

Sheet 1, 2 Sheets.

Marshall, Joslin, Curtis & Edwards.

Ship Building.

Nº 94,787.

Patented Dec. 14, 1869.

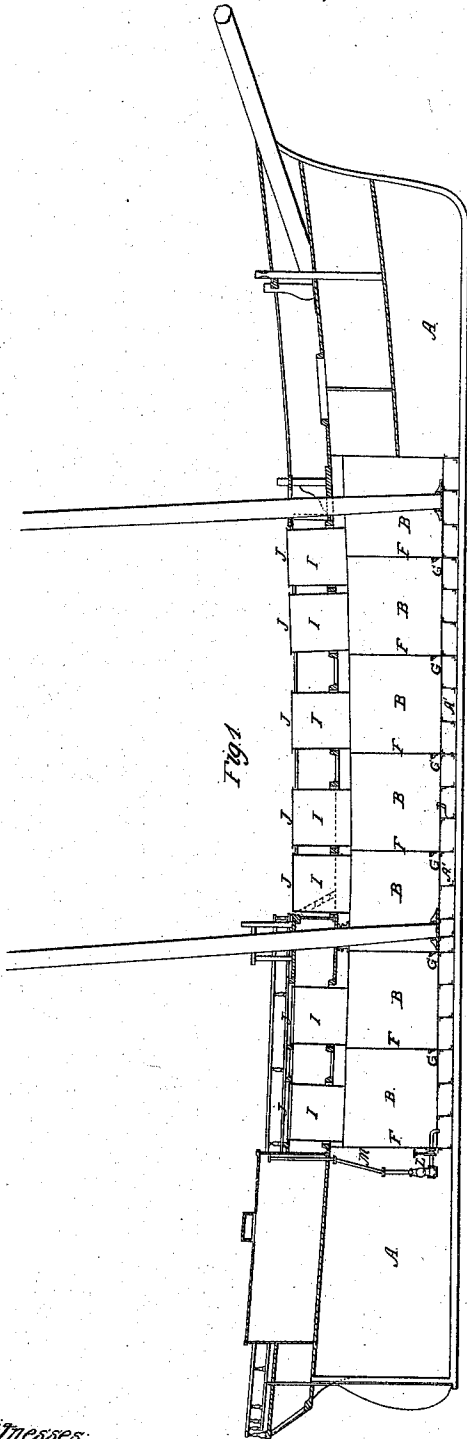


Fig 1

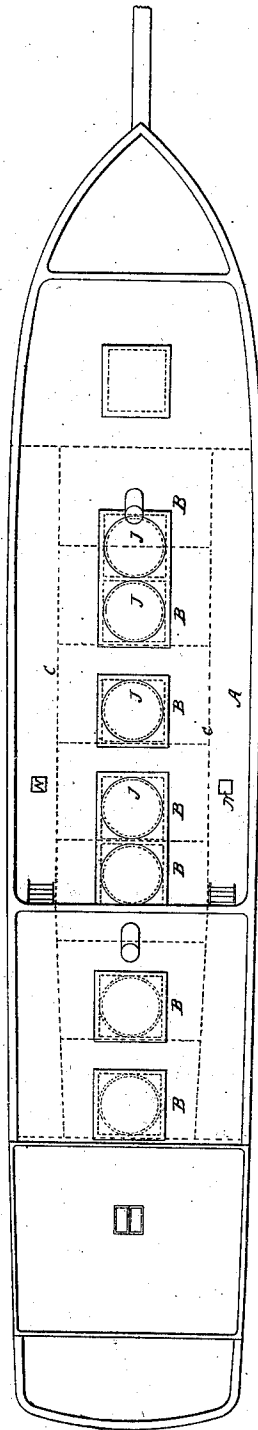


Fig 2

Witnesses:
Frank Allen

Wm. C. Hubbard

Inventors:
J. M. Marshall
Gilman Joslin
Nelson Curtis
Oliver Edwards

Sheet 2.2, Sheets.

Marshall, Joslin, Curtis & Edwards.

Ship Building.

N^o 97,787.

Patented Dec. 14, 1869.

Fig. 3.

