

(No Model.)

2 Sheets—Sheet 1.

T. R. BROUGH.
CENTER BOARD FOR VESSELS.

No. 367,593.

Patented Aug. 2, 1887.

Fig: 1.

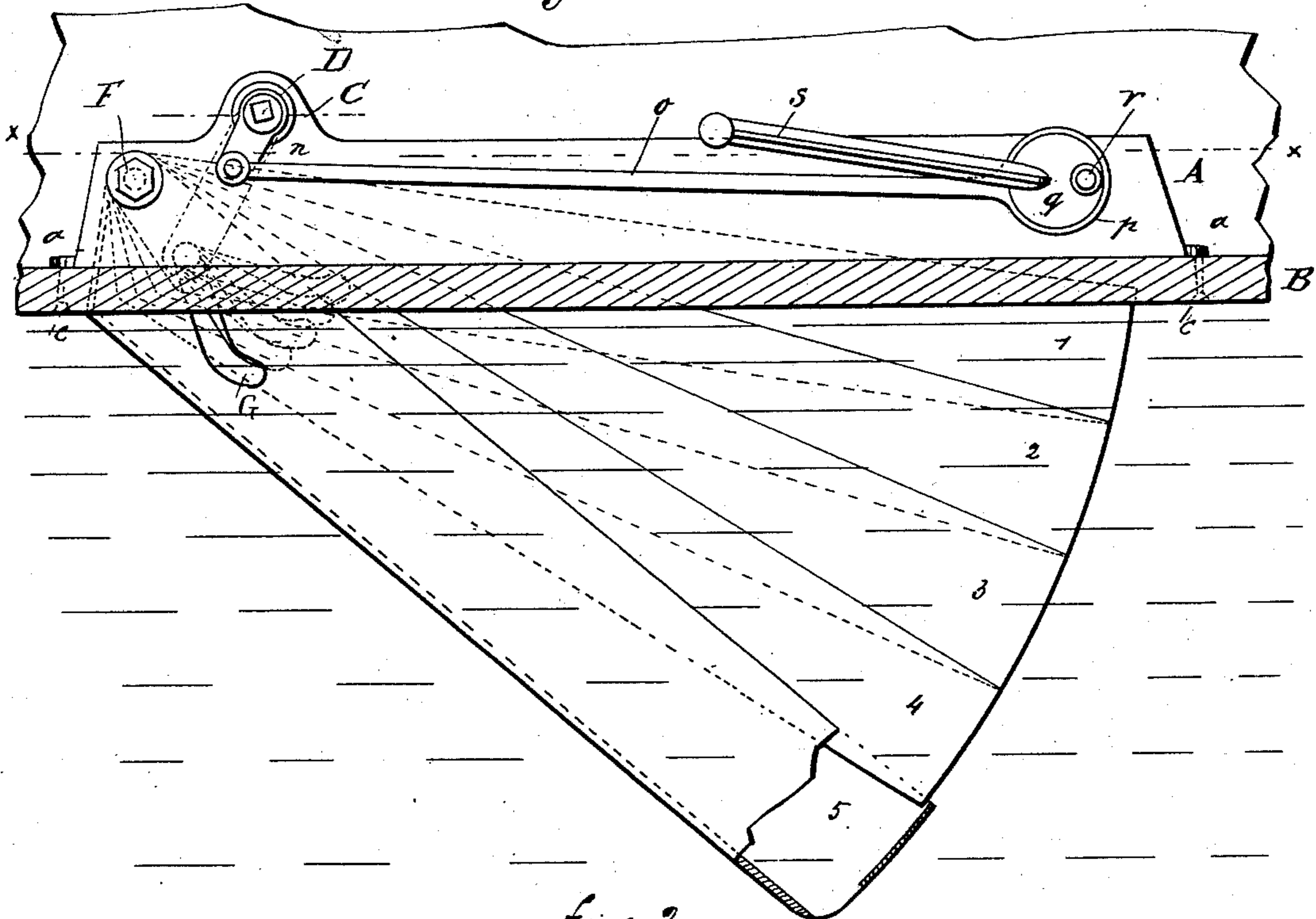


Fig: 2.

