3 Sheets—Sheet 1.

J. CUNNINGHAM.

Construction of Steam-Boats.

No. 217,928. Patented July 29, 1879.

Fig. 1.

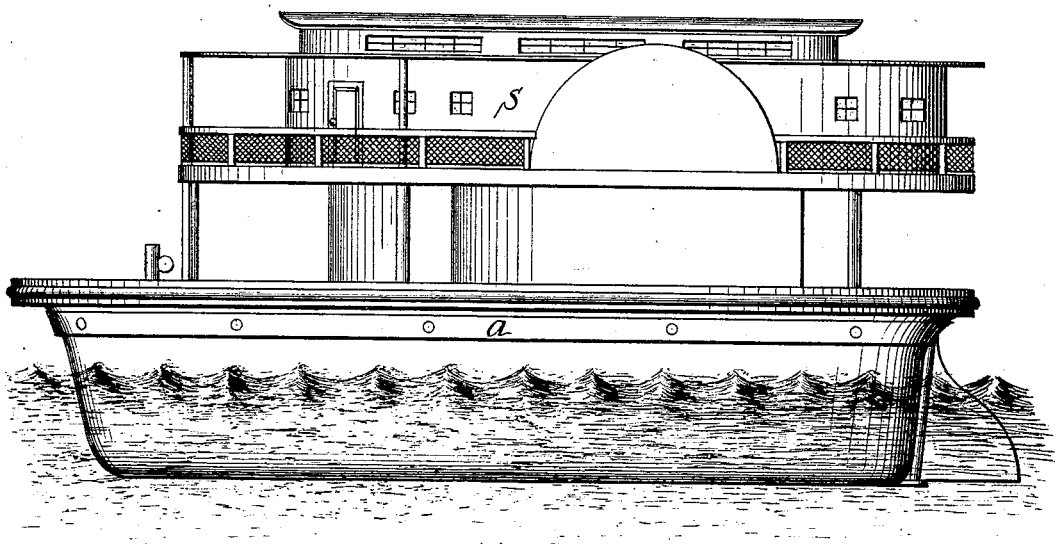


Fig. 2.

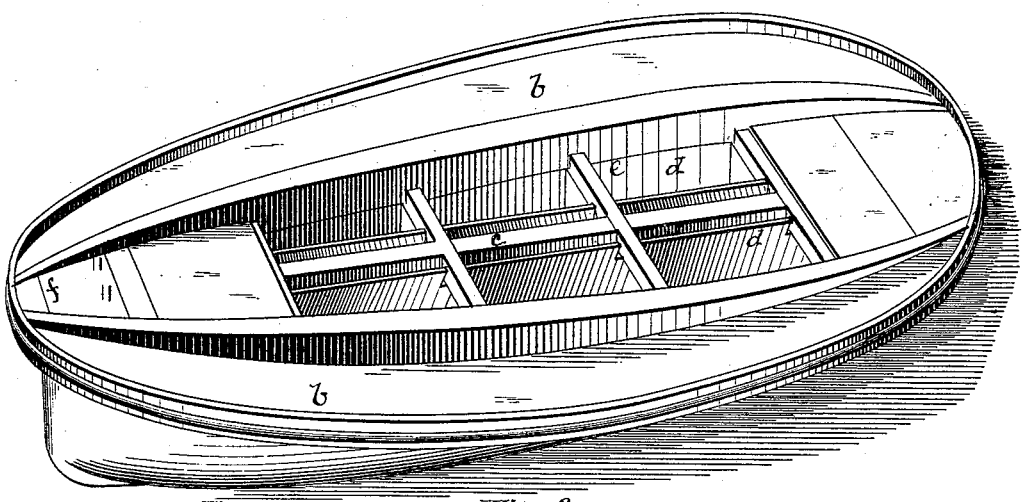
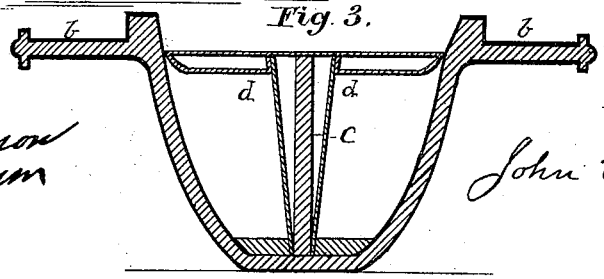


Fig. 3.



