

*J. Baird,
Shift Building
No 85051.*

*2. Sheets. Sheet 1.
Patented. Dec. 22 1868.*

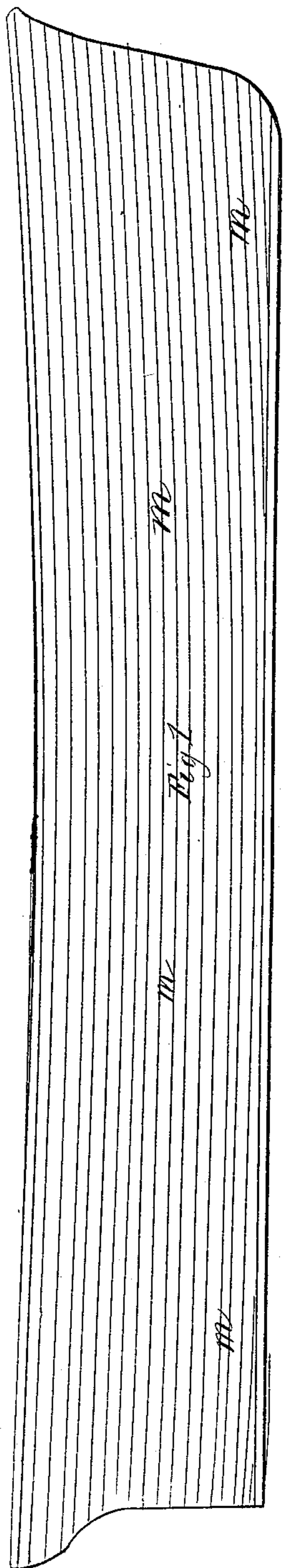


