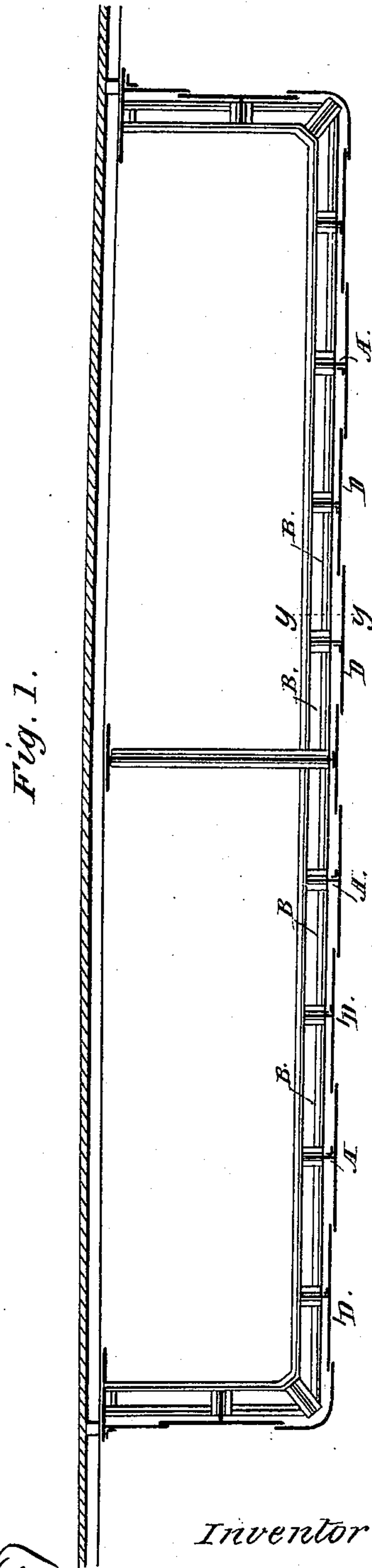