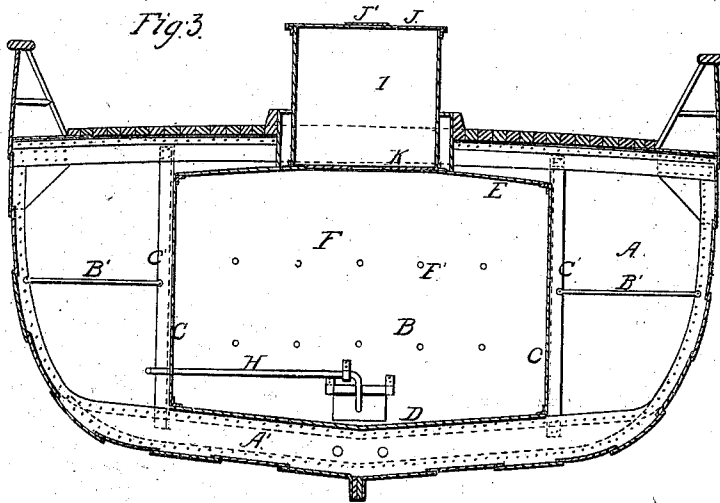
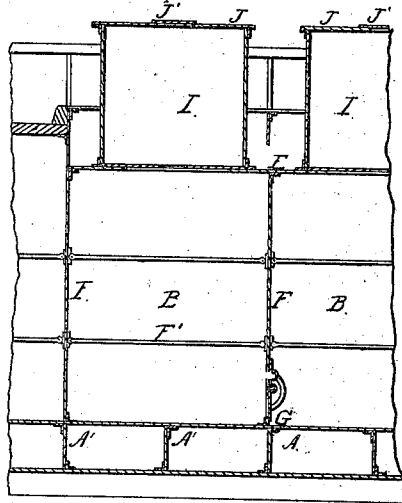


Fig. 4.



Witnesses:

Franklin

Wm. H. Nelson

Inventors:

J. W. Marshall

Edmund Joslin

Edison Curtis

Oliver Edwards

United States Patent Office.

JOHN W. MARSHALL, GILMAN JOSLIN, AND NELSON CURTIS, OF BOSTON,
AND OLIVER EDWARDS, OF BROOKLINE, MASSACHUSETTS.

Letters Patent No. 97,787, dated December 14, 1869.

IMPROVEMENT IN SHIPS OR VESSELS FOR CARRYING LIQUID CARGO.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that we, JOHN W. MARSHALL, GILMAN JOSLIN, and NELSON CURTIS, of Boston, in the county of Suffolk, and OLIVER EDWARDS, of Brookline, in the county of Middlesex, in the State of Massachusetts, have invented a new Method of Constructing Ships, or Vessels for Carrying Molasses, or other Liquid Cargo; and we do hereby declare that the following is a full, clear, and exact description of the same, taken in connection with the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical longitudinal section of the vessel and its cargo-tanks;

Figure 2 is a plan of the deck, showing the tanks in dotted lines beneath;

Figure 3 is a transverse section through the hull and tank, drawn to a larger scale; and

Figure 4 is a longitudinal section of a portion of the ship, showing the details of the tanks.

Our invention relates to the construction of ships and vessels for the purpose of carrying molasses, or other liquid cargo, so that the same may be carried in bulk, in suitable receptacles, and maintain a proper trim to the ship under the various conditions of sailing, and also meet the several conditions under which such cargo is carried.

In the carriage of molasses, in casks, on board of vessels, in the usual way, several serious difficulties are met with, each of which is a source of loss or expense in the business, and to avoid which is the main purpose of this invention. Some of these are as follows:

First, the cost of the casks and cooperage of a cargo of molasses, at the place of shipment, is generally more than one-half of the cost of the molasses itself.

Second, the loss of cargo, from leakage and the staving of the casks, is nearly, on an average, ten per cent. of the whole amount.

Third, the loss of cargo, from the running over of the contents of the casks, in froth, due to the generation of gas by fermentation, is often considerable in amount.

Fourth, the method of receiving and stowing such cargo, in casks, on board ship, in the usual way, consumes a much greater length of time than is required with our invention, whereby several days' delay in port are saved, in making the voyage, with a corresponding reduction of the expenses.

Fifth, the cargo being liquid, if placed in an open reservoir in the ship, would, by the movements of the ship, be continually changing its position, so that

it would be impossible to preserve the proper trim of the ship for sailing.

These several conditions, which more or less apply to any liquid cargo, are met by the vessel herein described.

