Sheet 1. 5 Sheets.

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Centre Board and Keel.

No. 6,299. Patented Apr. 10, 1849.

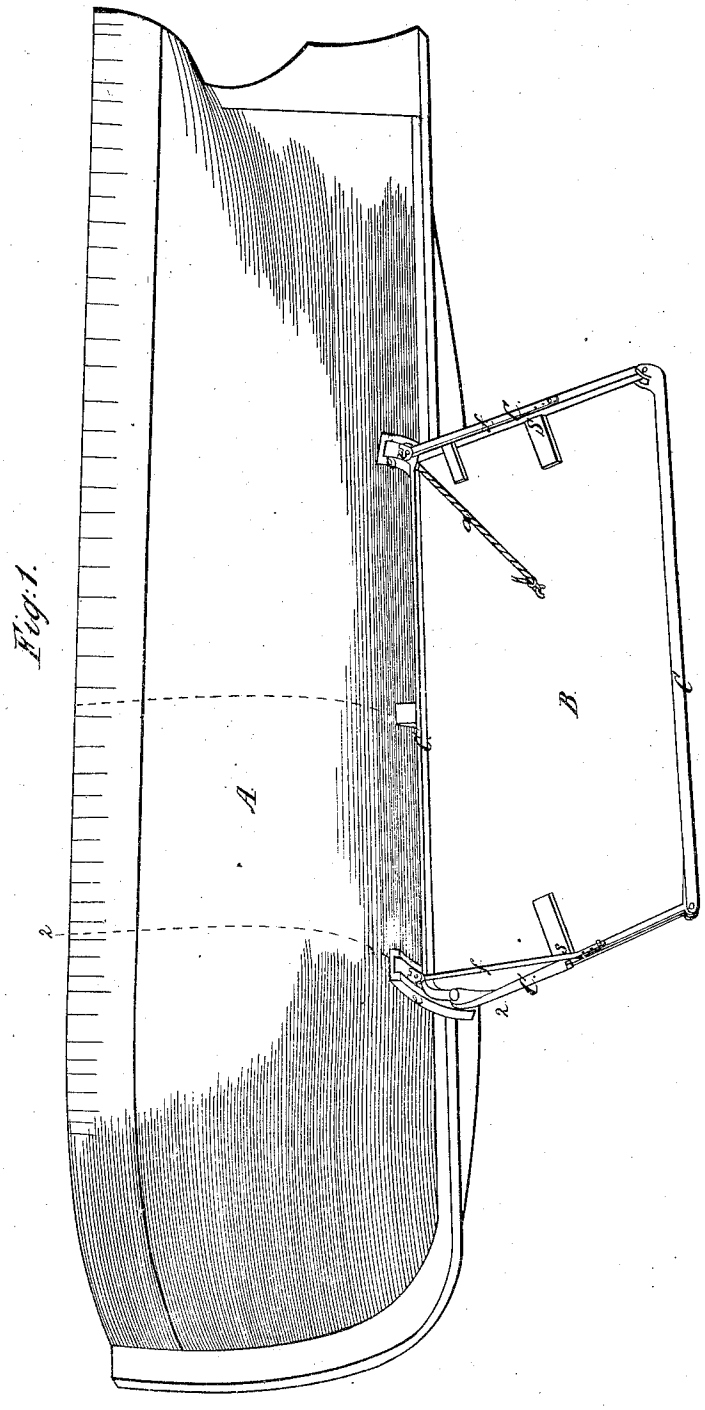


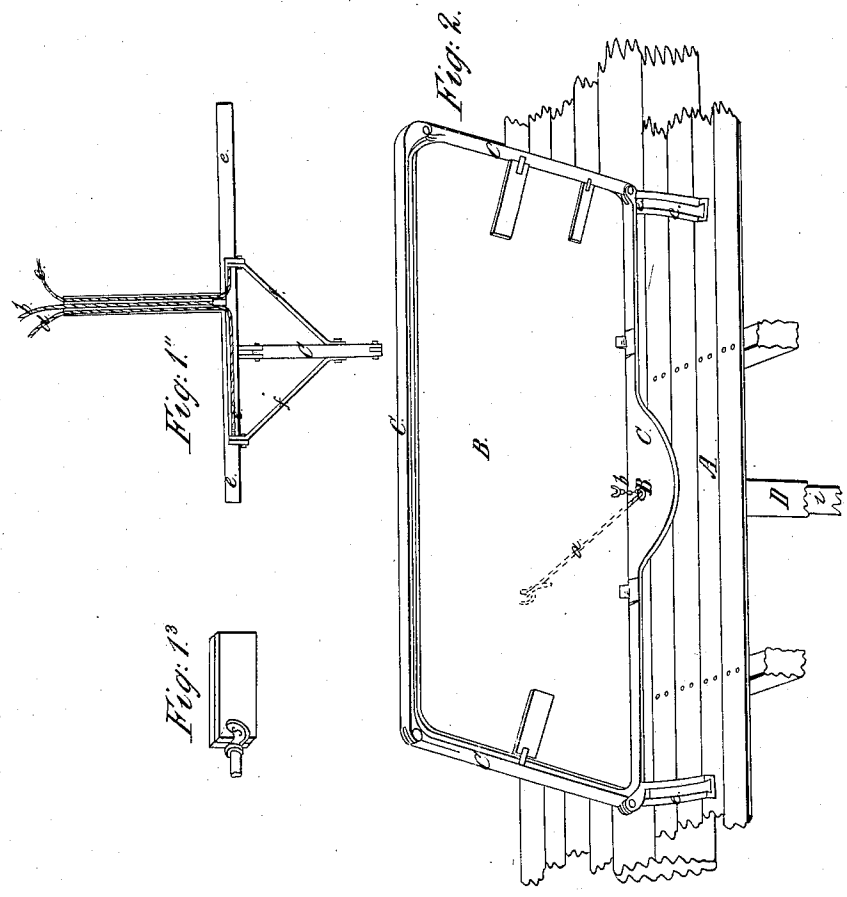
Fig. 1.

