

J. Campbell.
Floating Dock.

Nº 90,072.

Patented Nov. 9, 1869.

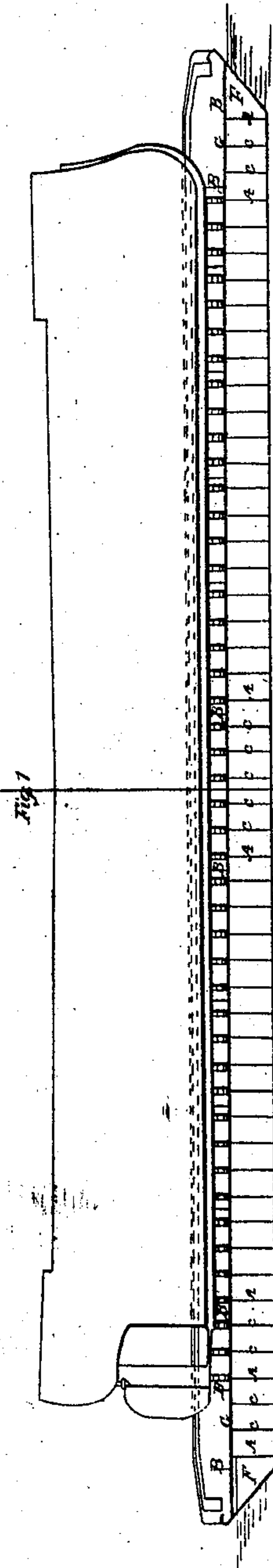
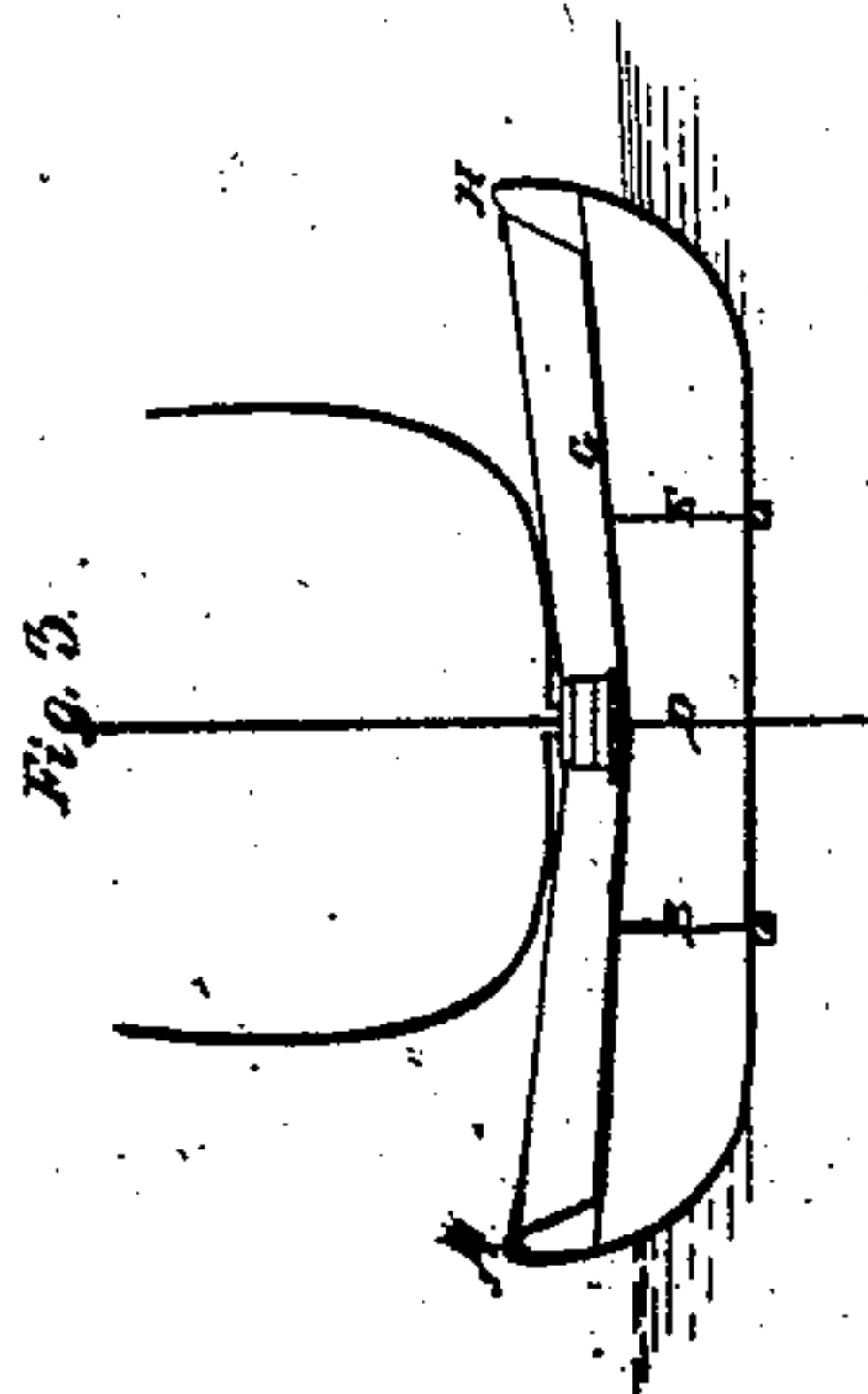
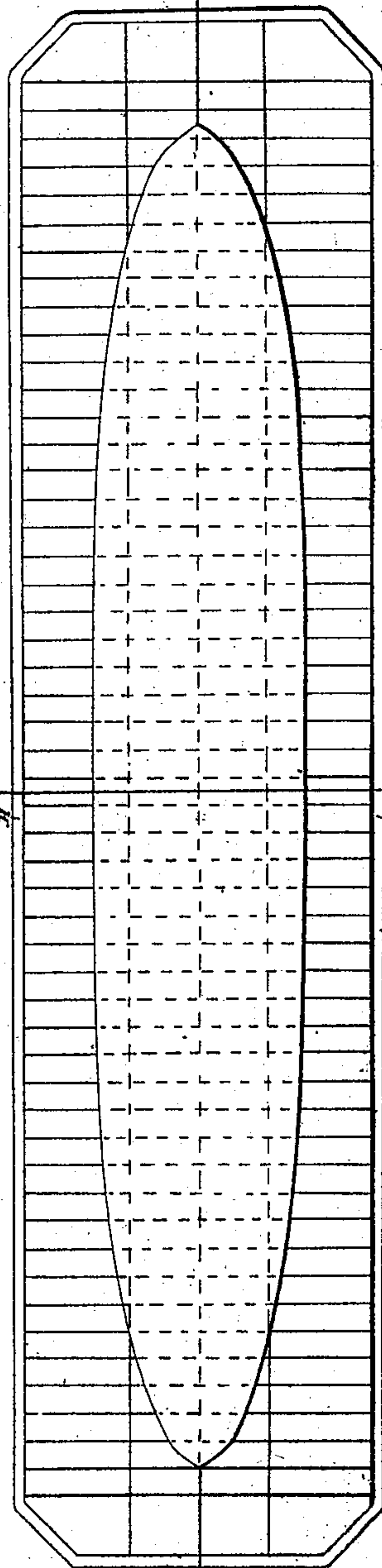


