

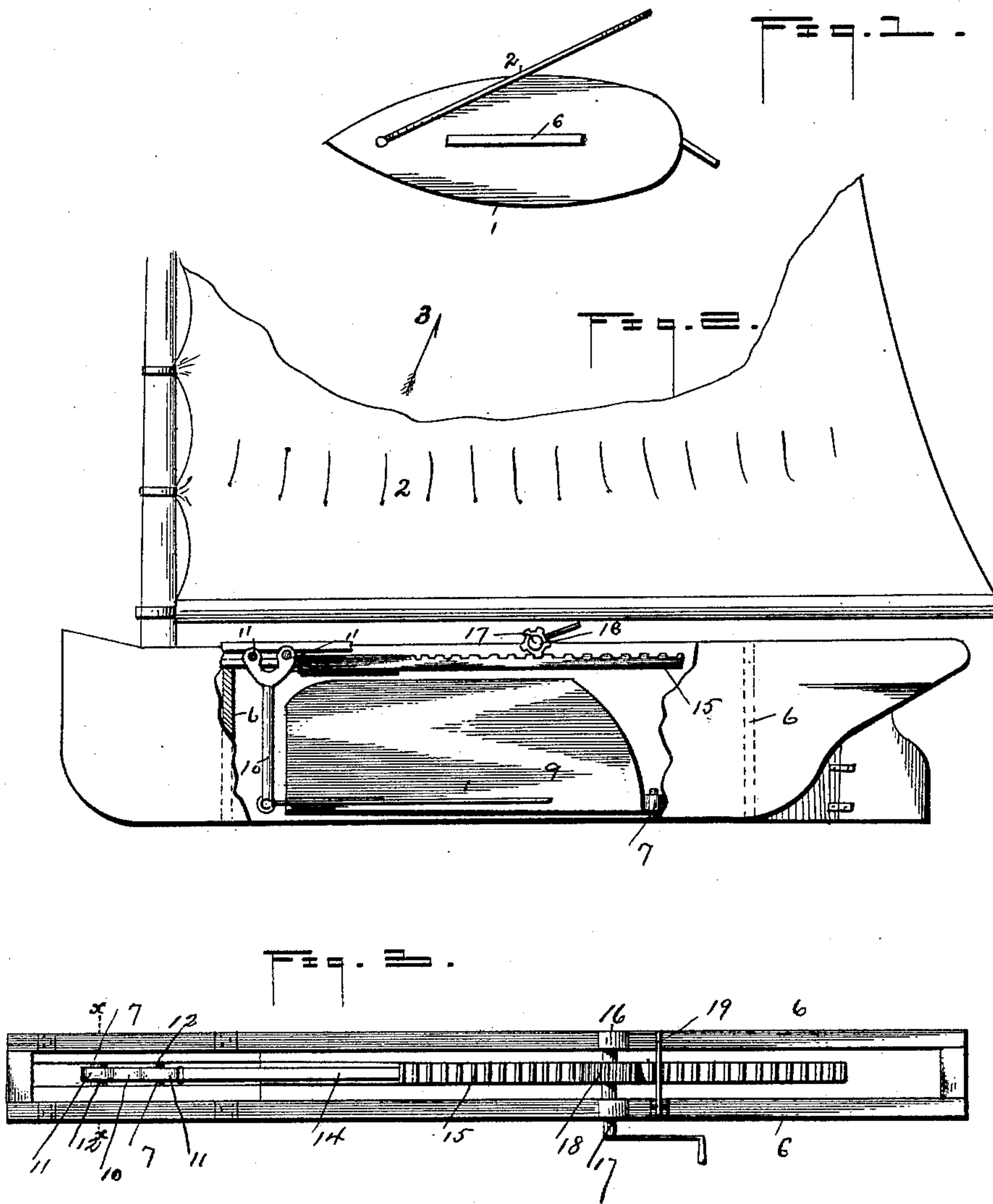
(No Model.)