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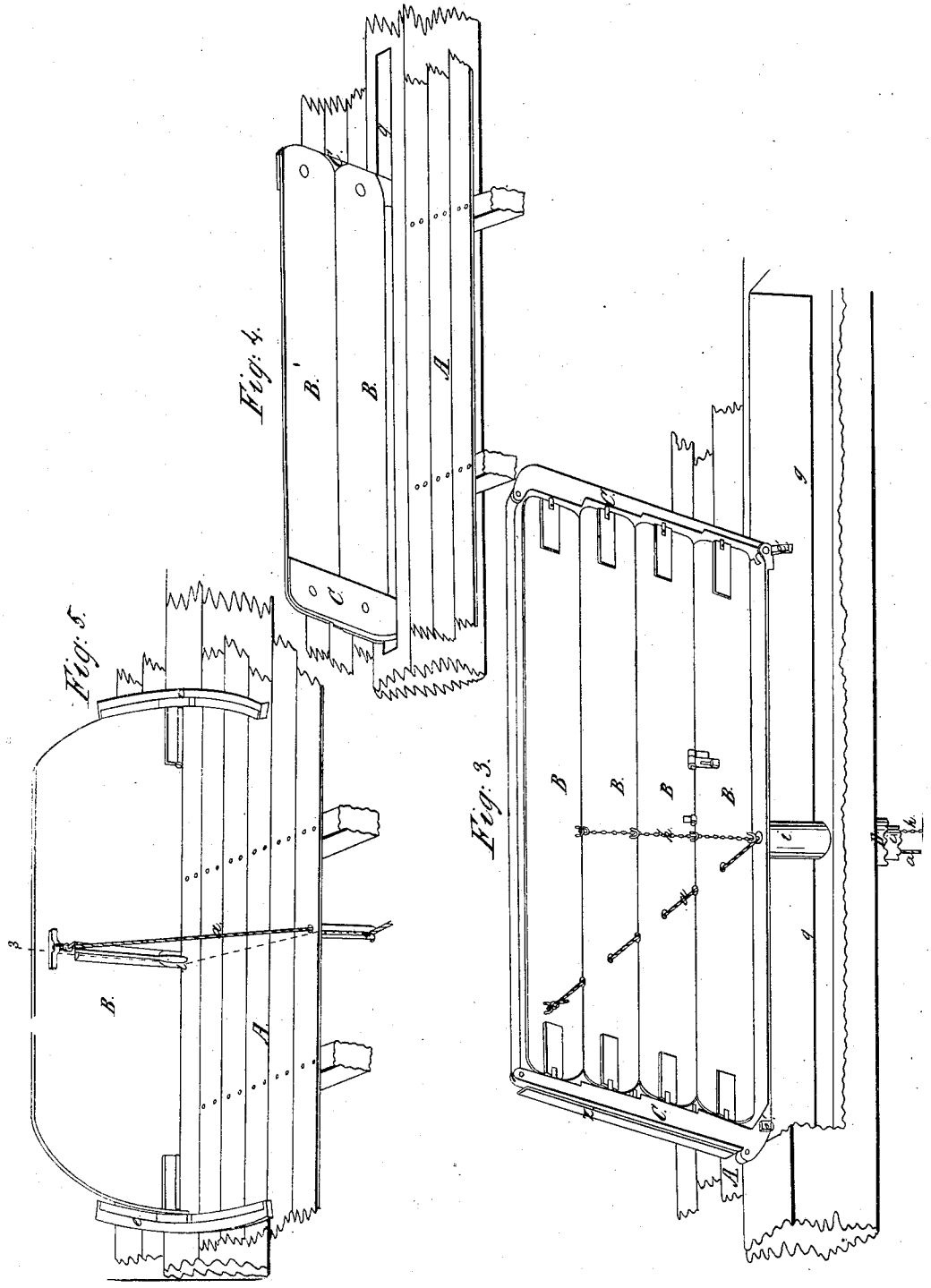


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Sheet 4. 5 Sheets.

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Fig: 6.

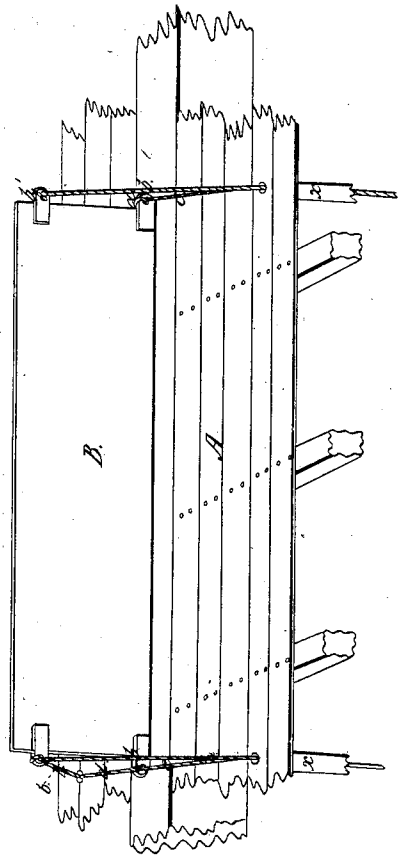


Fig: 8.