Attest.
D. R. Wilson
by W. Brown

Inventor.
John Cunningham

3 Sheets—Sheet 2.

J. CUNNINGHAM.

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Fig4.

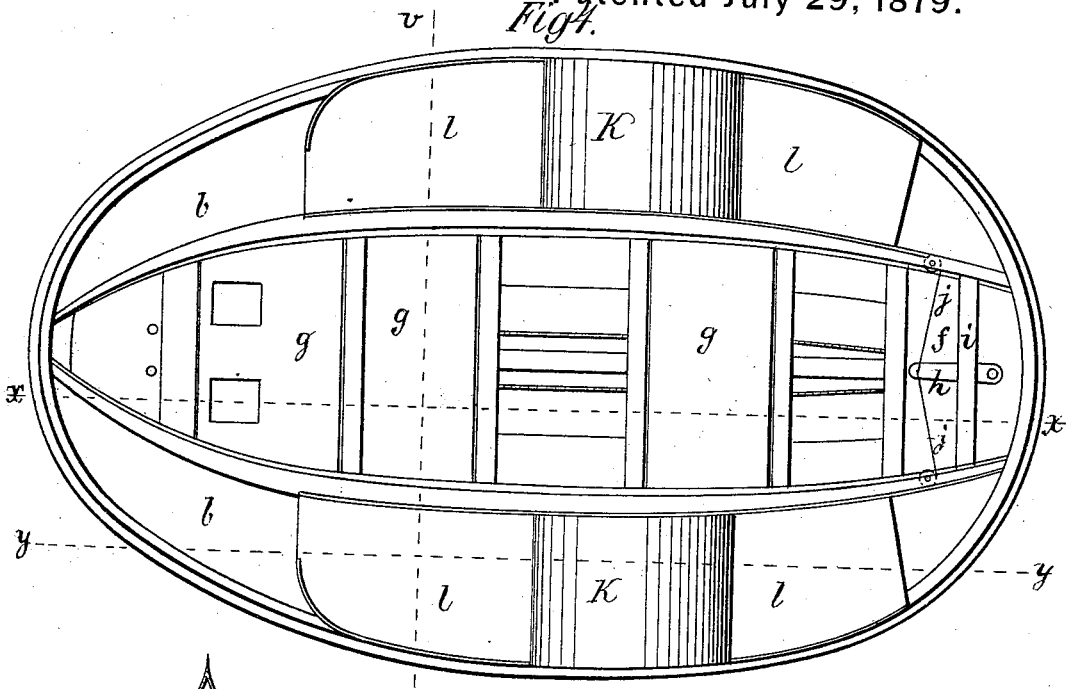
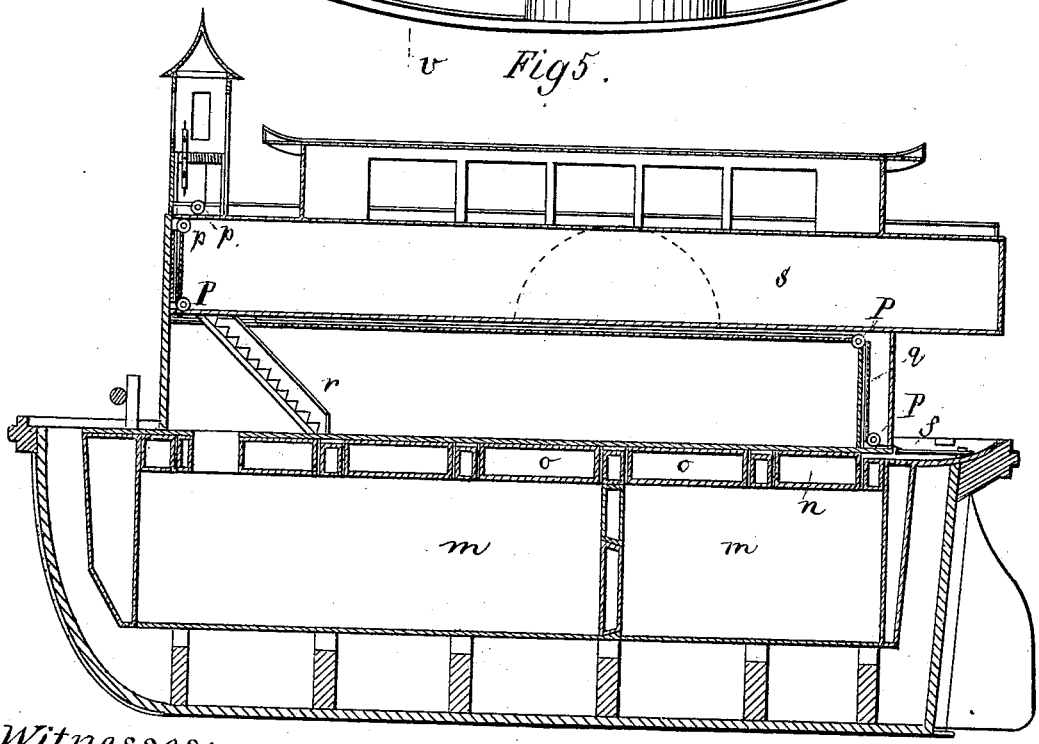