Fig. 2.



Witnesses
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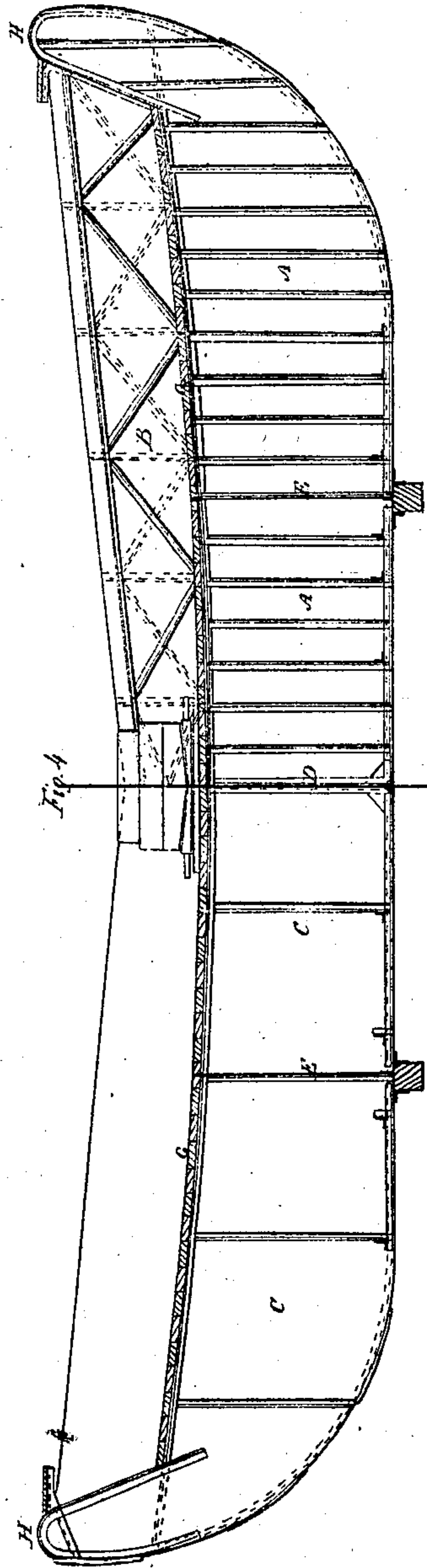
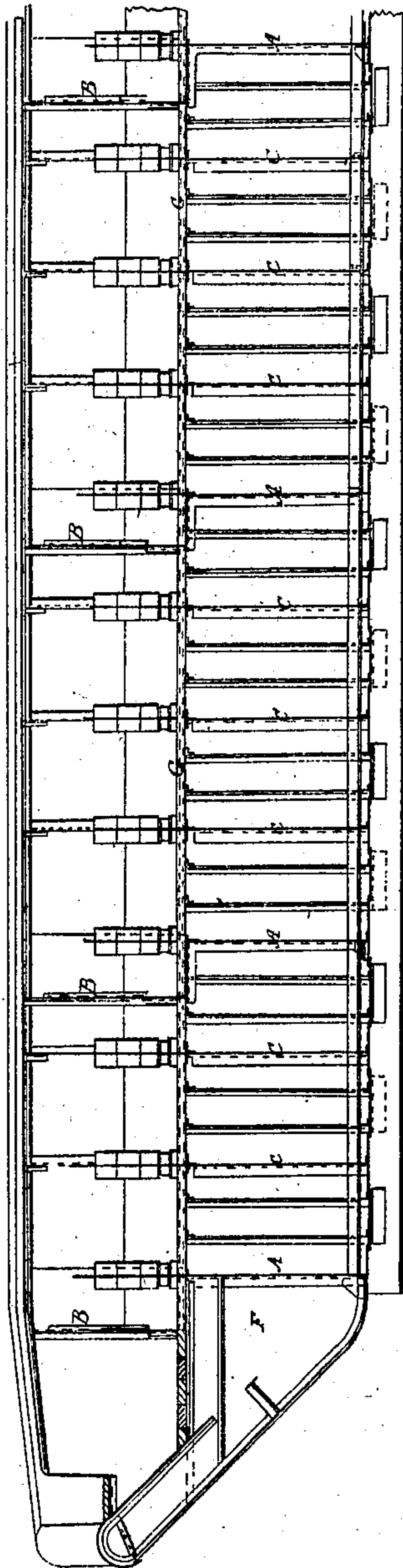