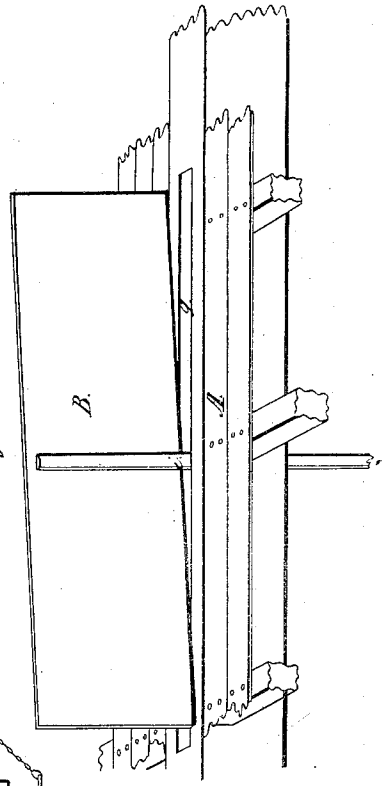
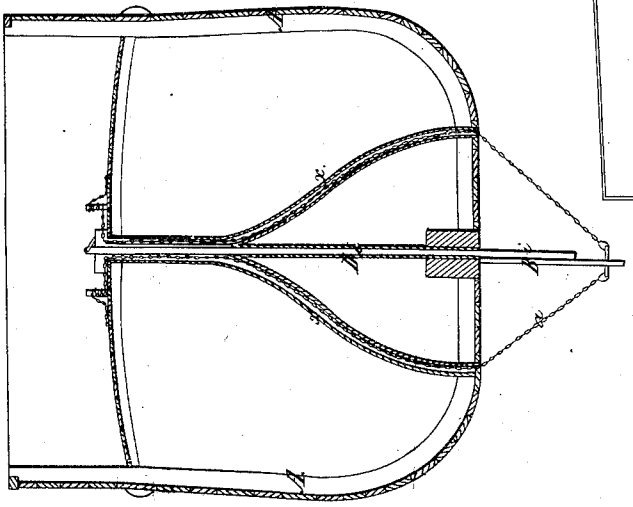


Fig: 9.



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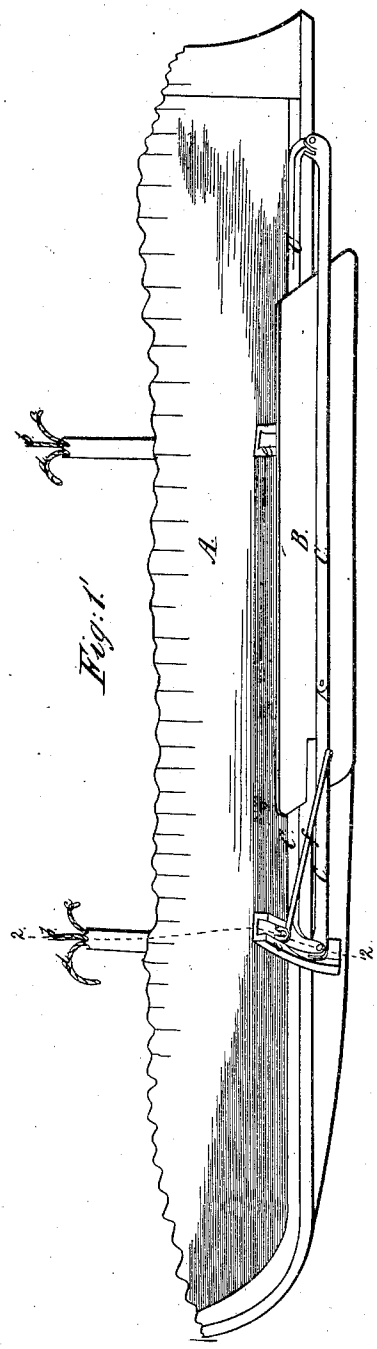


Fig: 1.