Our invention more particularly relates, in the first place, to the construction of the tank or tanks, which contain the cargo, in connection with the ship; and consists in making the tanks closed on all sides, and separate from the sides of the ship, but placed centrally therein, and of such size and shape, that when entirely filled with the liquid cargo, the centre of gravity of the same will bear such a relation to the centre of gravity of the ship; and centre of displacement, that the cargo will properly trim the ship.

Our invention relates, in the second place, to the manner of constructing the tanks, for containing the cargo, and securing them to the ship, so that the tanks will be a material support to each other, and will also contribute greatly to the strength and rigidity of the ship; and consists in forming the tanks by means of a series of tight partitions, placed transversely between two longitudinal bulkheads, and a floor, and a ceiling or top, all made continuous, and extending the length of the cargo-space, and forming, in effect, a large hollow girder, divided into compartments, which being attached to the floor-plates, or timbers, and the deck of the ship, throughout its length, gives to the whole structure great strength and rigidity.

Our invention relates, in the third place, to the method of constructing the several tanks or compartments, so that they shall be kept, at all times, completely full, and at the same time permit the expansion and contraction of the contents, and the free escape of the gas of fermentation; and consists in combining, with each tank, a rising-chamber, so called, which extends above the tank, and above the outer disk, a considerable distance, in which the surface of the liquid is maintained, so that any expansion or contraction of the contents of the tank will be received into or supplied from this chamber, and the motions of the ship will change the surface of the liquid within this alone, which will be practically unimportant in the trim of the ship. And this chamber also affords a free communication between the cargo and the external air, for the escape of the gases of fermentation, and an opening, through which the cargo is received and discharged, if desired, while the height of the chamber above the deck enables it to act as a combing, and exclude the water that may come on board when at sea.

In the drawings—

A represents the hull of a vessel, built of iron, in the usual manner, and

B B, &c., a series of tanks, built into the vessel, and formed of the longitudinal bulkheads C, the bottom D, which is secured to the upper edges of the floor-plates A' and the top E, all extending continuously, the entire length of the series of tanks.

These are connected, at intervals, by the partitions F, which, with them, form a series of cells or compartments.

The longitudinal bulkheads C are supported by the angle-iron stanchions O', which are secured to the beams and floor-plates, and also to the sides of the ship, by the stays B'.

The partitions F are made perfectly tight, and are stayed by the longitudinal rods F', so that each compartment may be filled or emptied independently of the others.

This mode of constructing the tanks, and connecting them with the ship, gives to the whole structure great strength and rigidity.

These compartments communicate with each other, by means of the valves G, which are each operated by means of a rocking-shaft, H, which passes out through a stuffing-box, on the side of the tank, and is operated by a lever, upon the outside, but any other usual kind of valve, for such purpose, may be used instead of this, if preferred.

Upon the top of each tank is placed a rising-chamber, I, the lower end of which is open into the tank, and through which opening free access can be had to the interior, when the cover J, of the chambers, is removed, for the purpose of stowing solid cargo therein or clearing them, or for any other purpose.

At the bottom of the chamber, a plate, K, may be placed, which serves as a floor to the chamber, through which there is free communication with the tank, to permit the gases and fluid to pass by the same.

When the chamber is to be used as a hatch, the plate K is removed, or it may be omitted entirely, if desired.

The top of the chamber is closed, by the cover J, bolted on so as to be readily removed, and provided with a man-hole, J', and a small vent-hole, for the escape of the gas.

Each rising-chamber is made of sufficient capacity to provide for the expansion of the contents of its tank by fermentation, or the contraction, by cooling or leakage, so that the tank shall be kept, under all conditions, entirely filled.

The proportion of the capacity of the rising-chamber to that of the tank shown, is about one-tenth, which is regarded as sufficient for the most variable cargo, such, for instance, as molasses, but for other less variable liquids, a smaller chamber may be used; and the chambers may also be differently located, in relation to the tanks, and still attain the same result.

As the tanks occupy all the middle part of the vessel, some provision, in connection with them, is necessary, for receiving the masts, and for this purpose, where the mast comes, the bottom of the tank is strengthened, and a mast-step is secured to the same within the tank; and to prevent the escape of the liquid, where the mast passes through the top of the tank, a stuffing-box is provided, as is shown at the main-mast, in fig. 1 of the drawing, by which a tight joint is made; or instead of this, a tight metal casing may be secured to the mast-step, and to the top of the tank, within which the mast is placed, as is shown at the foremast of the same figure.