Fig. 5



Witnesses

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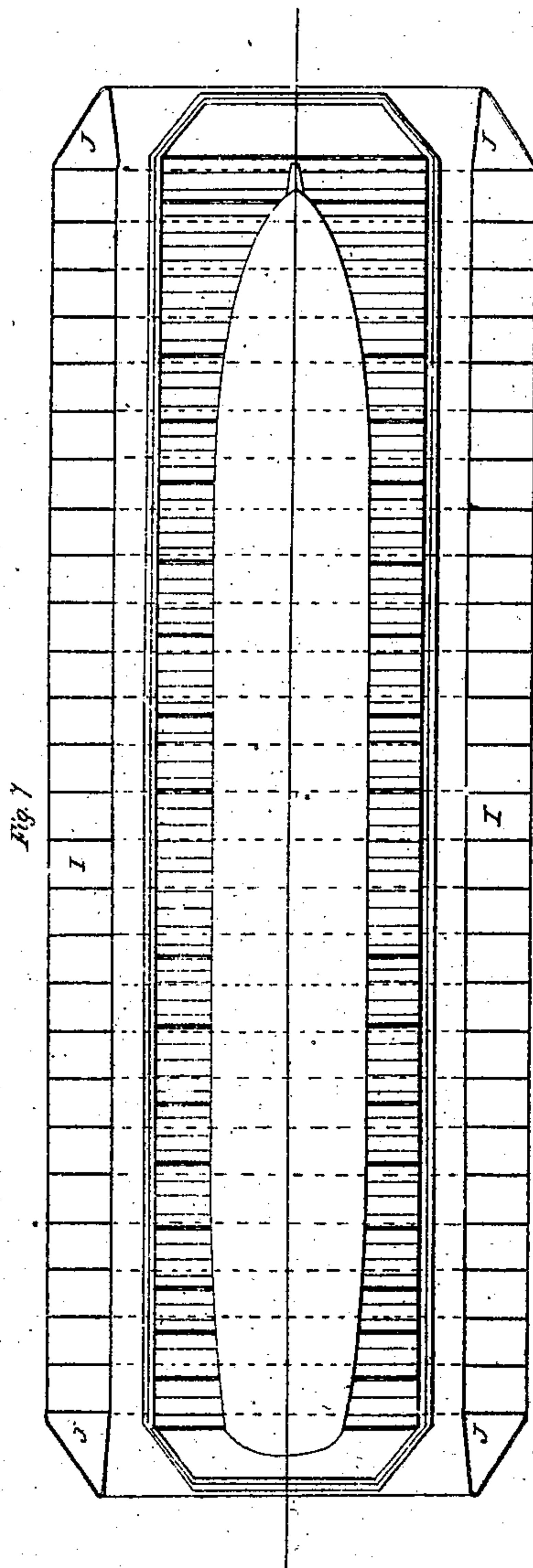
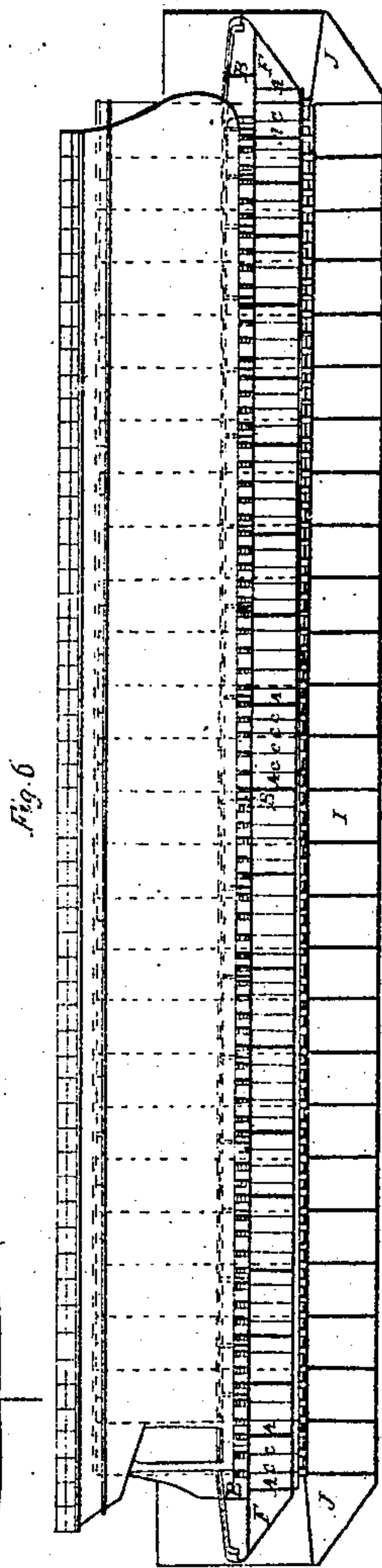
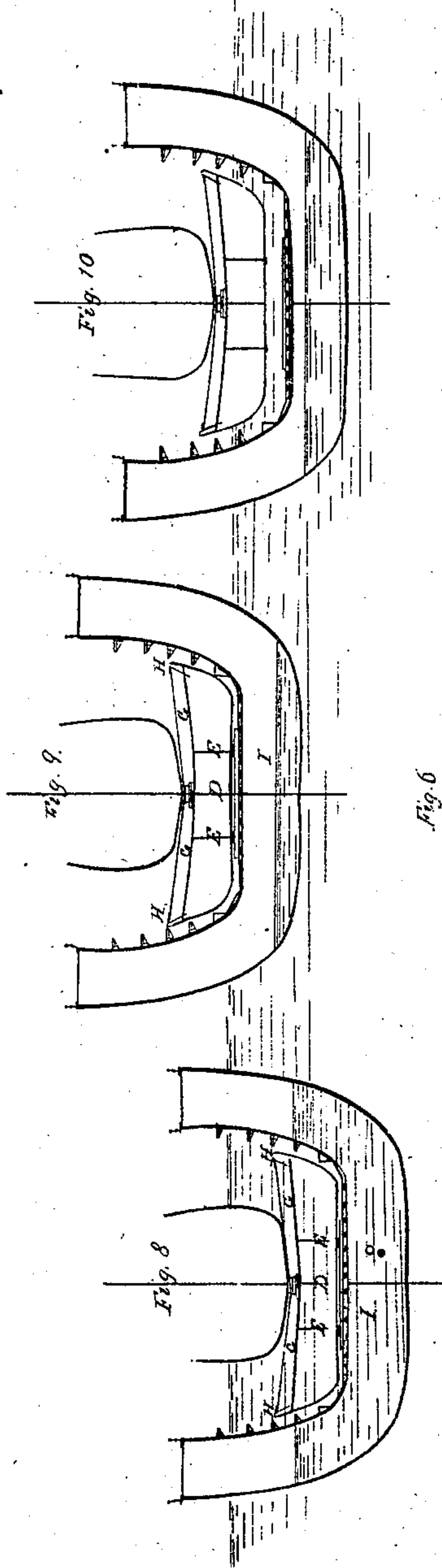