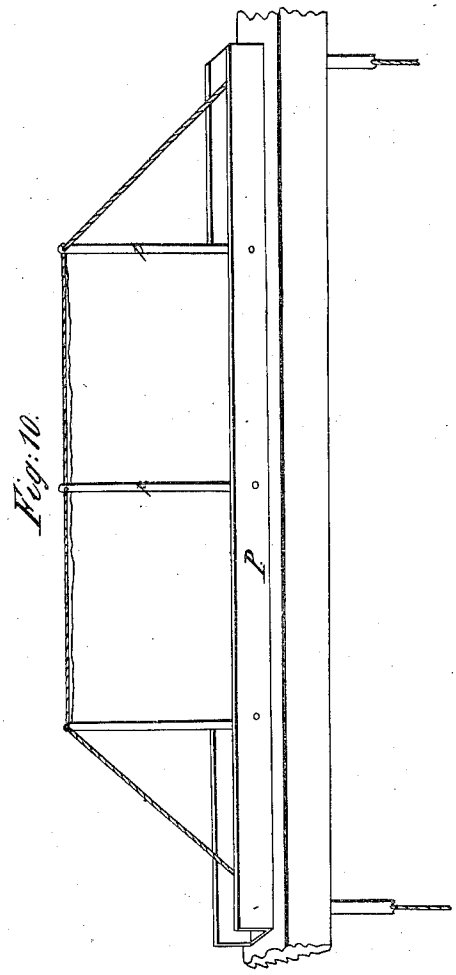


Fig: 10.

UNITED STATES PATENT OFFICE.

J. M. HOFFMAN, OF BUFFALO, NEW YORK.

FOLDING CENTERBOARD.

Specification of Letters Patent No. 6,299, dated April 10, 1849.

To all whom it may concern:

Be it known that I, JOHN M. HOFFMAN, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful improvements in centerboards to be attached to vessels for the purpose of improving their sailing qualities and rendering them more seaworthy, of which the following is a full and exact description, reference being had to the annexed drawings of the same, making part of this specification, in which—

Figure 1 is a perspective view of the hull of a vessel, seen from beneath, with one modification of my improved folding frame C, and turning removable center board B, applied thereto, in an expanded position, Fig. 1′ is an auxiliary figure showing a perspective view of a portion of the bottom, representing the same center board folded up, Fig. 1″ is a second auxiliary figure, being a section taken through the line 2 2 of Fig. 1 and 1′ showing the manner in which the chains and cords which suspend and govern the position of the center board, are arranged, Fig. 1^3 is a perspective view of the ball and socket hinge *s* detached from the board B. Fig. 2 is a modified form and arrangement of the folding frame C, and turning board B, which differ from Fig. 1, in not being removable from the bottom of the vessel, and in being turned obliquely across the keel, by a central stem *i* passing up through a tube, to the deck. Fig. 3 is another form of the folding frame C, with a center board B therein, formed of sections, joined by hinges, and with their frame, capable of being folded up into a recess I formed in the keel. Fig. 4 is another form of the folding frame C and sectional board B which are also arranged so as to be shut up into a cavity I in the keel. Fig. 5 is a view of a hinged center board B capable of being folded up against the bottom of the vessel, and turned by a stem which passes through a vertical tube extending from the bottom to the deck of the vessel. Fig. 6 is a view of an adjustable board B, suspended and braced by chains, cords, or jointed rods *c*, *b*, *d*, which pass through the hull from the bottom of the deck in a forked tube, formed and arranged as in Figs. 5 and 9, which board after being folded may be hauled up at the side of the vessel or upon the deck. Fig. 8 is a view of a center board B that slides up and down in a vertical sheath or oblong rectangular tube which extends up through the hull, which board when protruded down below the bottom turns on a vertical shaft or stem, so that it may be inclined to the keel. Fig. 9 is a transverse section, taken through the hull, in the line 3 3 of Fig. 5 for the purpose of showing the arrangement of a tri-forked tube through which the chains or cords pass which suspend and regulate the folding board. Fig. 10 is a fin, made of canvas or other flexible substance, with jointed rods and cords for extending and folding it up.

Figs. 2, 3, 4, 5, 6 and 8 and 10 represent the center board, and the fragment of the bottom to which it is attached, in an inverted position.

In Figs. 1, 2, 3, 5, 6 and 8 the board is arranged so that it is capable of being turned at an angle of about twenty degrees with the sides of the keel, its forward end being always inclined to windward for the purpose of counteracting the tendency of the vessel to drift to the leeward of her course, when either beating against the wind or a current, or sailing with the wind "a-beam."

The same letters indicate the same parts in all the figures.