Fig5.



Witnesses:
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William D Seal

Inventor:
John Cunningham
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Atty

3 Sheets—Sheet 3.

J. CUNNINGHAM.

Construction of Steam-Boats.

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Fig6.

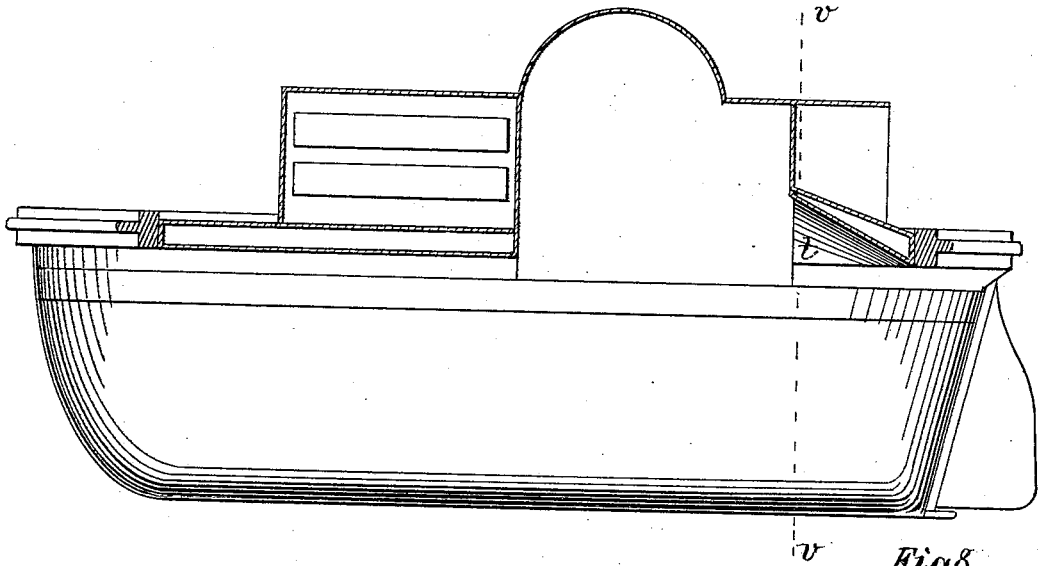


Fig8.

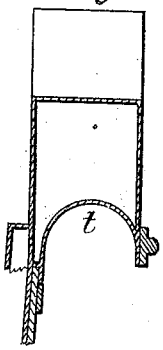


Fig7.