Fig 1

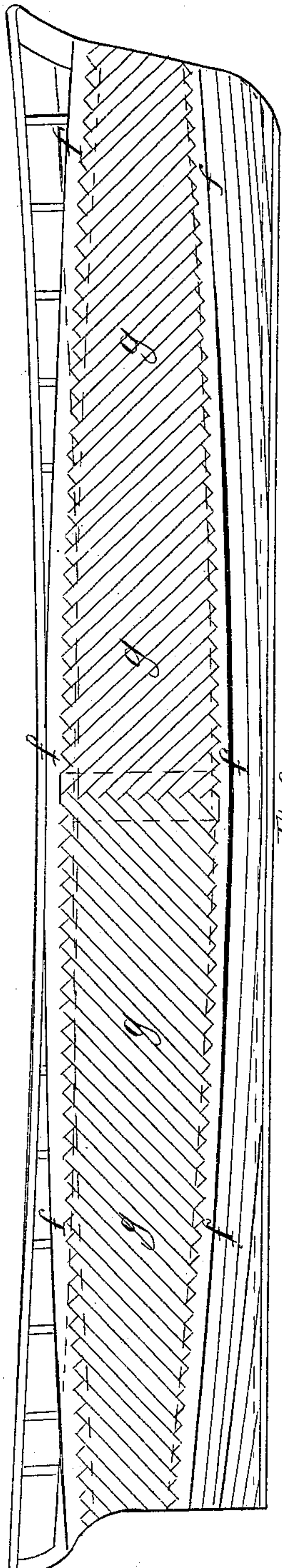


Fig 2

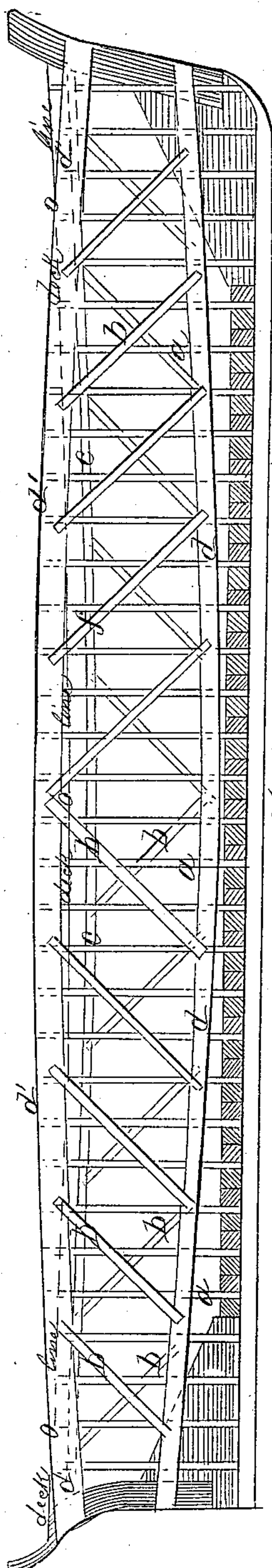


Fig 3