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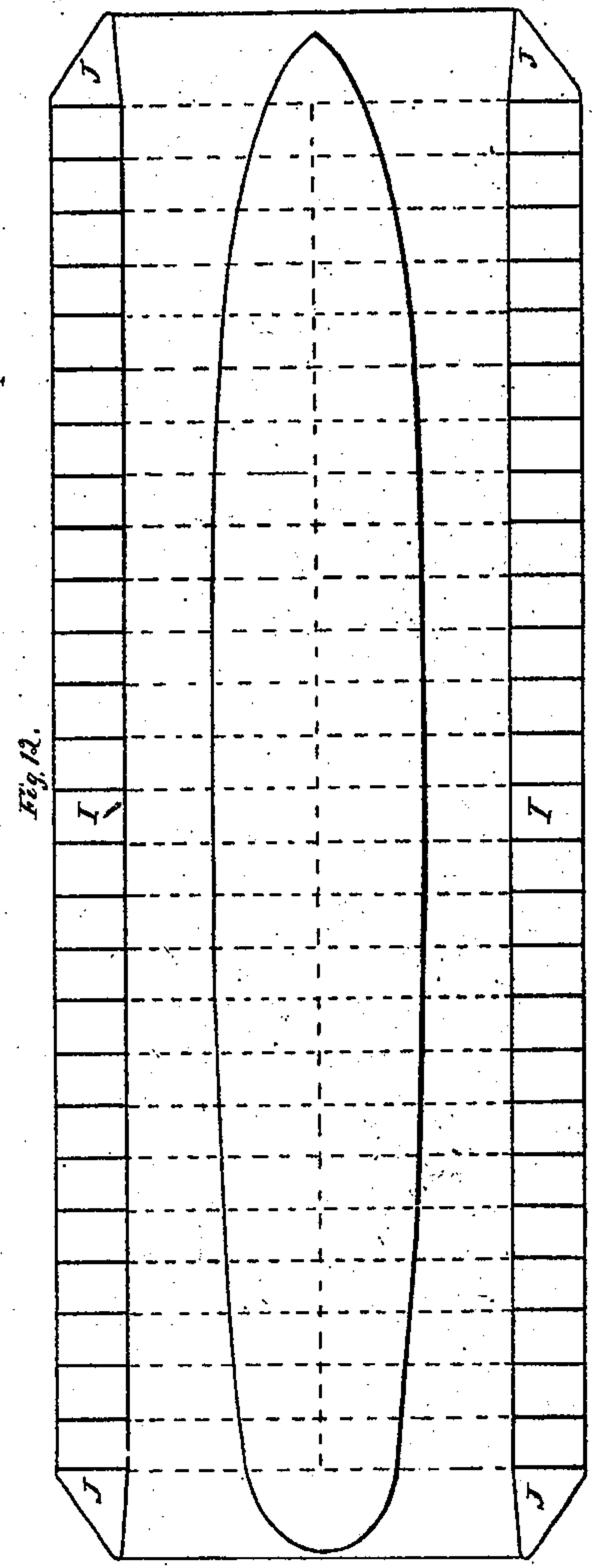
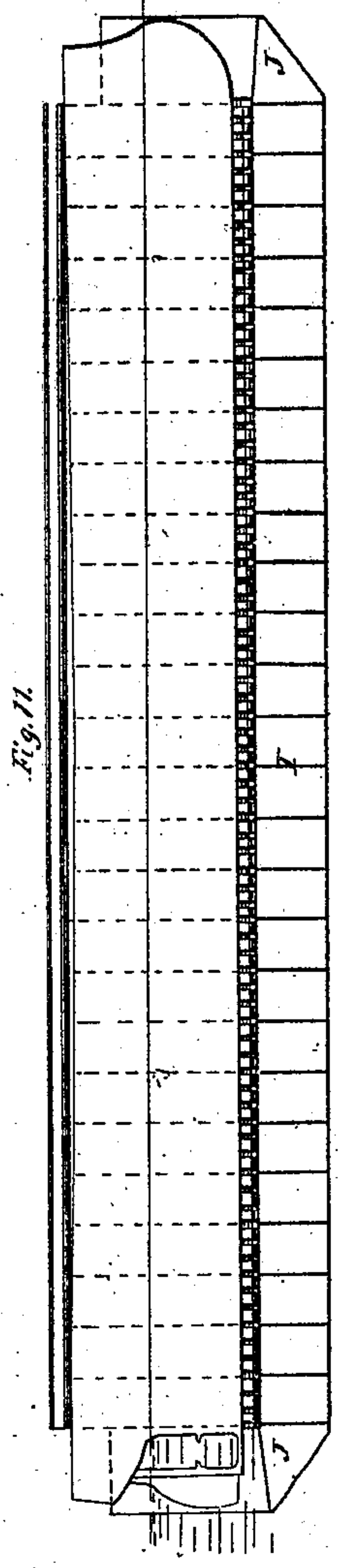
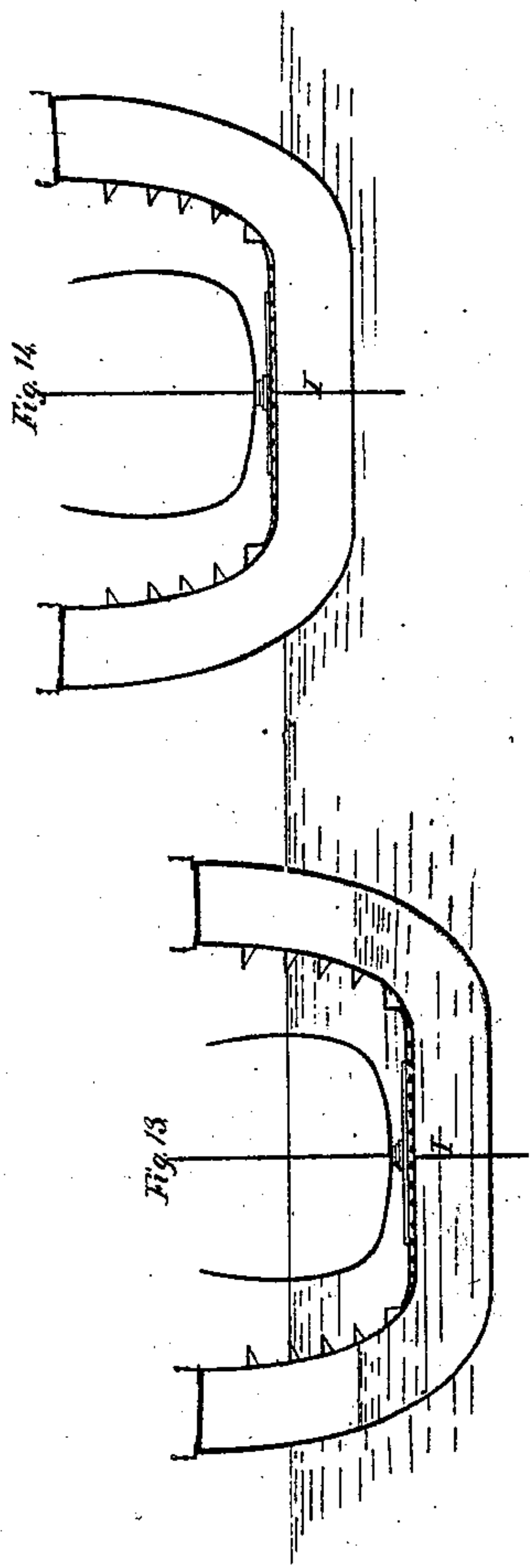