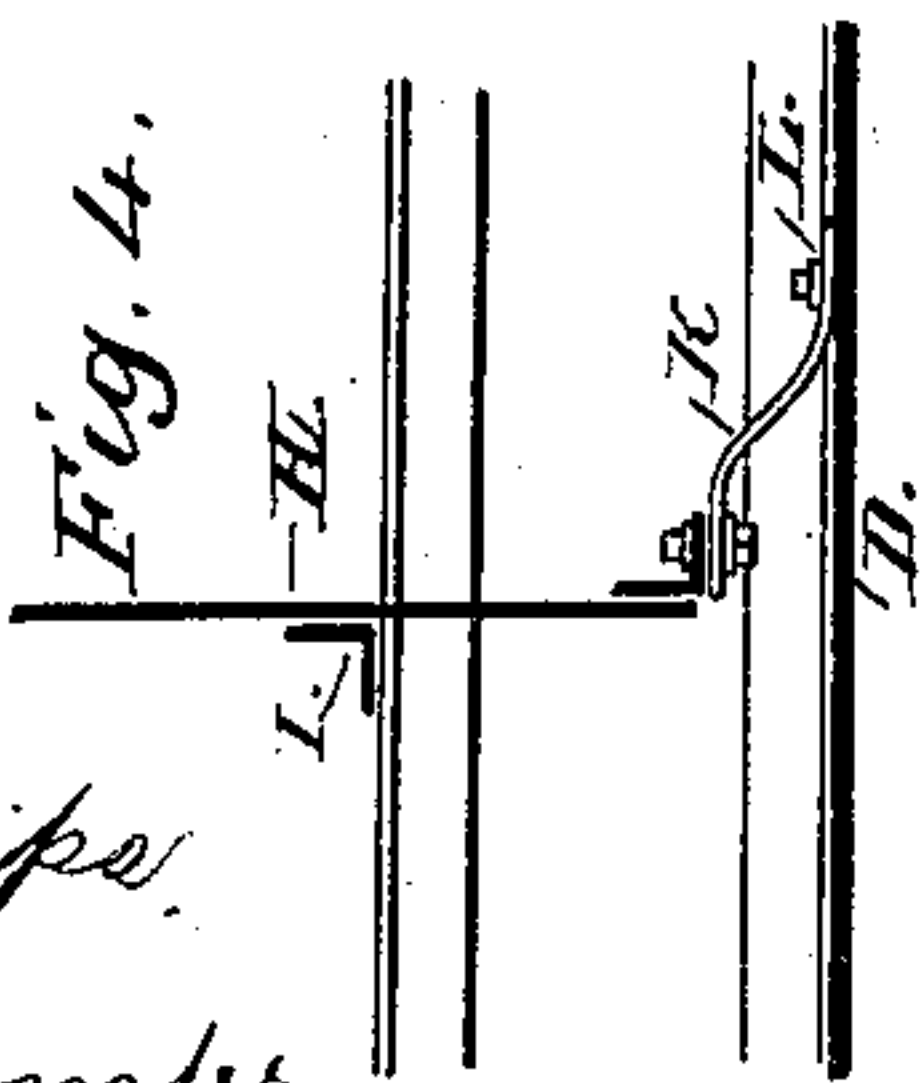
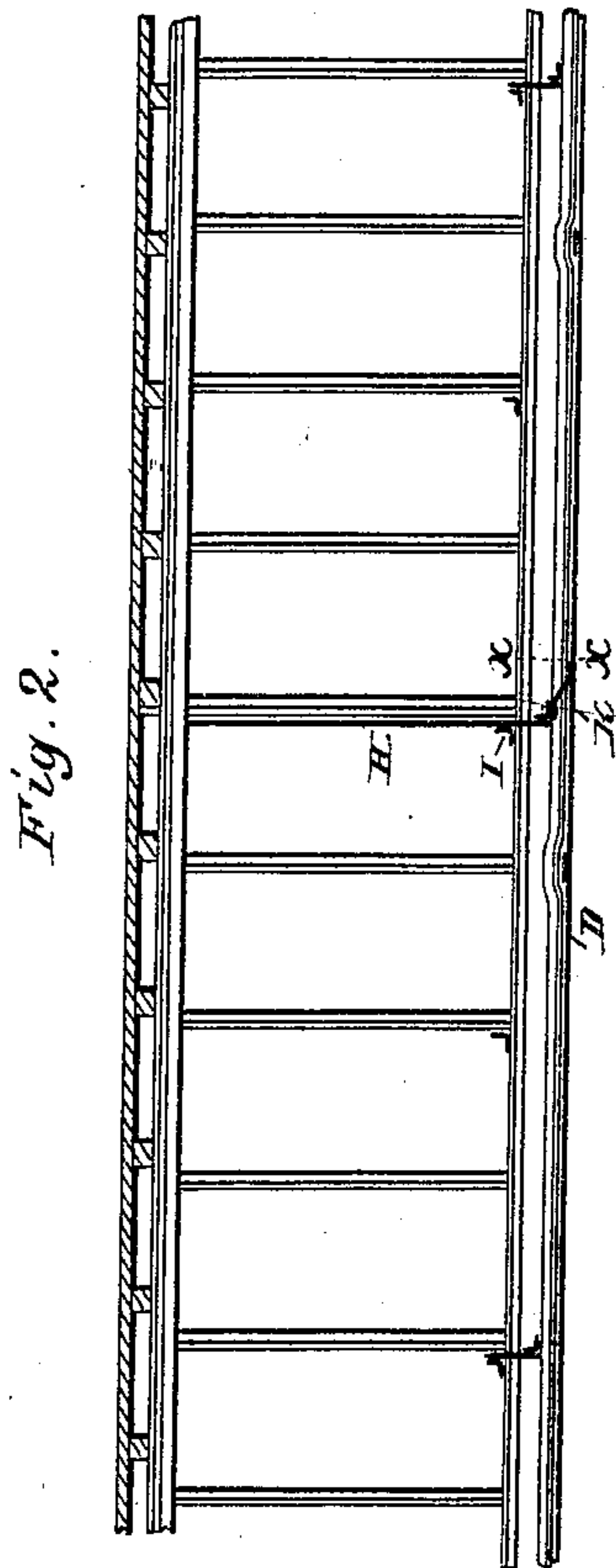