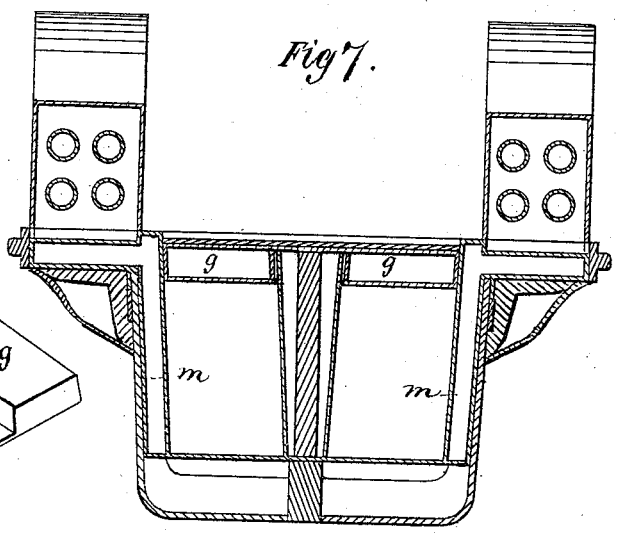
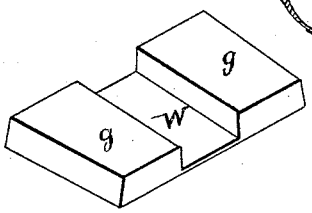


Fig9.



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UNITED STATES PATENT OFFICE.

JOHN CUNNINGHAM, OF PADUCAH, KENTUCKY.

IMPROVEMENT IN CONSTRUCTION OF STEAMBOATS.

Specification forming part of Letters Patent No. **217,928**, dated July 29, 1879; application filed June 11, 1877.

To all whom it may concern:

Be it known that I, JOHN CUNNINGHAM, of the city of Paducah, McCracken county, and State of Kentucky, have invented a certain new and useful Improvement in the Construction of Steamboats or other vessels to which it may be applicable; and I do hereby declare that the following is a clear, full, and exact description of the same, reference being had to the accompanying sheets of drawings, which form part of this specification, the same letters of reference indicating corresponding parts in all the figures.

My invention relates to that class of vessels known as "passenger and freight steamboats," especially adapted to rivers on which collisions, running against snags, and accidents from fire are frequent, and which boats are usually built of wood, wood combined with iron sheathing on the outside, or iron lining on the inside, and are objectionable for various reasons well known to naval architects and others familiar with this class of vessels.

It is well known that many accidents occur to vessels of the above construction by which many lives are lost and valuable freight and property destroyed either by the carelessness of engineers or unforeseen causes.

It is also well known that fire is the chief cause of all this destruction, either by conflagrations or explosions, and that the life-saving apparatus is often insufficient. There are many other objections to wooden vessels aforesaid, which will readily present themselves to those acquainted with the use of such vessels.

Now, to obviate all of these and various other objections is the object of my invention, and to provide a safe and reliable vessel against fire, explosion, and collision, as well as against other accidents; and to this end my invention consists in the construction of the hull of the vessel of galvanized iron or other suitable metal, so arranged as to form an entire air-chamber all around the inside of the ordinary hull, said chamber being provided with the usual braces, stays, &c., or may be constructed with air-tight compartments on the sides communicating with longitudinal and transverse bulk-heads. The said braces, stays, &c., may be made of hollow iron, tube-like, so that the whole inner surface of the hull may serve to give buoyancy.

It further consists in dividing the hull of the vessel in two equal chambers by a longitudinal hollow bulk-head, made air-tight, with air-tight chambers on each side and suitably braced, this bulk-head being in communication with the transverse bulk-head, or may form an independent chamber.

It further consists in building the vessel, above the water-line, of galvanized iron or of other suitable metal up to and including the deck proper, and also that portion which extends over and alongside the hull, which generally forms the frame-work for the wheel-house, and usually known as the "guards." All of these parts are made hollow, both for strength, elasticity, and buoyancy. Of course, this floor, deck, and guard-deck will be properly braced; and if my invention is applied to an ordinary deck the galvanized iron is laid in such a position as to form an air-chamber between the rib-knees or braces under the guard-decks.

My invention further consists in making hollow hatches, so if detached from the vessel they will serve as life-saving rafts. It will therefore be seen that not only the cabin is safer, but also the hull of the vessel, thus assuring greater safety to passengers, and also to any freight that may be in the boat. I am not aware of any such construction ever before known, and therefore desire to point it out distinctly.