L is a steam-pump, which connects with the after-tank, by means of which the contents of the tanks are discharged, through the pipe M, on deck, into any receptacle or conductor provided to receive them.

The contents of the other tanks are led to the pump through the valves G. But the tanks may be each provided with a separate pipe, leading to the pump, if preferred, by which each tank may be emptied independently of the others.

The pump is to be operated by a portable steam-boiler, placed in any convenient position, either in the hold or on deck.

N N are hatches, let in flush with the deck, through which access is obtained from the deck to the spaces between the sides of the vessel and the tanks.

By this construction and arrangement of the tanks, it will be seen that free access to all parts of the same, both inside and outside, is secured, so that they may be easily painted, and kept tight and in good order. And this arrangement of the tanks, at some distance from the sides of the ship, also prevents any injury to the tanks from the impact or collision of the vessel with any hard body, which would indent its sides, and would otherwise cause the tanks to leak, and many other advantages, which it is not necessary to describe.

The manner of using this invention is as follows:

To prepare the vessel for sea, if the outward trip is to be made in ballast, several of the tanks are to be filled with water, so selected as to give the vessel the proper trim, or the tanks may be filled with any other suitable cargo, which would be introduced through the rising-chambers, after removing their covers. To prepare the vessel to receive a cargo of molasses, for instance, the man-holes J', in the covers, are opened, and a long wooden trough is laid upon the tops of the chambers, with holes through its bottom, corresponding with the man-holes of the tanks. On each side of this trough is placed a long skid, upon which the casks in which the molasses is usually brought to the ship, are placed, close together, with their bungs downward, so that a long row of them is being emptied at once, and the tanks are filled in a very short time, when the vessel is ready for sea.

If the molasses is in a state of fermentation when loaded, the rising-chambers are to be nearly filled, but for other cargo they might be filled to a greater or less height, as would best trim the ship.

The horizontal area of the chambers is so small, in proportion to the contents of the tanks, that the change of the surface of the liquid in the chambers, from the motion of the vessel, does not appreciably affect its trim, or make any swashing of the cargo that is injurious, while, at the same time, the chamber permits such a free escape for the gas generated by the fermentation, that the foam will not accumulate so as to run over.

When the vessel has arrived in port, the cargo is pumped out by the steam-pump, and by a hose, or other conductor, led to a tank, or other receptacle, on shore, the contents of the other tanks being allowed to flow into the after tank through the valves G.

After the tanks are emptied, they are cleansed, by closing them, and admitting steam into them from the boiler, by suitable pipes, and after they are cleaned, they are washed with lime-water, and painted, if necessary, and to dry the paint hard, it is proposed to put stoves into them and heat them up hot. By this means the tanks can be kept from corrosion and from getting sour.

It is obvious that tanks can be arranged in a similar manner in a wooden vessel, although it can more readily be done in an iron one, but as regards the other properties of the arrangement, they are as applicable to tanks arranged in a wooden vessel as to the one shown and described.

What we claim as our invention, is—

1. The combination of the cargo-space or tank, either with or without compartments, with the hull

of a vessel, when arranged centrally within the hold, and at such distance from the hull as to be accessible on all sides, and made of such relative length, breadth, and height, that when filled with cargo, the centre of gravity and weight of the contents will bear such relation to the centre of gravity and displacement of the vessel as to load and trim it, substantially as described.

2. The cargo-space, arranged centrally in the hull, as described, and made with its sides longitudinally continuous, in structural combination, with the hull, as described, so that the rigidity due to such construction of the cargo-space shall be imparted to the hull.

3. The combination of the series of tanks, arranged centrally in the hull, and provided with rising-cham-

bers, as described, with the hull of the vessel, when so arranged that the rising-chambers shall extend above the outer deck, so as to serve as hatches, and afford free communication between the interior of the tanks and exterior of the hull, and as combings, to prevent the influx of water that may come on board, as well as means of keeping the tanks entirely filled, substantially as described.

Executed February 29, 1869.

J. W. MARSHALL.
GILMAN JOSLIN.
NELSON CURTIS.
OLIVER EDWARDS.

Witnesses:

FRANK ALLEN,
WM. C. HIBBARD.