*John Baird and
J. H. Bennett
at*

Inventor

In presence of

*George B. Schaeffer
W. R. Bradford*

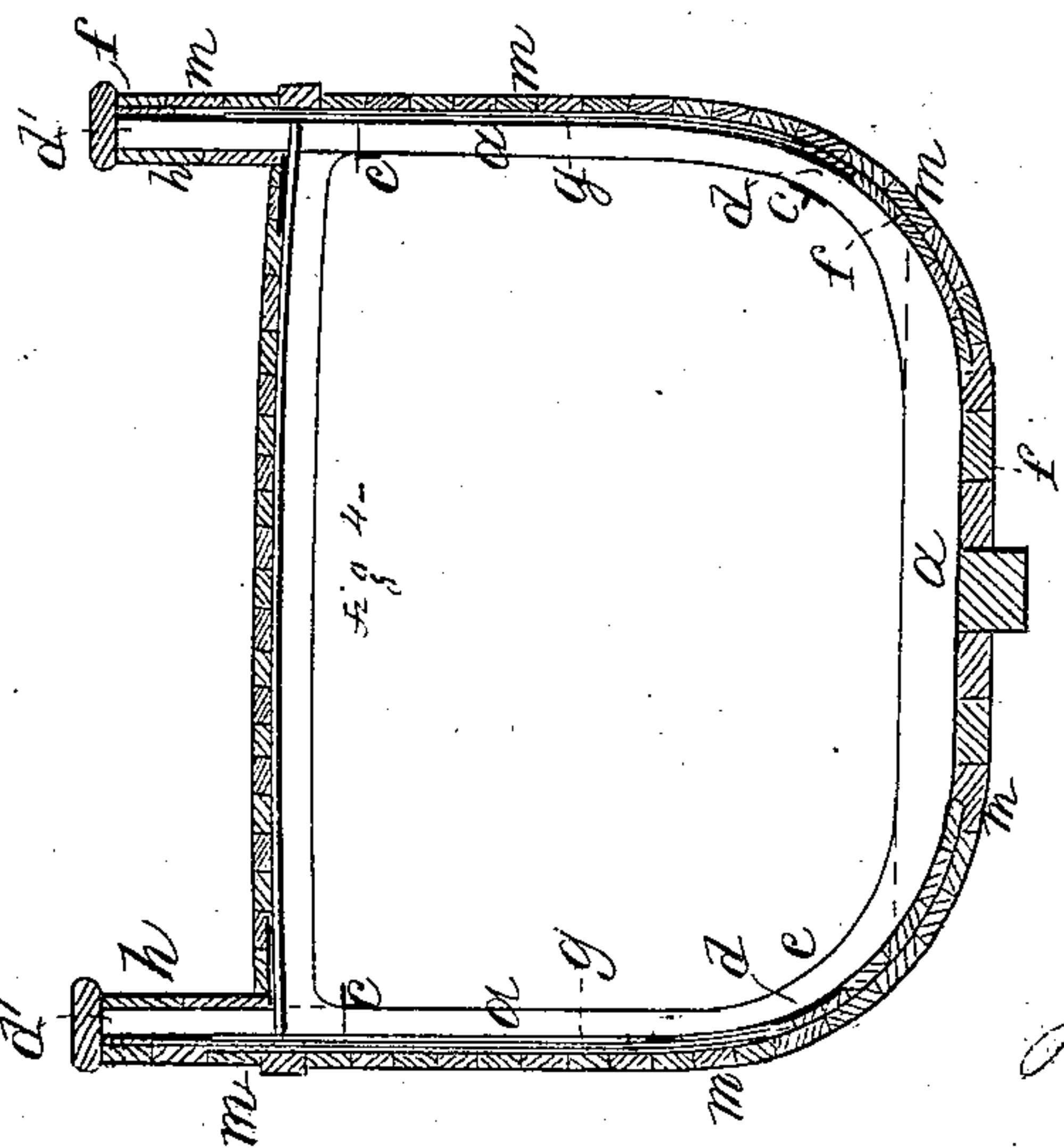
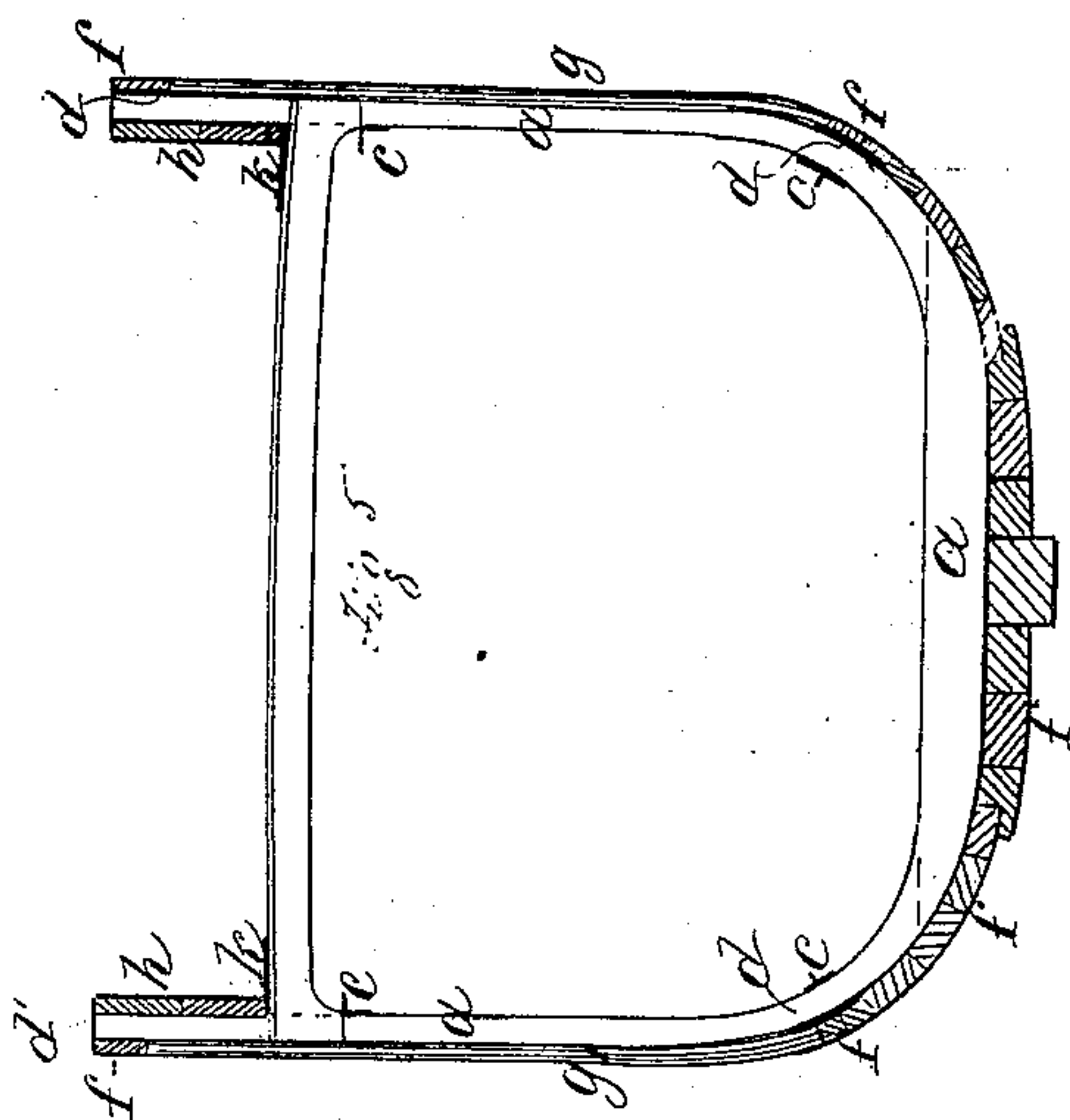
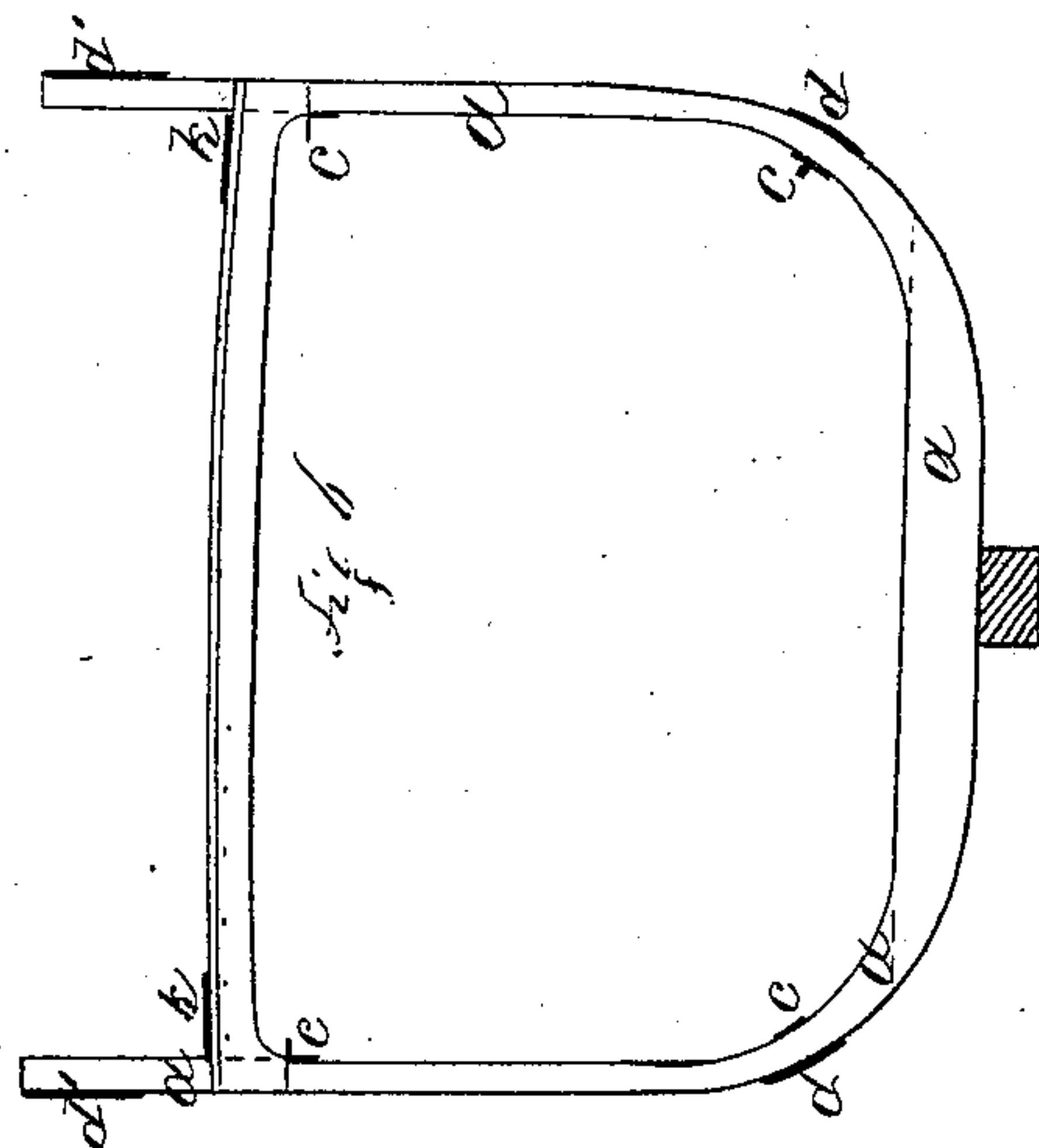
J. Baird,