My invention further consists in so arranging all the air-tight compartments, chambers, boxes, decks, tubes, &c., in such a manner that air may be forced into all of said vessels or to any part of them by suitable cocks and valves, (not shown,) whereby the outside pressure is counterbalanced and collapse prevented.

It further consists in constructing the passengers' department, pilot-house, &c., of galvanized iron, as a further preventive against fire; and it further consists in providing a chamber in which the tiller, lever, or handle works, so that in case of any derangement on deck from any cause it is protected, and is also out of the way; for any purpose is entirely safe and easily accessible. I may add that

the tiller-chains are also incased in iron tubes, for further and better protection, and with other details and advantages, as will be hereinafter further described; and it lastly consists in arranging, in the under portion of the air-chamber under the guard-deck and in rear of the wheels, a concave surface, by which the splash-water thrown from the wheel against said surface is utilized in giving additional force or momentum to the vessel, and thus utilizing what has heretofore been troublesome—viz., compelling the water to fall from under the deck, instead of, as heretofore, thrown over the deck, to the annoyance of passengers and detriment of freight.

To better enable those skilled in the art to which my invention appertains to make and use it, I will now refer to the drawings and letters of reference marked thereon.

Figure 1 represents a side elevation of my improved boat, showing the line of attachment of the galvanized iron to a wooden hull, as seen at *a*, and the location of the cabin, the side wheel in this instance being removed.

Fig. 2 is a plan view in perspective, clearly showing the guard-decks *b*, the central bulkhead, *c*, incased by a metallic casing, *d*, forming an air-tight chamber on each side, and transverse bulk-heads *e*, which may also be incased or made hollow. This figure also shows the depression *f* at the stern of the vessel for the tiller handle or lever to work in.

Fig. 3 shows a cross-section of a modified form of my improvement as applied to an old hull, clearly showing the air-tight chamber on each side of the longitudinal bulk-head, and also the hollow deck or hatchways immediately over the hull. The deck may be a continuous hollow air-tight chamber, or may be made in sections, as desired. The knees or supports under the guard-decks may be utilized to fasten the galvanized sheet-iron to, thus forming an air-tight chamber, to add to the buoyancy of the vessel in case of danger of sinking, and this, too, without lessening in any degree the carrying capacity of the vessel.

Fig. 4, Sheet 2, is a plan view with the cabin removed, and also two of the chambered hatchways. In this figure is shown the incased bulkheads, forming an air-chamber on each side. This bulk-head and chamber extends longitudinally through the center of the hull from bow to stern, and may form one chamber, or may be in sections. *g* in this figure shows the hollow hatches or sections of deck, as shown at Fig. 9, Sheet 3, and which will hereinafter more fully appear. *f* is the depression in the deck at the stern for the tiller handle to work in. *h* is the tiller-handle, and *i* is a transverse beam, upon which the floor of the deck rests, thus hiding out of the way the tiller-handle. Chains *j* run from the tiller-handle through suitable tubes and over friction-rollers to the pilot-house. (See Fig. 2.) *k* shows the top of the wheel-houses in this figure; *l* the boiler-rooms, and *b* the guard-decks.

Fig. 5 is a vertical longitudinal section on line *x x* of Fig. 4. *m* in this figure shows a section of the hull of the vessel to one side of the central longitudinal bulk-head, with one division of the hull. Doors or apertures may be made from one department to another for access thereto; but when desired to be strictly air-tight the doors or apertures should be lined, so as not to leak, as the primary object is that under any circumstances the vessel shall not sink, even when the hull is filled with water outside of the air-chambers. *n* is the transverse hollow bulk-head, which forms braces and ties the decks, and also forms the sleepers for the floor of the deck. These may be solid or cased, forming a chamber, or may be made hollow and air-tight. *o* shows the hollow hatch or deck-floor over the hull; *f* the depression for tiller-handle, and also the chain from the handle over the friction-rollers *p*, up through hollow tubes *q*, and thence along the floor of the cabin to the pilot-house. Thus it will be seen that the chain, as well as the tiller-handle, is entirely protected and hid from view. *r* is the stairway to the cabin. It will be seen that the air-chambers are a considerable distance above the keelson, and may be inserted between the ribs, each being an independent chamber; or they may be flush with the ribs, as the case may demand. *s* is the cabin.