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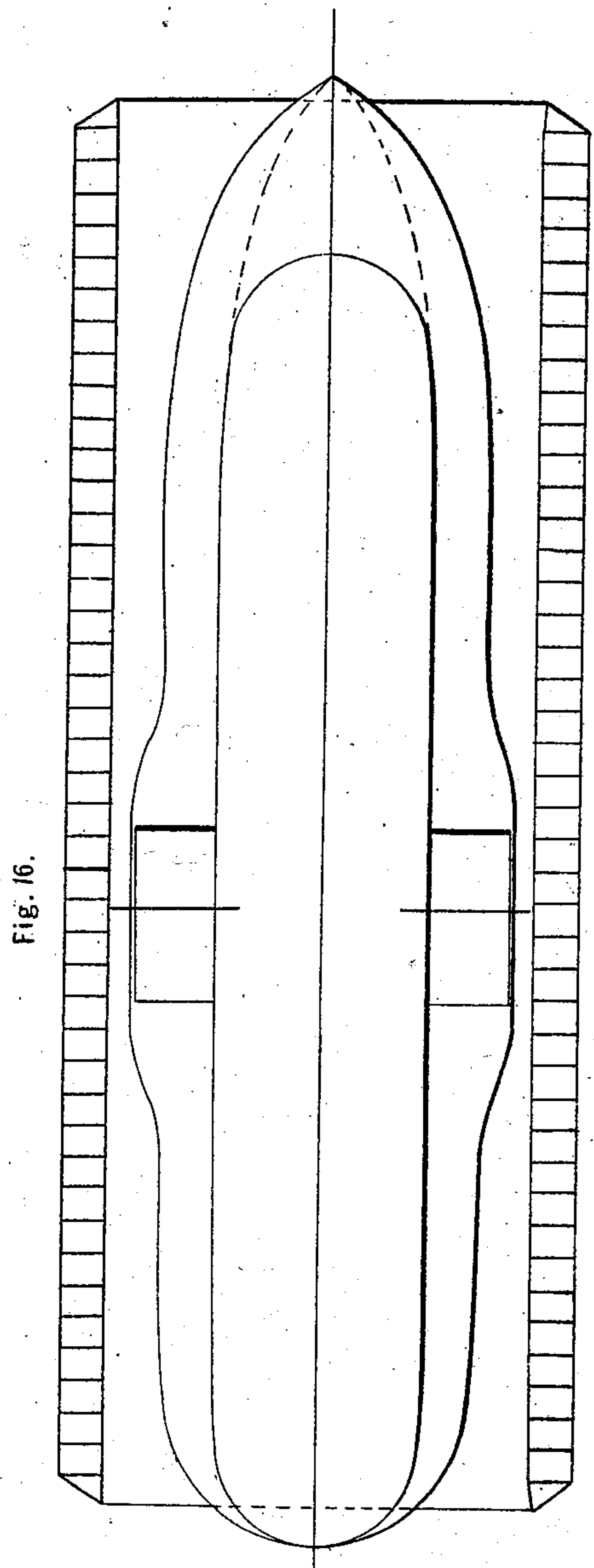
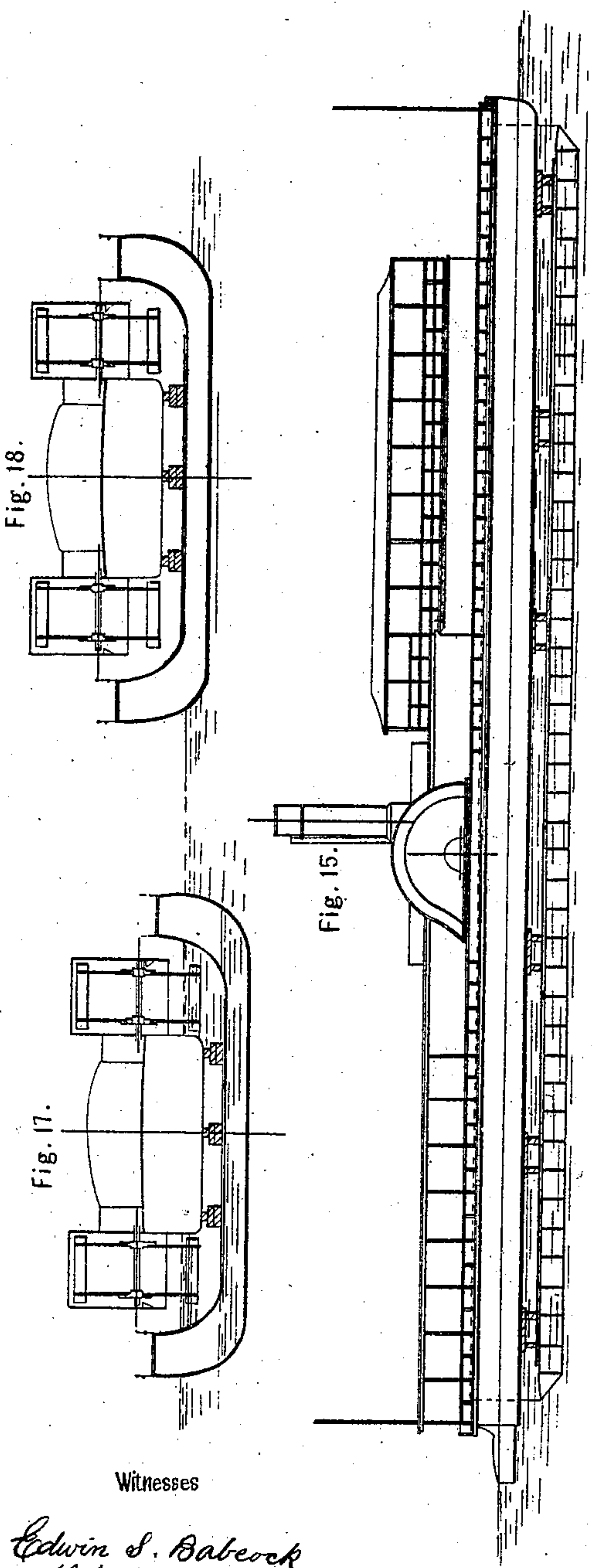
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Witnesses