2. Sheets, Sheet 2.

Ship Building.

No. 85051.

Patented. Dec. 22, 1868



John Baird
per H. B. Remick } Director
att'y

In presence of { George B. Schaffner
Charles Allen

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

United States Patent Office.

JOHN BAIRD, OF NEW YORK, N. Y.

Letters Patent No. 85,051, dated December 22, 1868.

IMPROVEMENT IN COMPOSITE VESSELS.

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

To all whom it may concern:

Be it known that I, JOHN BAIRD, mechanical engineer, of the city, county, and State of New York, have invented certain new and useful Improvements in Composite Ships; and that the following, taken in connection with the drawings, is a full, clear, and exact description thereof.

In the drawings—

Figure 1 is a side elevation of a finished vessel, built according to the principles of my invention;

Figure 2 is an elevation of the same, partially planked up;

Figure 3 is a longitudinal elevation, exhibiting the iron framing, with its chords, the stern and stern-post, and the solid wooden filling of the floor-timbers;

Figure 4 is a vertical cross-section through a finished ship, made according to the principles of my invention;

Figure 5, the same, partially planked up; and

Figure 6 is a vertical cross-section through the framing only.

Composite ships are those composed of a metallic frame, to which is secured a wooden planking.

Such ships are now in use, and my invention relates to certain peculiarities of construction, which make such ships stronger, and also better fit them for being coppered.

My improvements may all be applied in the same vessel, or may be used separately, and, in elaborating my invention, I have kept steadily in view the principles known to mechanical engineers, and governing the construction of beams and bridges.

In the drawings, metallic timbers or frames are shown at *a a a*.

These are secured to each other by diagonal bracing *b b b*, and by iron string-pieces *c c*, and chords *d d'*, the whole firmly riveted together, and the precise relative location of the parts being immaterial, although I prefer to locate the stringers inside and the chords outside of the frames; and also to place the diagonal straps, one half inside and the other half outside of the frames, and to rivet their ends fast to either the stringers or chords; and I also prefer to make the upper chord *d'* arched upwards, (see fig. 3,) and so to locate it as part of the framing, that the 'midship part thereof is above the deck-line *o o*, and the ends thereof below the deck-line, whereby my framing is as deep amidships as the whole depth of the vessel, or nearly so, and tapers to the ends, thereby securing, with a given weight of material, the greatest strength, and so disposed as to resist best the strains to which a vessel is exposed. But my method of planking, and other of my improvements, are applicable to iron framing made in any proper or usual manner.

I prefer to fill in these frames solid along the floor of the vessel, with timber, up to the turn of the bilge, or thereabouts, as shown by fig. 3 and the dotted lines on the cross-sections.

Upon this framing, or any suitable metallic framing,

I then bolt planks, *f f*, preferring to incline the upper planking downwards from amidships toward the stem and stern, as seen clearly in fig. 2.

This planking, it will be seen, extends from the keel up to and beyond the turn of the bilge, and from the gunwale, or, as I prefer, from the top of the bulwarks amidships, some distance down the side of the vessel.

If the framing be made with metallic chords, such as *d d'*, this planking should extend downwards, partly over the upper chords, and upwards, partly over the lower chords, and be secured to the chords.

When this planking is secured to the metallic framing, there will be an open space all along the ship, from stem to stern, and I plank up this space with diagonal planking, *g g*, bolted or riveted to the framing. This planking may be diagonal in one direction only, or may be disposed as shown in fig. 2, which construction I prefer, and its ends may either abut against the longitudinal planking, or be notched into it, as shown in the same figure, the notching being the preferred construction; and, in case the metallic chords are partly covered by the fore-and-aft planking, as described, then the diagonal planking will cover the rest of the surface of these chords, and be secured to them, the chords lapping all the joints.