2 Sheets—Sheet 1.

C. HANSCOM.
CENTER BOARD.

No. 462,640.

Patented Nov. 3, 1891.



WITNESSES:
F. B. Keefer
W. E. Aughinstump.

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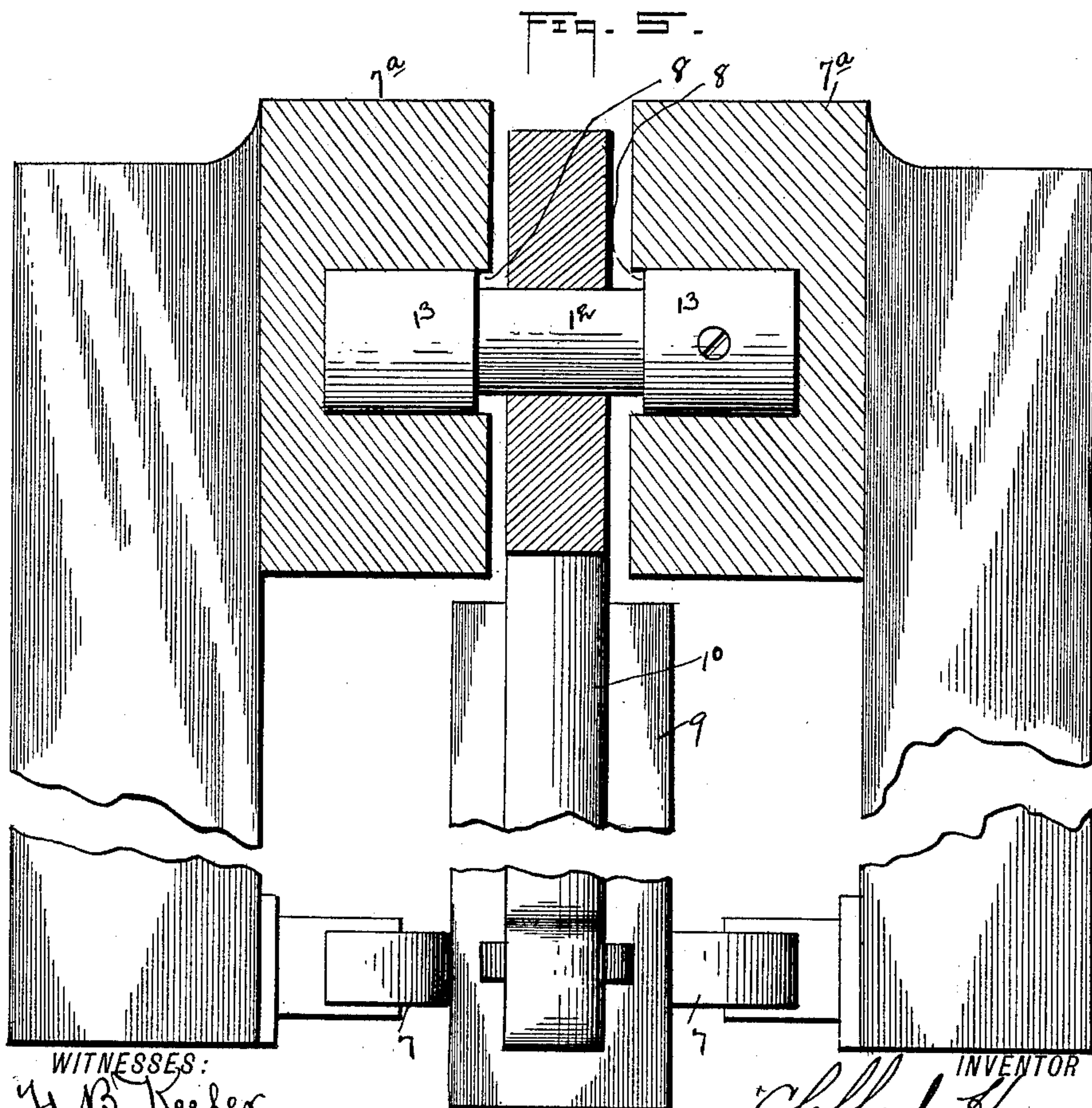
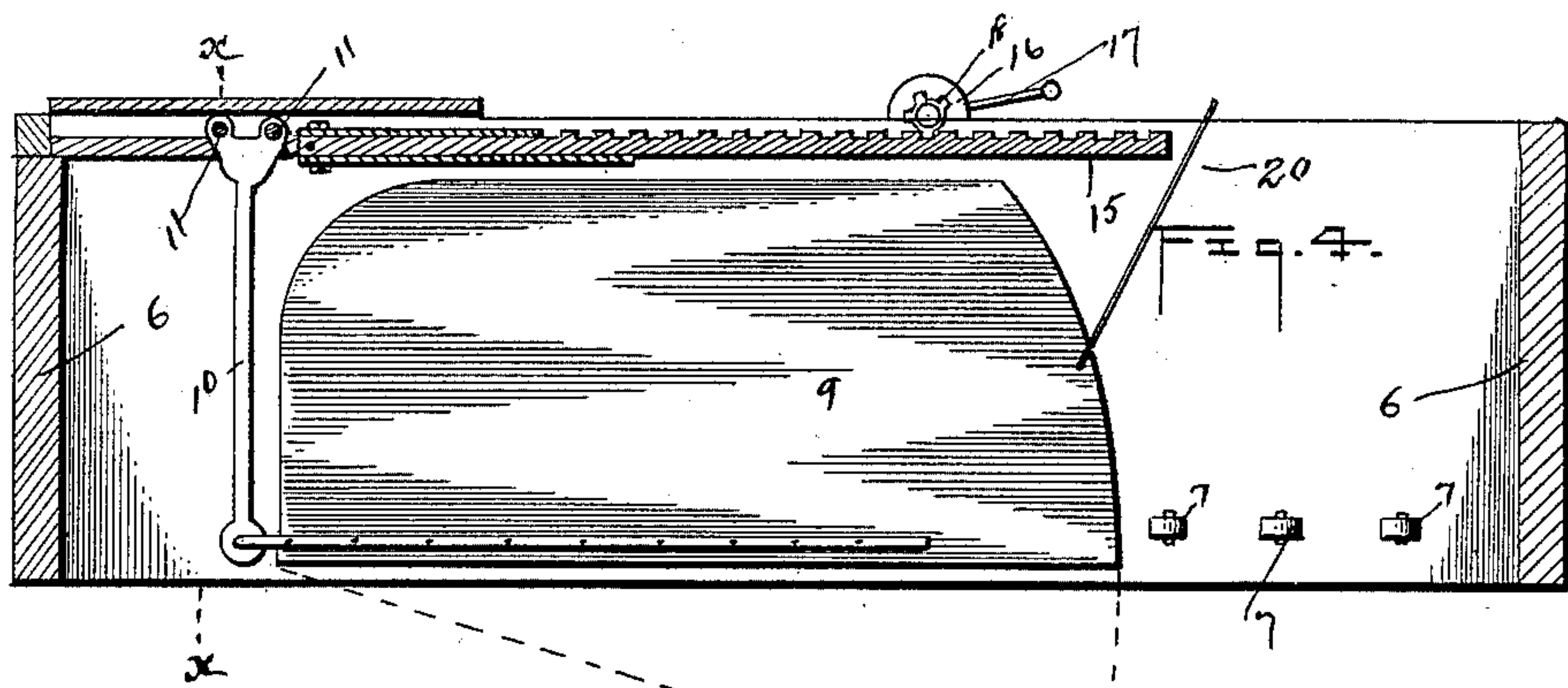
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2 Sheets—Sheet 2.