The nature of my invention and improvement consists in constructing center boards to be attached to flat-bottomed vessels, which can readily be folded up to allow the vessel to pass over a bar or shallow place, and may without inconvenience be unshipped at any time, and taken on board, either to repair damages or for other purposes, which boards, thus arranged, diminish greatly the leeway of this class of vessels, when sailing on a side, or beating against a head wind or current, and render them much more seaworthy.

In the accompanying drawings A Fig. 1 represents the hull of a vessel having my improved center board B attached thereto, this center board B is mounted upon ball and socket hinges *a* Figs. 1 and 1^3 in the jointed folding frame C, and may be folded up against, and parallel to the bottom as in Fig. 1′, or hang down as in Fig. 1. It is folded by pulling up the cord or chain *a* Fig. 1, and is suspended in the grooved segment guide blocks *e* by the chains or cords *b* (Figs. 1 and 1″), and is placed obliquely to, or held parallel with, the keel, by the guide ropes *c* and *d* (Fig. 1″) the cord *c* being drawn up, and the cord *d* let out to turn the board obliquely across the keel, as repre-

sented. It is obvious that if the cord *d* wire drawn up, and the cord *c* let out, the board would cross the keel in the opposite direction. The guide segment *e* which suspend the board and frame are themselves suspended to the bottom by the cord *h*. The frame C is formed of rods or bars of iron jointed to each other and to the sliding blocks *e'*, the ends are braced by the rods *f* which abut on the blocks *e*, being hinged thereto, this frame is so connected to, and arranged with the board, that when force is properly applied to either both will be folded, as for instance when the cord *a* is pulled the board is folded and carries with it the frame, but if the vessel runs unexpectedly into shoal water and the front of the frame strikes the bottom, it will fold up of itself together with the board and thus save both from injury. The turning of the board in the frame, and thus allowing both to be folded up by force applied as above, results from the form of the ball and socket joint (*s*) by which the board and frame are connected, being made with a twist like a screw as seen in Fig. 1[3] where the joint is represented upon an enlarged scale. The motion obtained by this construction of the joint and arrangement of the board and frame, I deem important, because it admits of the board being left down until it strikes the bottom, thus enabling the vessel to carry more sail among shoals than under other circumstances would be prudent, together with the oblique action of the board when inclined to the keel, which constantly presses the vessel up to the wind, thereby counteracting the tendency to drift to leeward of her course, and enabling her to work off from a lee shore, and avoid other dangerous places which vessels without such a contrivance as this are not ordinarily capable of doing.

In Fig. 2 the frame and board are made and arranged as in Fig. 1 except that they are not removable from the bottom of the vessel, but they are capable of being turned obliquely across the keel by a stem *i* which projecting from the frame C passes through a tube D to the deck in a manner analogous to the arrangement for the same purpose shown in Fig. 9. The board is kept expanded in this case by a weight attached to the end of the chain (*x*) which passes over a pulley on the underside of the deck, this weight or counterbalance is just sufficient to oppose the ordinary resistance offered by the water.

In Fig. 3 the board is represented as formed of separate slats or sections, each mounted upon separate hinges in the end bars of the frame, which hinges are constructed with a twist in the socket part and another corresponding thereto on the pivot, whereby the several sections are turned parallel to the bottom, and to each other when the frame is folded or shut up, or the journals and boxes may be respectively made without any twist, the boards hinged together at the sides, and a bar *z* arranged as represented, and having pins on it, which slide in holes made through the front bar of the frame, the ends of these pins being slanted off, so that whenever the bar *z* by force applied to its front side, is pushed back these slanted pins may partially turn the boards, and thus when the front of the frame meets with any obstruction to its progress it will invariably fold it up and thereby avoid injury. As the slats are narrow I make a cavity *g* in the under side of the keel, into which they are received when folded up, which cavity protects them from external violence or injury in case the vessel should strike upon a bar or rock. There are two cords or chains passing through the tube D one of which *a* is for the purpose of folding up, and the other *h* for extending the boards, the manner in which they are respectively attached to, and act upon the boards will be fully apparent from an inspection of the drawing. Through the tube D a stem *i* descends, the upper end of which extends above the deck, and has a lever attached to it in some convenient manner whereby it is turned together with the boards, and the frame, for the purpose of inclining them to the keel at any angle most suitable for counteracting the leeway of the vessel.