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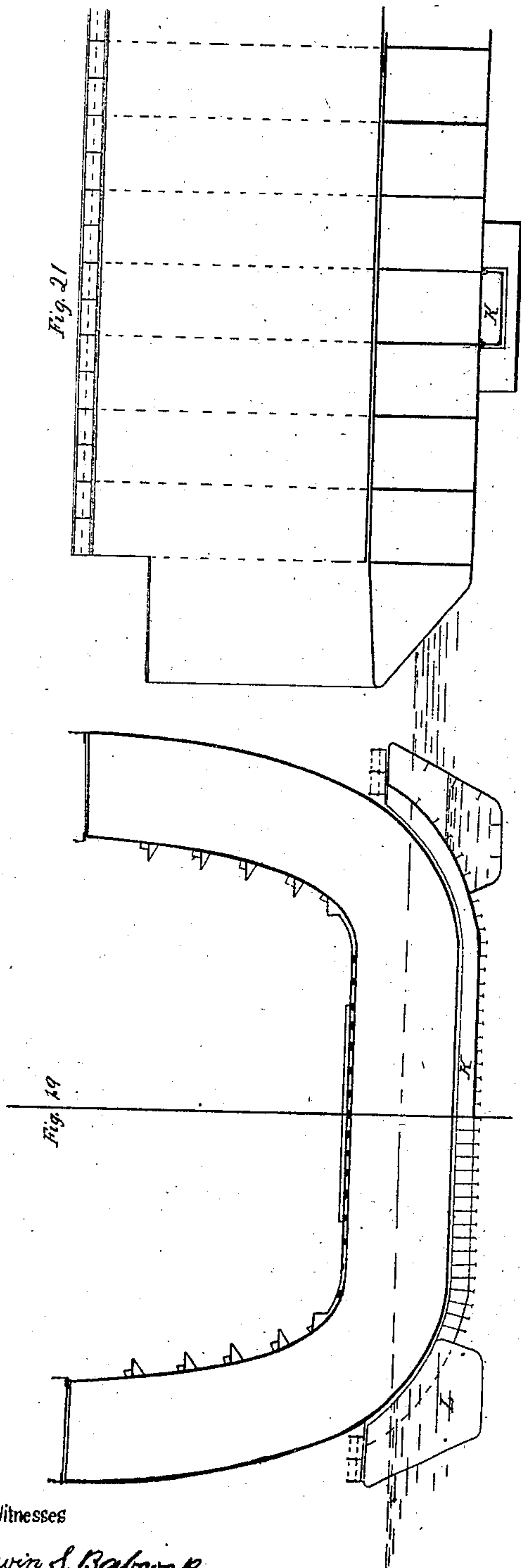
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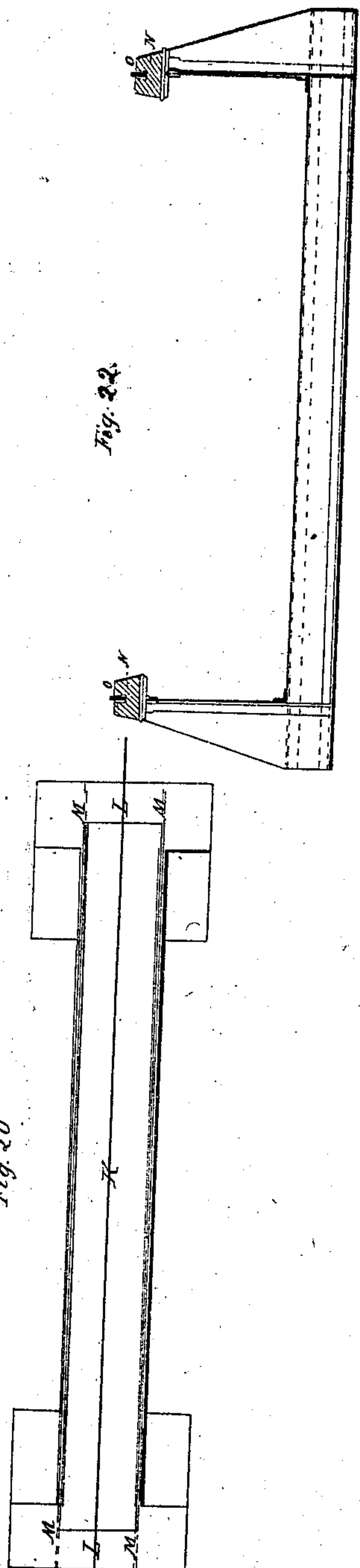
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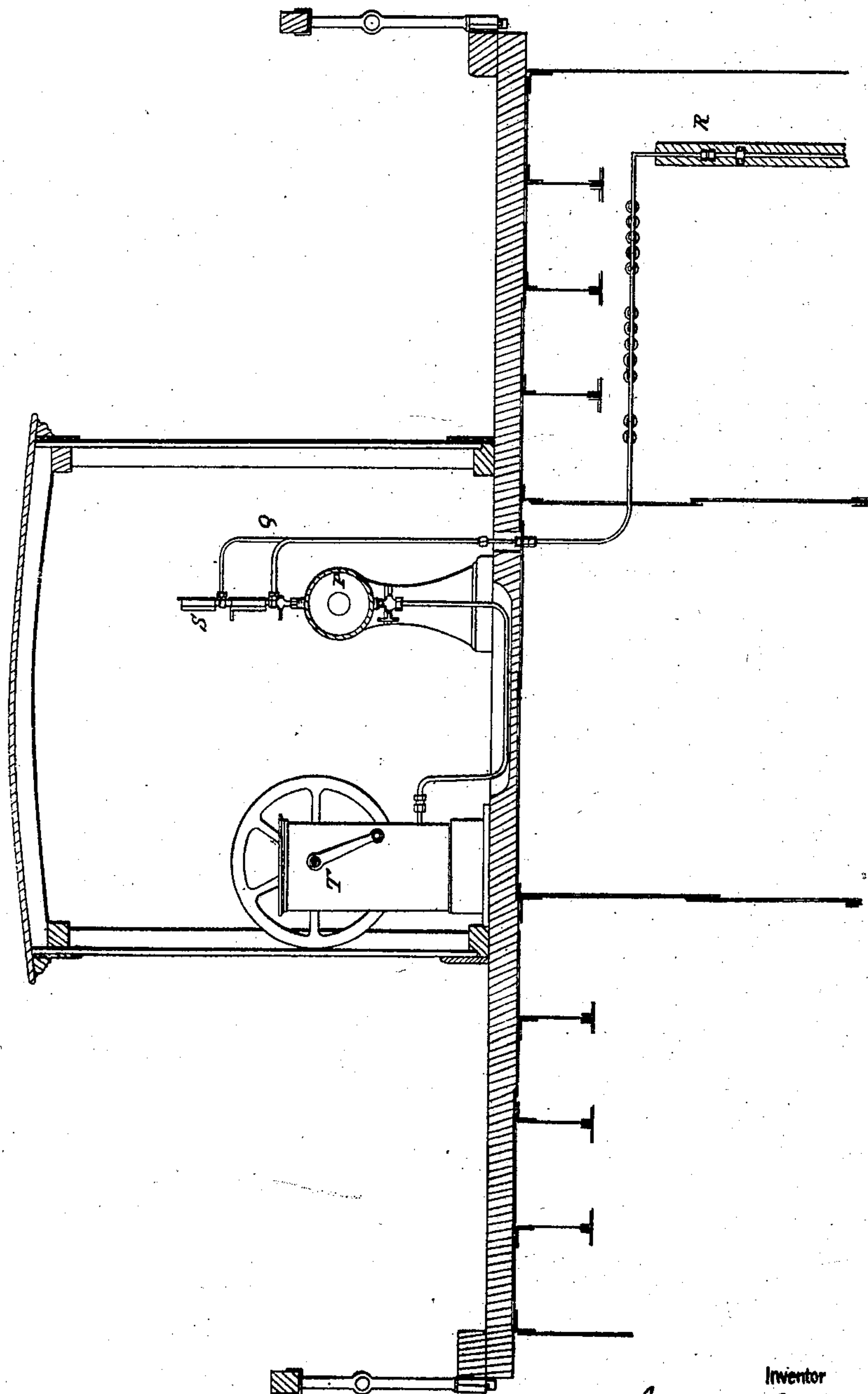
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Witnesses
Geo. H. Collins
Thos. J. Baldwin