C. HANSCOM.
CENTER BOARD.

No. 462,640.

Patented Nov. 3, 1891.



WITNESSES:
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UNITED STATES PATENT OFFICE.

CLIFFORD HANSCOM, OF BALTIMORE, MARYLAND.

CENTER-BOARD.

SPECIFICATION forming part of Letters Patent No. 462,640, dated November 3, 1891.

Application filed January 20, 1891. Serial No. 378,464. (No model.)

To all whom it may concern:

Be it known that I, CLIFFORD HANSCOM, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Center-Boards; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In designing sailing-boats it is always an object to cause the center of effort (the mean center of the action of the wind against the sails) to be in the same vertical line as the "center of lateral resistance," (the mean center of the action of the water upon the hull;) but this is a difficult result to obtain, as not only is the "center of effort" affected by the position of the sails, but the center of lateral resistance is affected by the heeling or trim of the boat, the heeling causing the center of lateral resistance to move forward, while the trim causes the center of lateral resistance to move either forward or backward as the boat is deepest at the bow or stern, respectively. It thus appears after the proper position for the centers of effort and lateral resistance have been calculated after a laborious work for normal conditions they are liable to be changed by conditions to which every boat is subjected in use. The effects of these changes are as follows: If the center of effort is in front of the center of lateral resistance, the bow of the vessel will be forced away from the wind. If the center of effort is in the rear of the center of lateral resistance, the bow of the vessel will be forced toward the wind. In either case the rudder must be so inclined to the desired course of the boat as to hold the latter's head pointing in the desired direction, which not only puts a strain upon the rudder, but by the friction of the water upon the rudder and by its resistance to a rudder so inclined decreases the speed of the vessel.

My invention therefore has for its object to avoid these objections by changing the shape of the under-water hull in such a manner that the center of the lateral resistance may be caused to assume a position in a vertical line with the center of effort, and for this purpose the device used by me is a cen-

ter-board capable of moving forward and aft in the hull of the boat, thus permitting the exposed surface of the hull of the vessel in front and the rear of the center of effort to be altered, changing in a corresponding manner the position of the center of lateral resistance, which may be thus made to assume a position in a vertical line with the center of effort; and my invention further consists in the construction, arrangement, and combination of the several parts used, as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings, in which corresponding parts are designated by similar numerals, Figure 1 is a diagrammatic representation of a boat when beating. Fig. 2 is a side view of a vessel having my invention applied thereto, portions of the said boat being broken away for the purpose of better illustration. Fig. 3 is a detail plan view of the casing for the center-board and parts contiguous thereto. Fig. 4 is a side elevation of the casing with one side thereof removed. Fig. 5 is a vertical cross-section on line $x x$ of Figs. 3 and 4.

In the several figures of the drawings I have shown my invention as applied to a boat having a single mast and a fore-and-aft sail; but it is evident that it may be applied to any class of vessels.

In the drawings the point 1 may be supposed to represent the center of lateral resistance, which should be, as before stated, directly under the center of effort 2, for if it is not and the vessel be beating against the wind, which may be indicated by the arrow 3 in Fig. 1, in order to keep her course she must incline her rudder. If the center of effort 1 is in front of the center of lateral resistance 2, the latter will act as a fulcrum, upon which the wind-pressure upon the sails and upper hull of the vessel will tend to blow the vessel's head to leeward, to counteract which the rudder must be thrown to windward. If, on the contrary, the center of effort is behind the center of lateral resistance, the vessel will be turned on the latter point, as on a pivot, her bow being thrown up to the wind, thus rendering it necessary to throw her rudder to leeward. It will be evident that a rudder projecting from the side of a vessel will greatly increase her resistance and thus

retard her progress, and therefore I provide a center-board, which, not only preventing drifting to leeward, as is usual, but being also movable fore and aft, permits the shape of the under-water hull to be varied, and thus the center of lateral resistance to be adjusted in the center of effort, thereby obviating the use of the rudder except when changing the vessel's course. Indeed, it will be evident that the rudder may be dispensed with altogether and the vessel steered by means of moving such center-board, which, as it is parallel with the vessel's course, offers but a small resistance to the motion of the vessel.