Fig. 6 is a vertical longitudinal section on the line *y y* of Fig. 4. This figure is more particularly designed to illustrate the position of the nest or battery of boilers on the guard-deck. Of course this kind of boilers is not essential to my invention; but I desire to show the entire safety from common accidents in a steamboat built after my plan and invention. I may remark here that the risk taken by insurance companies would not be so great. This figure also shows, in sections, the hollow deck and the concavity *t* in rear of the wheel-house, the purpose being that the force of the splashing water from the wheel, and impinging against this concave surface with great force, serves to assist in propelling the vessel forward. The hollow air-space is plainly seen over this concavity. It will be further observed that every available place where an air-chamber or buoy can be placed without interfering with the conveying capacity of the vessel, and without marring the æsthetic effect, has been utilized, having the main object in view—viz., the safety of life and property.

Fig. 7 is a vertical cross-section on line *v v* of Fig. 4, in which are shown the air-tight compartments resting up against the skin of the hull of an iron vessel, each compartment being located between the ribs, the central hollow bulk-head extending to the surface of the floor of the deck; also, the side air-chambers extending up and over the side of the hull and forming the floor of the guard-deck. It will be seen in this figure that the batteries of boilers are independent. Should it so happen that one battery became disabled from any cause, the other battery could be used to fur-

nish steam to finish the voyage or to bring the boat to shore; although in ordinary use they are connected together by any well-known means and used in common for supplying steam to the engine. But their position is clearly shown in this figure, by which, in case of explosion, the passengers and freight are entirely free from danger, both from fire and water, all the parts contiguous to them being iron, and therefore non-combustible.

Fig. 8 shows a cross-section of a portion of the vessel at line *v v*, Fig. 6, and which is particularly designed to show the wheel water-splashing concavity heretofore explained.

Fig. 9 is a detached inverted view of one of the hatches made in two air-tight chambers, connected together by a single plate of iron, which also forms the top of the two chambers *g g*. The recess W between said chambers is designed to fit over the top of the central hollow bulk-head, and thereby forming a part of the deck. This hatch is designed for a double purpose—viz., to produce buoyancy when in danger, and to serve as a life-preserver when detached from the vessel. All these parts will be rigidly secured in their proper places to the hull of the vessel.

It is evident that all these improvements may be applied to vessels already built, as well as to new ones.

I am aware that air-tight chambers have been used in the construction of boats and ships, and therefore lay no claim to such, broadly. Nor do I desire to confine myself strictly to the construction shown and described, as many modifications may be made therein without departing from the spirit of my invention.

I therefore claim and desire to secure by Letters Patent—

1. In a ship or boat either propelled by steam or sail, a longitudinal bulk-head extending from keel to deck vertically, and from bow to stern, dividing longitudinally the hull of the vessel into two equal divisions, said bulk-head being provided with an air-tight chamber on each side extending its entire depth and length, whereby the hull is strengthened by said bulk-head and the air-tight chamber adding to the buoyancy of the vessel, substantially as herein set forth and specified.

2. In combination with the hull of a vessel, a longitudinal central bulk-head, arranged to be lapped on top by a chambered deck—that is to say, one air-tight chamber on each side of said bulk-head—the whole to be tied by transverse beams or hollow bulk-heads, whereby strength, buoyancy, and compactness are combined, substantially as herein described and shown.

3. In combination with air-tight bulk-heads and chambers constructed for the purpose of buoyancy and strength, arranged within the hull and forming the guard-deck, the air-chambers formed by incasing the knees or supports under the guard-deck and fore and aft of the wheel-house, by which additional buoyancy is secured without interfering with the carrying capacity of the vessel or inconvenience of the passengers, substantially as hereinbefore set forth and described.

4. The removable hatch, provided on either end with an air-chamber, *g*, and with a recess, W, by which it is made to form a cover for said bulk-head and fill the office of a life-preserver when detached, substantially as shown and described.

5. The deck of a vessel constructed with a chamber between its top and bottom surfaces, as at *f*, in which the tiller operates, substantially as shown and described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN CUNNINGHAM.

Attest:

D. R. WILSON,

CY. M. BROWN.