and in it are formed the doors *G'*, corresponding in position with the spouts *O* and *P*. When the vessel is to be loaded, grain or other loose cargo is delivered to one end of the conveyers *H'*, which are set in motion by any suitable means and convey the grain to the spouts *P*. The doors in the compartment below the spouts *P* are opened and this compartment filled. The conveyer is then stopped, the doors closed, and the vessel rotated to bring this compartment to the top. The compartment at the bottom is now filled and the hull again rotated to bring the filled compartment to the horizontal position. The compartment now at the bottom is filled, and then the compartment opposite, and so on until the vessel is full. The method of discharging is exactly the reverse to this, the doors in the compartment over the spouts *O* being opened and the compartments emptied one after the other in reverse order. The conveyers may discharge directly into some smaller vessel or

conveyance or may discharge directly to the elevating mechanism of an ordinary elevator.

The vessel as described, besides being economical as a carrier, may be used during the winter months or at any other season for storage purposes, as it will hold a large quantity of grain without any possible danger of heating.

What I claim as my invention is—

1. In a marine vessel, the combination of a central tube; an inner skin; and an outer skin suitably connected and arranged to form an annular air-space between the two skins and an annular cargo-space between the inner skin and the central tube, substantially as described.
2. In a marine vessel, a central tube; an inner skin; an outer skin suitably connected and arranged to form an annular air-space between the two skins; and an annular cargo-space between the inner skin and the central tube in combination with machinery adapted to propel the vessel endwise, substantially as described.
3. In a tubular marine vessel, an outer skin; an inner skin; a central tube; and a cargo-compartment inside the inner skin in combination with an endless horizontal conveyer located below the said compartment and separated therefrom by a suitable partition; and a door located in said partition by means of which the contents of the compartment may be allowed to flow into the conveyer, substantially as described.
4. In a marine vessel, the combination of an outer skin and an inner tube forming between them an annular cargo-space; bulkheads dividing the said space into compartments; and a hatch communicating with the interior of each compartment, substantially as described.
5. A tubular marine vessel having a double skin substantially surrounding the cargo-space; machinery located at one end adapted to propel the vessel endwise; an elevator connected with the vessel and a conveyer adapted to draw the cargo to the elevator and extending from end to end of the cargo-space, substantially as described.
6. In a tubular marine vessel a rotatable outer hull comprising two cylinders inclosing an annular cargo-space; and longitudinal bulkheads dividing the cargo-space into compartments; in combination with a stationary platform suitably supported within the inner cylinder; endless longitudinal conveyers carried by the said platform; means connected with the platform for rotating the said hull to bring any given compartment over the conveyer; and doors in the inner skin communicating with the said compartments, substantially as described.
7. In a tubular marine vessel a rotatable outer hull comprising two cylinders inclosing an annular cargo-space; and longitudinal

bulkheads dividing the cargo-space into compartments; in combination with a stationary platform suitably supported within the inner cylinder; endless longitudinal conveyers carried by the said platform; means connected with the platform for rotating the said hull to bring any given compartment over the conveyer; doors in the inner skin communicating with the said compartments; and means for propelling the vessel endwise, substantially as described.

Montreal, December 27, 1901.

FREDERICK A. KNAPP.

In presence of—

E. T. ASHCROFT,

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