Fig. 4 represents a cavity *g* formed in the keel, in which two bars C C are hinged by one end, to which bars two or more narrow boards B are pivoted in such a manner that the whole may be pulled up into the cavity by a cord attached to one of the bars C and passing up through a tube to the desk, or otherwise, the boards B when shut up being placed side by side, to admit of this arrangement the bars C are stepped so that no two boards will be attached to them in the same vertical plane, but in adjacent planes.

Fig. 6 is a plain board suspended from the bottom, and braced by cords or chains *h h'* and adjusted in the plane of the keel or obliquely thereto by the guide ropes or chains *c* and *d*, or rather by the combined action of all these ropes—for instance if the ropes *h* and *c* be pulled up, and the ropes *h'* and *d* be slackened at the front end, and the opposite cords at the hindmost end of the board be respectively pulled up, and slackened in the same manner, the board will be placed obliquely across the heel. If the ropes *h h* on one side are slackened and on the other drawn up tight, and at the same time the ropes *c* and *d* on the opposite side be respectively tightened and slackened, the board will be hauled up close, and lay flat against the bottom. These ropes pass up to the deck through forked tubes (*x*) which come

through it on opposite sides, and as this board is not attached to the keel, the vessel is in no way weakened by the perforation of that important timber. When it becomes necessary to haul up this or any of the other removable boards, it may be done by means of a rope passing over the side of the vessel, one end of which is attached to the board and the other secured to a belaying pin or otherwise fastened upon the deck.

Fig. 10 is a perspective view of what I call a fin; it is composed of a stock (P) in shape resembling an inverted trough with jointed ribs (*p*) hanging on pins passing through its sides, these ribs being covered with canvass or other flexible material, with ropes attached to the fin at either end, to close or fold it up either forward or backward as may be most convenient. The stock may turn on a shaft or stem, and the action of the whole is obviously analogous to that of the center brands, and acts upon the vessel in the same manner.

The figures not particularly described exhibit different modifications of the form and arrangement of the board, its frame, and the manner of adjusting and managing it, but as these changes will be sufficiently apparent from an inspection of the drawings I shall not here describe them.

The construction of the frame, and of the hinges or joints connecting it to the board may be varied to almost any extent as a great variety of common and well known devices can be applied to that purpose, without in the least changing the characters of the invention. The boards may be held in place on the vessels bottom by ropes or chains passing over the sides and arranged in any way that seamen may find best suited to the circumstances of each particular case. If the boards were held down by rigid fastenings they could not be folded by the sudden striking of the vessel without being either broken or loosened themselves, or having their fastenings broken. Such a state of things as this would be productive of the greatest inconvenience, and to avoid it I attach a counterbalancing weight sufficient to oppose the ordinary resistance offered by the water and keep the board in an expanded position, but which will yield to a force less than would be required to break or seriously injure the frame or board.

Having thus described the construction and operation of my improved center board, and the manner in which the same may be applied to flat bottomed vessels, what I claim therein as new and desire to secure by Letters Patent is—

1. Suspending in a jointed frame, a center-board, composed of one or more pieces, capable of being turned with either their edges or sides to the bottom of the vessel, and with the frame folded up against, or projected down therefrom, as herein set forth, whether the several parts be arranged as described, or in any other substantially similar manner.

2. Hanging the above claimed apparatus so that it is capable of being turned obliquely across the keel for the purpose of counteracting the leeway of the vessel, substantially as herein set forth.

In testimony whereof I have hereunto signed my name this 19th Oct. 1848.

J. M. HOFFMAN.

Witnesses:
WM. D. WASHINGTON,
P. H. WATSON.