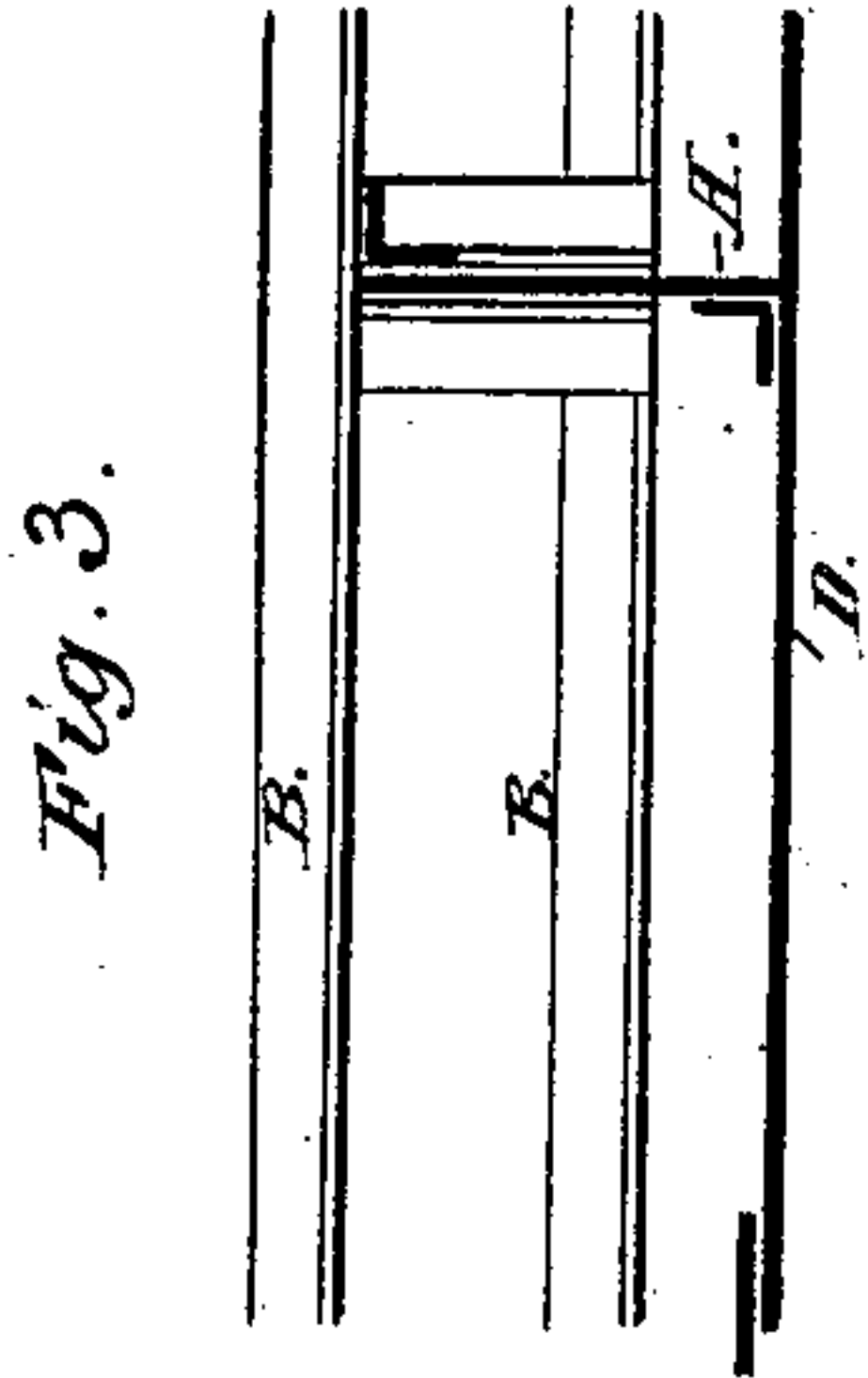


