UNITED STATES PATENT OFFICE · LETTERS PATENT NO. 6,469

# Buoying Vessels over Shoals

Abraham Lincoln, of Springfield, Illinois

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Fig. 1.

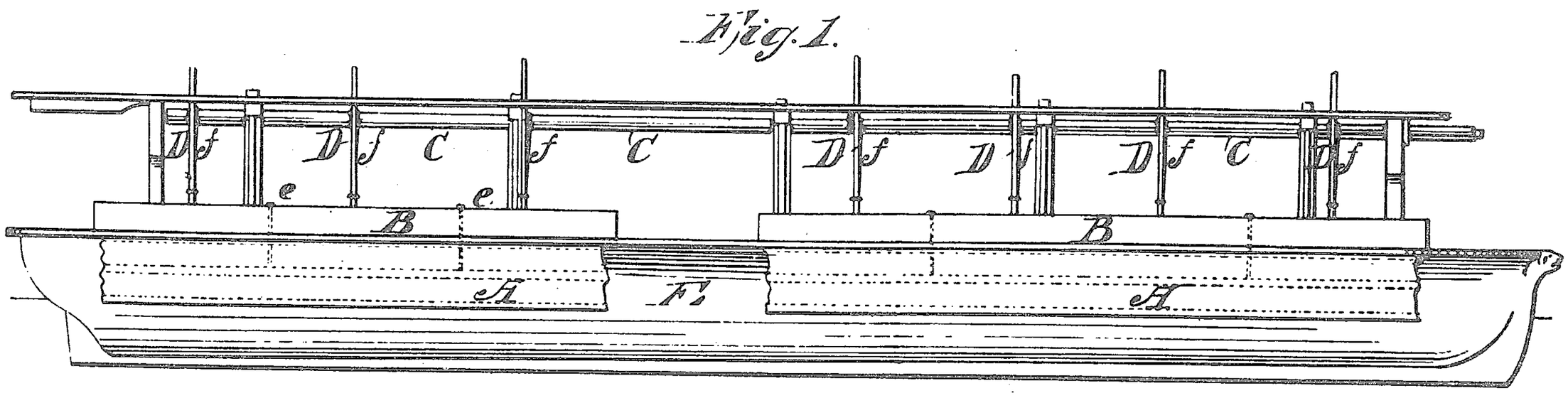



Fig. 3.

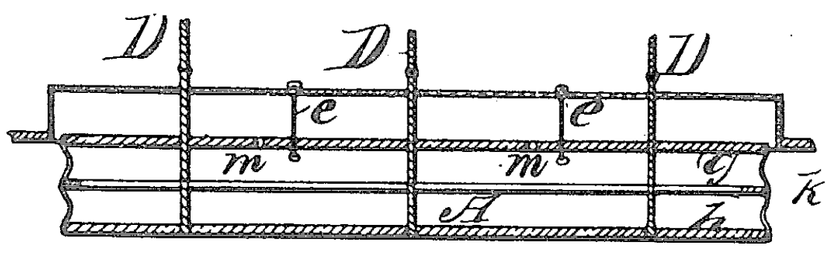
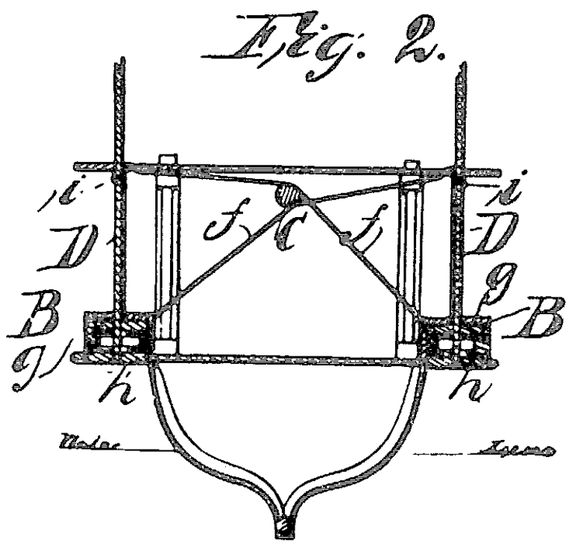



Fig. 2.




*The sheet of drawings, turned a quarter turn: Fig. 1, a side elevation of a vessel with the buoyant chambers expanded; Fig. 2, a transverse section with the chambers contracted; Fig. 3, a longitudinal section through a chamber and its box B.*

*To all whom it may concern:*

Be it known that I, Abraham Lincoln, of Springfield, in the County of Sangamon, in the State of Illinois, have invented a new and improved manner of combining adjustable buoyant air chambers with a steamboat or other vessel for the purpose of enabling their draught of water to be readily lessened to enable them to pass over bars, or through shallow water, without discharging their cargoes; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings making a part of this specification. Similar letters indicate like parts in all the figures.