When this diagonal planking droops both to stem and stern from amidships, I secure the abutting ends by bolting them to an iron plate, (see dotted lines in fig. 2,) this iron plate or plates extending over and filling the space between the two 'midship-frames, and being riveted to them. This plate may be attached to any proper part of the iron framing, and may extend across a frame, but I prefer to fill with it the space between two frames.

It will now be seen, by consideration of the description and drawings, that I have a vessel completely planked up, and a bridge-like structure, the wood and iron being intimately united, and the joints, between the diagonal and fore-and-aft planking, strengthened by the chords, and the whole disposed in the best form to resist the strains that vessels are exposed to, either from unequal loading, or from the action of the waves, such strains causing vessels to change their sheer.

It will be further seen that this structure, by reason of the use of the iron plate on which the diagonals abut, is strongest amidships, and that this strength is further increased by the arched chords, as before explained.

In order further to strengthen the ship, I intend, at times, to bolt, on the inside of the frames, and above the deck of the vessel, strong planking, which shall extend amidships, from the deck-beams to the top of the bulwarks, and gradually diminish in depth, fore and aft, its top being coincident, or nearly so, with the top of the iron chords *d d'*, (this timber-chord is shown at *h h*, figs. 4 and 5,) and the upper part of the whole structure is further strengthened, if desired, by iron plates, riveted upon the deck-beams.

After the framing and inner planking are complete,

the whole vessel is to be planked over with the ordinary wooden planking *m m*, and I prefer to secure the outer planking to the inner planking only, and to secure it with wooden fastenings, such as treenails, the treenail for which I have a patent being a suitable device for this purpose; but this planking may be fastened with metal, or may be secured through the inner planking to the timbers, and I sometimes intend to dispose the inner planking as in ordinary double-planked ships, the outer planking secured to the inner planking only.

In the drawings, the garboard and adjacent streaks of planking are shown single. These may, however, be in two thicknesses, but as these streaks are secured to the filling of the floor, without through-bolts, into the metallic floor-timbers, they will answer as well single as double.

The object in fastening the outer planking to the inner planking only, or of securing the former, by means of treenails, either to the latter only, or through the frames, is to prevent galvanic action between the copper, with which the vessel should be sheathed, and the iron frame, and the safest plan is to use wooden fastenings, not passing into the iron framing.

I am aware of the fact that double-planked ships are not new; neither is it new to build a ship with the planking, or one thickness thereof, running diagonally; but such ships, as far as I know, were what are termed "bread-and-butter ships," without any frames; neither are composite ships new, nor is it new to place chords or arches of timber in ships; but I know of no planking diagonal in two directions, nor of any diagonal planking secured amidships upon an iron plate, nor of any timber-chord lying above deck, and inside of the bulwarks, nor of any iron chord, making part of the

iron frame of a ship, high in the centre and low at the ends, whereby greater strength may be secured with a given weight of frame, as a whole, than can be attained with a horizontal chord, or one depressed amidships, which latter is the usual, and, so far as I know, the only form of metallic chord used in ship-building.

I claim, as of my own invention—

1. A vessel, composed of a double planking, and an iron frame, in which the outside planking is secured to the inner planking only with wooden fastenings, whereby a composite ship may be coppered without serious risk of galvanic action, the combination of planking and frame being substantially such as described.

2. In combination with an iron frame, a planking, partly fore and aft, and partly diagonal, the latter drooping both ways from amidships, and being secured, amidships, or nearly so, upon an iron plate, the whole construction being substantially such as specified.

3. In combination with an iron frame, having metallic chords secured to the outside thereof, fore-and-aft planking partly covering the chords, and diagonal planking abutting thereon, and covering the remainder of the chords, whereby the chords serve as lapping-plates, and the frame and both sets of planking are all intimately and firmly secured together, substantially as described.

4. A diagonal planking, drooping both ways from about amidships, in combination with an outer fore-and-aft planking covering the diagonal planking, as described, the two sets occupying substantially such relative positions to each other as are described herein.

JOHN BAIRD.

Witnesses:

EDWARD S. CLINCH,
WILLIAM MAN.