Inventor
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United States Patent Office.

JAMES CAMPBELL, OF FOUNDERS' COURT, LONDON, ENGLAND.

Letters Patent No. 96,672, dated November 9, 1869.

IMPROVED FLOATING DOCK.

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

I, JAMES CAMPBELL, of No. 6 Founders' Court, in the city of London, trading under the firm of Campbell, Johnstone & Co., do hereby declare the nature of the said invention for "Improvements in Floating Docks" to be as follows:

My invention relates to improvements upon floating docks and trays or pontoons, as described in the specification of a British patent granted to me, and bearing date the 29th day of August, 1864, No. 2,118.

My invention has reference, in the first place, to trays or pontoons, whether used in combination with floating docks or otherwise, and consists in the construction of such trays or pontoons with the transverse ribs sufficiently close to allow of a deck of stout planking to be laid thereon, so that a vessel can be securely shored as in a store-dock, with the keel resting on proper docking-blocks over the ribs, and at a sufficient height to admit of the men working under the bottom of the ship.

Such of the transverse ribs as are designed to be water-tight are to be continued so up to the keel of the vessel, but the part thereof above the deck is to be constructed so as to admit of being readily moved several inches, and to consist of plates on edge nearest the vessel, in order to prevent interference with the repairs of the vessel. Such upper continuations of the ribs or upper bulkheads are, by preference, constructed not directly over the ribs, but, say two feet off, so as not to interfere with the docking-blocks.

In order to render the tray capable of being trimmed as required by water, forward and aft, so as to adapt the upward pressure of the tray along its length to the varying weight of the vessel, it is proposed to make the sectional area of the tray to the height of the water-tight continuations of the ribs under the keel of the vessel at least $1\frac{1}{4}$ S, (S being the immersed sectional area of the vessel to be docked on such tray,) and the width of the tray at least $2\frac{1}{2}$ \sqrt{S} .

By means of these proportions, the required trimming will be provided for, and a margin left for security against accidents.

In order to adapt the trays for carrying ships with their cargoes over shallows and up rivers, or, say through the isthmus of Suez canal before its final completion, or through the proposed Nicaraguan ship-canal, they are constructed with conical ends or cutwaters, so as to facilitate their being towed, as required. It is also intended to make the outer or upper edges of the trays cylindrical, so as to combine stiffness with lightness.

My invention consists, secondly, in constructing docks capable of taking the larger classes of vessels over shallows, and adapted for the use of trays for large ships, which docks should be as light as possible, and must be of great width. For this purpose it is intended to employ a dock with only two chambers

transversely, one on each side of a centre partition, from which the water will have to be pumped when raising the vessel.

In this form of dock, the upper or load-chambers, and the lower or air-chambers, described in my said former patent, are dispensed with altogether. By this arrangement, although the power of pumping at any time, or using the load-chambers as an accumulator is lost, and although a large body of water has to be pumped out which cannot escape from balance-chambers, yet there is much less pressure of water to contend with, and a considerable saving in the weight of the dock.

The safety of the dock is provided for by making several of the transverse ribs water-tight, and it is preferred that there should not be less than sixteen water-tight ribs on each side of the keel.

My invention consists, in the third place, in employing docks of similar construction to the docking of river steamers of light draught, which require a dock of considerable width, and when the greater amount of water required to be pumped out is not relatively important.

In these docks it will be advisable to use a belt, (described in my said former patent,) for repairs, this belt consisting of a trough which has three sides, but is open at the top, and floated at each end by ordinary tanks, to which it is fixed, as owing to their great proportionate width, and having no load-chambers, they cannot be conveniently made to heel over.