The buoyant chambers A, A, which I employ, are constructed in such a manner that they can be expanded so as to hold a large volume of air when required for use, and can be contracted, into a very small space and safely secured as soon as their services can be dispensed with.

Fig. 1, is a side elevation of a vessel with the buoyant chambers combined therewith, expanded;

Fig. 2, is a transverse section of the same with the buoyant chambers contracted.

Fig. 3, is a longitudinal vertical section through the centre of one of the buoyant chambers, and the box B, for receiving it when contracted, which is secured to the lower guard of the vessel.

The top *g*, and bottom *h*, of each buoyant chamber, is composed of plank or metal, of suitable strength and stiffness, and the flexible sides and ends of the chambers, are composed of india-rubber cloth, or other suitable waterproof fabric, securely united to the edges and ends of the top and bottom of the chambers.

The sides of the chambers may be stayed and supported centrally by a frame *k*, as shown in Fig. 3, or as many stays may be combined with them as may be necessary to give them the requisite fullness and strength when expanded.

The buoyant chambers are suspended and operated as follows: A suitable number of vertical shafts or spars D, D, are combined with each of the chambers, as represented in Figs. 2 and 3, to wit: The shafts work freely in apertures formed in the upper sides of the chambers, and their lower ends are permanently secured to the under sides of the chambers: The vertical shafts or spars (D, D,) pass up through the top of the boxes B, B, on the lower guards of the vessel, and then through its upper guards, or some other suitable support, to keep them in a vertical position.

The vertical shafts (D, D,) are connected to the main shaft C, which passes longitudinally through the centre of the vessel—just below its upper deck—by endless ropes *f*, *f*, as represented in Fig. 2: The said ropes, *f*, *f*, being wound several times around the main shaft C, then passing outwards over sheaves or rollers attached to the upper deck or guards of the vessel, from which they descend along the inner sides of the vertical shafts or spars D, D, to sheaves or rollers connected to the boxes B, B, and thence rise to the main shaft (C,) again.

The ropes *f*, *f*, are connected to the vertical shafts at *i*, *i*, as shown in Figs. 1 and 2. It will therefore be perceived, that by turning the main shaft C, in one direction, the buoyant chambers will be expanded into the position shown in Fig. 1; and by turning the shaft in an opposite direction, the chambers will be contracted into the position shown in Fig. 2.

In Fig. 3, *e*, *e*, are check ropes, made fast to the tops of the boxes B, B, and to the upper sides of the buoyant chambers; which ropes catch and retain the upper sides of the chambers when their lower sides are forced down, and cause the chambers to be expanded to their full capacity. By varying the length of the check ropes, the depth of immersion of the buoyant chambers can be governed. A suitable number of openings *m*, *m*, are formed in the upper sides of the buoyant chambers, for the admission and emission of air when the chambers are expanded and contracted.

The ropes *f*, *f*, that connect the main shaft C, with the shafts or spars D, D, (rising from the buoyant chambers,) may be passed from one to the other in any direction that may be deemed best, and that will least incommode the deck of the vessel; or other mechanical means may be employed as the medium of communication between the main shaft and the buoyant chambers, if it should be found expedient.

I shall generally make the main shaft C, in as many parts as there are corresponding pairs of buoyant chambers, so that by coupling the sections of the shaft together, the whole of the chambers can be expanded at the same time, and by disconnecting them, either pair of chambers can be expanded, separately from the others as circumstances may require.

The buoyant chambers may be operated by the power of the steam engine applied to the main shaft C, in any convenient manner, or by man power.

Where the guards of a vessel are very high above the water, the boxes B, B, for the reception of the buoyant chambers when contracted, may be dispensed with, and the chambers be contracted by drawing them against the under side of the guards. Or, protecting cases may be secured to the under sides of the guards for the reception of the buoyant chambers when contracted.

When it is desired to combine my expansible buoyant chambers with vessels which have no projecting guards; shelves or cases must be strongly secured to their sides for the reception of the buoyant chambers.

I wish it to be distinctly understood, that I do not intend to limit myself to any particular mechanical arrangement, in combining expansible buoyant chambers with a vessel, but shall vary the same as I may deem expedient, whilst I attain the same end by substantially the same means.

What I claim as my invention and desire to secure by letters patent, is the combination of expansible buoyant chambers placed at the sides of a vessel, with the main shaft or shafts C, by means of the sliding spars or shafts D, which pass down through the buoyant chambers and are made fast to their bottoms, and the series of ropes and pullies, or their equivalents, in such a manner that by turning the main shaft or shafts in one direction, the buoyant chambers will be forced downwards into the water and at the same time expanded and filled with air for buoying up the vessel by the displacement of water; and by turning the shaft in an opposite direction, the buoyant chambers will be contracted into a small space and secured against injury.

A. LINCOLN.

Witness:
Z. C. Robbins,
H. H. Sylvester.



*The spelling and punctuation are those of the printed specification. Text and drawing in the public domain.*

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