I generally apply my invention to a vessel by constructing a fore-and-aft water-tight casing 6 therein, the bottom of which is open and passes through the keel of the boat, while its top is also open and projects within the boat to above the normal water-line, a series of rollers 7 on vertical pivots being secured to the lower edges of the interior faces of each side of the said case in order to reduce the resistance to the longitudinal motion of the center-board.

Within the top of casing (preferably at the forward end) I secure a guide 7^a to each of the sides of the casing. Each of these guides consists by preference of cast-iron and has the horizontal slot 8 in its inner side, the slots in the two guides registering with one another, the guides being at such a distance apart as to leave a vertical longitudinal slot between them.

The center-board 9 is of an approved construction and has pivoted at its forward end near its lower edge the pendent bar 10, the upper edge of which is bifurcated and passes through the slot between the two guides. Each of the arms 11 formed by such bifurcation carries a transverse shaft 12, having rollers 13 upon its opposite ends, which rollers are contained within the grooves 8 in the guides 7^a, thus permitting bar and the center-board carried thereby to be removed fore and aft. A rod 14 is connected to the rear one of the said arms 11 at one end and has its opposite end connected with a rack-bar 15, which is contained between the upper edges of the side boards of the casing 6, upon the top of which is mounted in suitable bearings 16 a crank-shaft 17, carrying the cog-wheel 18, which engages with the said rack-bar, thus affording a means for altering the position of the center-board. I also provide a dog 19, adapted to engage the said rack-bar and thus hold it in position, while the center-board may be lowered upon its pivoted point assuming the position shown in dotted lines in Fig. 4 and again raised by means of a rope, &c., 20, secured to one end thereof, as is well known, although it will undoubtedly be desirable in larger boats to provide some more powerful means for this purpose.

It will thus be seen that I construct a center-board that can be moved fore and aft, thus altering the shape of the under-water hull of

the vessel and changing the position of the center of resistance, as has been described and shown to be desirable, and it will also be seen that by pivoting the center-board to a pendent arm rising above the water-line, as no pins or pivots pass through the casing 6, danger of leakage is greatly lessened.

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

1. In a boat, the combination, with fore-and-aft guides located therein, of a center-board pivotally and movably mounted on the said guides, whereby the said center-board may be given an independent vertical or longitudinal motion, as described.

2. In a boat, the combination, with a fore-and-aft casing therein, of rollers upon the lower portion of the said casing, and of a center-board within the said casing capable of longitudinal and vertical motion, or of either of the said motions without the other, as described.

3. In a boat, the combination, with a fore-and-aft casing therein and extending through the bottom thereof, of horizontal guides in the said casing and a center-board pivotally mounted on the said guides and capable of independent vertical and horizontal motion thereon, as described.

4. In a boat, the combination, with a fore-and-aft casing projecting through the bottom thereof and above the water-line therein, of guides at the top of the said casing, a pendent arm longitudinally movable in the said guides, and a center-board pivoted to the base of the said arm, as described.

5. In a boat, the combination, with a fore-and-aft casing projecting through the bottom thereof and above the water-line therein, of slotted guides at the top of the said casing, a pendent arm having rollers upon its upper end contained within the slots in the said bars, a center-board pivoted to the lower end of the said arm, a rack-bar connected with the said arm, and a crank-shaft having a cog-wheel thereon gearing with the said rack-bar, as described.

6. In a boat, the combination, with a fore-and-aft casing projecting through the bottom thereof and above the water-line therein, of slotted guides at the top of the said casing, a pendent arm having rollers upon its upper end contained within the slots in the said bars, a center-board pivoted to the lower end of the said arm, a rack-bar connected to the said arm, and a crank-shaft having a cog-wheel thereon gearing with the said rack-bar and roller upon the lower edge of the said casing, as described.

In testimony whereof I affix my signature in presence of two witnesses.

CLIFFORD HANSCOM.

Witnesses:

J. H. CODY,
H. G. FANT, Jr.