T. ALLEN.
CONSTRUCTION OF SHIPS.

No. 178,703.

Patented June 13, 1876.



Witnesses
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UNITED STATES PATENT OFFICE.

THEODORE ALLEN, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN CONSTRUCTION OF SHIPS.

Specification forming part of Letters Patent No. **178,703**, dated June 13, 1876; application filed September 18, 1875.

To all whom it may concern:

Be it known that I, THEODORE ALLEN, of St. Louis, in the county of St. Louis and State of Missouri, have invented certain new and useful Improvements in Method of Constructing the Hulls of Vessels, of which the following is a specification:

This invention relates to certain improvements in that class of vessels which are constructed with an exterior plating or skin of metal, in order to produce what is known as an iron hull.

Such class of vessels, as heretofore constructed, have been made with what is known as transverse structure or framing—that is, where the frames of the vessels are arranged at right angles to the keel-forming ribs, to which the iron skin or plating is directly secured by rivets. This class of vessels has also been made with what is known as longitudinal framing—that is, the frames are arranged longitudinally and parallel with the keel of the vessel, or are drawn together at the ends where the girth diminishes, the iron skin or plating being secured to said longitudinal frames, and stiffened and supported between the latter by cross-frames, which are secured to the skin and the longitudinal frame by rivets.

The objections to this construction of the hulls of vessels, among other things, is that when the vessel comes in contact with a snag or other rigid object the plating yields between the cross-frames, and is pressed upward, and as the vessel continues to move the non-elasticity or rigidity of the plating, when the cross-frame is encountered, causes either the plating to be torn from the bottom, or the snag punches its way through the same.

The object of my present invention is to obviate these objections, and to so construct the hull that, while great strength and lightness are secured, the liability of the iron plating becoming ruptured or injured from any such cause as above stated is entirely obviated; and to this end my invention consists, first, in the method hereinafter specifically described of constructing the hulls of iron vessels—that is to say, arranging and supporting the iron plating or skin of the vessel, at any point below the water-line thereof, at a distance from

the cross-frames which strengthen and brace the longitudinal frames, in such manner that the skin does not bear against any of the cross-frames, and an uninterrupted flexibility of the plating between the frames is obtained, and such portions are permitted to readily yield in the direction of the keel of the vessel, and thereby rupture of the plating between the longitudinal frames is prevented, while the strength, durability, and lightness of the vessel are much improved.

The invention consists, secondly, in connecting the transverse bulk-heads, where the latter are introduced for the purpose of dividing the hold of the vessel into water-tight compartments, with the iron skin or plating by means of sheets of rubber or other elastic or flexible material, for the purpose of maintaining the flexibility of the plating between the longitudinal frames from stem to stern, and permitting such portions to readily yield should they come in contact with a snag or other obstacle.

In the accompanying drawings, illustrating the manner of carrying out my invention, Figure 1 represents a transverse vertical section of a vessel embodying my improvements; Fig. 2, a longitudinal vertical section thereof; Fig. 3, an enlarged detached view, on the line *yy* of Fig. 1, and Fig. 4 is an enlarged detached view, on the line *xx* of Fig. 2, showing the manner of flexibly connecting the transverse bulk-heads with the iron skin of the hull.

I will now proceed to give a detailed description of the manner of constructing the iron hulls of vessels according to my invention, reference being had to the accompanying drawings, in which like letters of reference indicate corresponding parts.