My invention has reference, in the fourth place, to improvements in the belt, above referred to, and consists, first, in enlarging the tanks at the ends thereof, and making, say two, or as many as may be requisite, bulkheads transversely in each, so as to enable the water-tight joints of the belt proper to be raised out of the water for adjustment and repairs without docking.

These improvements consist, secondly, in the mode of securing the vulcanized India rubber to the wood-work of the water-tight joints, by inserting a stout band thereof in a dovetailed groove formed in the wood-work, which has been made to correspond as nearly as possible to the bottom of the dock. This band may be of about four inches in depth, and one inch in thickness, and made to project about one inch out of the groove, and may be kept in its place by pieces of hard wood driven in for the purpose.

And my invention consists, in the last place, in the use of a water-gauge, composed of a reservoir, P, of compressed air at, say forty to fifty pounds pressure per square inch, communicating by suitable taps with small pipes, Q, branching off to the lower parts of the various compartments, R, wherein it is required to ascertain the level of the water. Each of these pipes is

intended to have a pressure-gauge, S, divided, not in pounds, but in feet and inches, showing the head of water corresponding to the pressure. By this arrangement, when one of the small pipes has received, through its tap, a sufficient supply of air from the reservoir, its gauge will indicate the head of water above its lower extremity.

T represents the air-pump, by which air is compressed in the reservoir P.

By making the reservoir sufficiently large in proportion to the capacity of the small pipes, and taking reasonable care to avoid leakage and waste, no inconvenient amount of pumping of air into the reservoir will be required, either during the docking or undocking.

It is preferred that each side of the dock should have its reservoir and pipes, all the gauges on either side being together in a small office for the purpose.

Description of the Drawings.

No shores have been shown on the drawings, to avoid confusion.

Figures 1 to 5, inclusive, represent the tray as adapted to vessels of the unarmored screw-sloop "Eclipse" class.

Figure 1 is a sectional elevation through the centre of tray.

Figure 2 is a plan.

Figure 3 is a transverse section.

Figures 4 and 5 show the construction of the tray, A being the water-tight transverse ribs, of which there are fourteen, making twenty-six water-tight compartments, thirteen on each side of the keel; B being the upper bulkheads, C, the intermediate transverse ribs, of which there are thirty-eight, D, the water-tight keel, E and E are the longitudinal girders, and F F, the cutwaters. The deck G is supported on the transverse ribs A and C, which are 4' 6" apart, H H are the outer or upper edges. The draught of this tray, with the unarmored screw-sloop "Eclipse" at her load displacement of one thousand eight hundred tons on it vary from 7' 0" to 8' 9", according to the quantity of water admitted forward and aft for trimming.

Figures 6 to 10, inclusive, represent the dock as adapted for the large trays, the tray shown being suitable for the Indian transport "Euphrates."

Figure 6 is a sectional elevation through the centre of the dock.

Figure 7 is a plan.

Figure 8 is a transverse section, showing the vessel grounded on the blocks of the tray.

Figure 9 is a section showing the tray lifted up and drained out.

Figure 10 is a section showing the tray floating off, with the vessel on it.

The letters of reference on this tray indicate corresponding parts to those in figs. 1 to 5 inclusive.

The tray is composed of twenty-one water-tight transverse ribs, making forty water-tight compartments, twenty on each side of the keel, and sixty-two transverse ribs.

The draught of this tray, with the Indian transport "Euphrates" at her load displacement of six thousand two hundred and eleven tons on it, vary from 10' 3" to 12' 8", according to the quantity of water admitted forward and aft for trimming.

I is the dock, which is composed of a water-tight keel and twenty-seven water-tight bulkheads, making

fifty-two water-tight compartments, twenty-six on each side of the keel. J J are the cutwaters.

Figures 11 to 14, inclusive, represent the same dock, showing its capability of taking the larger class of vessels, such as the "Minotaur," over shallows.

Figure 11 is a sectional elevation.

Figure 12 is a plan.

Figure 13 is a transverse section, showing the vessel grounded on the blocks of the dock.

Figure 14 is a section showing the vessel lifted up, ready for being taken over shallows.

The draught of the dock, with the iron-clad "Minotaur" at her load displacement of ten thousand two hundred and thirty tons on it, is 17' 7".

Figures 15 to 18, inclusive, represent a dock suitable for docking river-steamers of light draught.

Figure 15 is a sectional elevation.

Figure 16 is a plan.

Figure 17 is a transverse section, showing the vessel grounded on the blocks of the dock.

Figure 18 is a section showing the vessel lifted up:

This dock is composed of forty-two water-tight compartments, twenty-one on each side of the keel.

Figures 19 to 22, inclusive, represent an iron belt, K, for repairing the dock.

Figure 19 is a sectional elevation.

Figure 20 is a plan.

Figure 21 is a transverse section, to a larger scale.

L L are the tanks at the ends. The under side of the tank is shown six feet lower than the water-tight joint; M M are the transverse bulkheads in the tanks; N N is the wood-work of the water-tight joints; and O O, the India rubber for the same.

Figure 23 represents the water-gauge, composed of reservoir P, small pipes Q, separate compartments R, pressure-gauge S, and air-pump T.

I claim—

1. In combination with the deck of a tray or pontoon for supporting a vessel shored thereon, the lower transverse ribs, supporting the deck, and dividing the hull into several water-tight compartments, and the upper transverse water-tight bulkheads, above the deck, substantially as described.

2. Also, a tray or pontoon, as distinguished from a floating dock, for carrying vessels, with their cargoes, over shoals, with cutwaters to facilitate the towing thereof, substantially as described.

3. Also, a floating dock, with only two sets of water-chambers transversely, one set on each side of a longitudinal centre partition, thus dispensing with the upper or load-chambers and the lower or air-chambers described in my said former patent, the same being constructed substantially as herein described.

4. As an improvement upon the belt described in my said former patent, to facilitate the repairing of docks or trays, the large end tanks, with one or more transverse water-tight bulkheads in each, substantially as described.

5. The combination and arrangement of reservoir P, pipes Q, gauge S, and air-pump T, substantially as and for the purpose herein set forth.

The above specification of my invention signed by me, this 1st day of July, 1868.

JAMES CAMPBELL.

Witnesses:

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