In vessels intended for shallow waters the requirements to procure light draft render it necessary to construct the vessels with flat bottoms and straight sides, with only such shape to the extremities as is essential to diminish the head or forward resistance, and enable the vessel to be readily manipulated and governed in its movements, and I have, therefore, represented my invention as embodied in the construction of a vessel of this description.

The letters A A represent the usual longitudinal frames, which are arranged to run parallel with the keel, and B B the transverse or cross frames, which strengthen and brace the longitudinals. D D represent the iron skin or plating, which may be of any preferred construction, and which is attached to the longitudinal frames A. The iron skin or plating is supported and held by the longitudinals at a distance from the cross-frames which strengthen said longitudinals, and the skin is not in contact with any of the cross-frames below the water-line of the vessel, from the stem to stern of the latter, whereby an uninterrupted flexibility of the plating is obtained between the longitudinals, and the same is permitted to readily yield at such portions, should they come in contact with a snag or other object. In order that the longitudinal frames shall be stiffened by transverse bracing, to keep them in their proper position, I introduce, at suitable intervals in the length of the hull, a partial bulk-head, H, which extends down to within a short distance of the skin. The plate which forms this partial bulk-head extends above the top longitudinal floors, and is secured to an angle-iron, I, which is made continuous from the central bulk-head to the beam-shelf, as shown in Fig. 1, thereby effectually tying all the longitudinals together, and preventing their buckling when under compressive strain.

In order to divide the hold of the vessel into water-tight compartments, I introduce transverse bulk-heads, the lower ends of which terminate at some distance from the skin of the vessel, and the end of the plate forming the bulk-head is connected with the skin by means of a sheet, K, of rubber, sheet metal, or other elastic or flexible material. The sheets of flexible material are made sufficiently long to permit them to be carried a short distance along the skin of the vessel, to which they are fastened by light strips L of wood or iron, of sufficient strength to resist the pressure of a head of water equal to the depth of the hold. By thus connecting the bulk-head with the skin of the vessel the continuity of the elasticity of the skin between the longitudinal frames is maintained, while a tight joint is secured.

In order to illustrate the principle of my invention, we will suppose that the vessel comes in contact with a snag just sufficiently near the bottom to permit the vessel to be forced upon it. The vessel will rise a little and pass

on, the light iron between the two longitudinal floors most nearly in the line of the obstruction is sprung upward, the vessel will, perhaps, rise a little, and the iron, thus yielding, permits the vessel to pass over without liability of rupturing the skin, or else, if the resistance becomes too great for the power of the vessel, it will stop. This function is due to the fact that it is very difficult, as every one is aware, to punch a hole through a piece of iron unless the latter is supported by a solid and rigid base.

I would here remark that one or more of the transverse bulk-heads and intercostal plates may be made to rest upon or be secured to the iron skin or plating at certain intervals apart without departing from the spirit and intent of my invention, and I, therefore, do not desire to restrict myself; but

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The method of constructing the hulls of vessels, substantially as hereinbefore described—that is to say, arranging the iron skin or plating of the vessel below the water-line thereof, at a distance from the cross-frames which strengthen and support the longitudinal frames, whereby an uninterrupted flexibility of the skin between the longitudinals is obtained, and such portions permitted to readily yield, for the object set forth.

2. The iron skin of a vessel supported at a distance from the cross-frames by means of the longitudinal frames, substantially as hereinbefore described, whereby an uninterrupted flexibility of the plating is obtained between the longitudinal frames, as and for the object specified.

3. The transverse bulk-heads H, in combination with a sheet of rubber or other elastic or flexible material, connected with the said bulk-heads and to the skin of the vessel, for dividing the hold of the latter into water-tight compartments, while permitting said skin to readily yield at such points, substantially as described.

In testimony that I claim the foregoing, I have hereunto set my hand in the presence of the subscribing witnesses.

THEODORE ALLEN.

Witnesses:

JNO. D. PATTEN,
A. H. NORRIS.