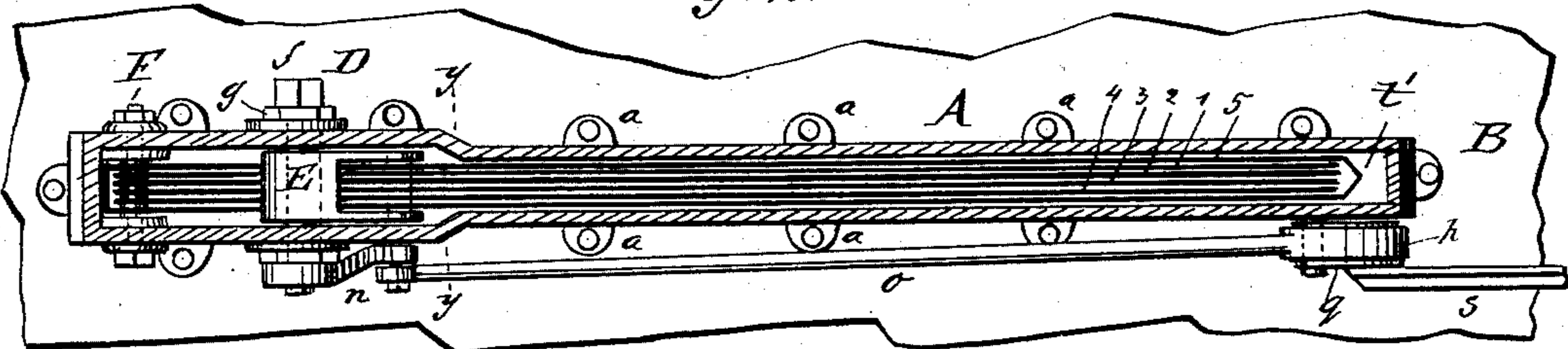
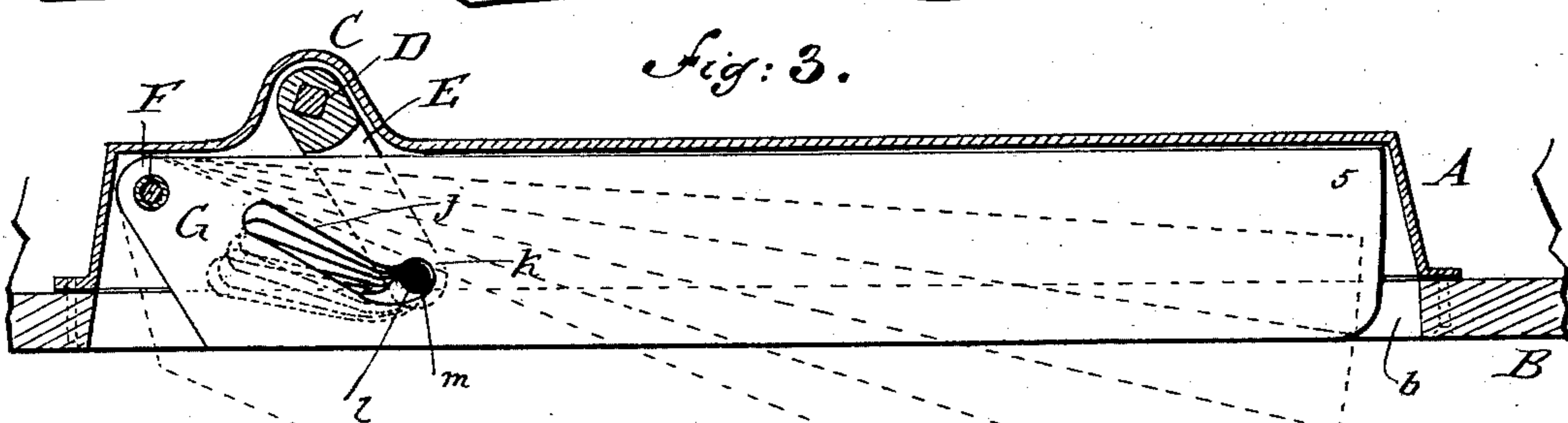


Fig: 3.



WITNESSES:

Chas. A. A. A.
C. Sedgwick

INVENTOR:

T. R. Brough
Munn & Co.

BY

ATTORNEYS.

(No Model.)

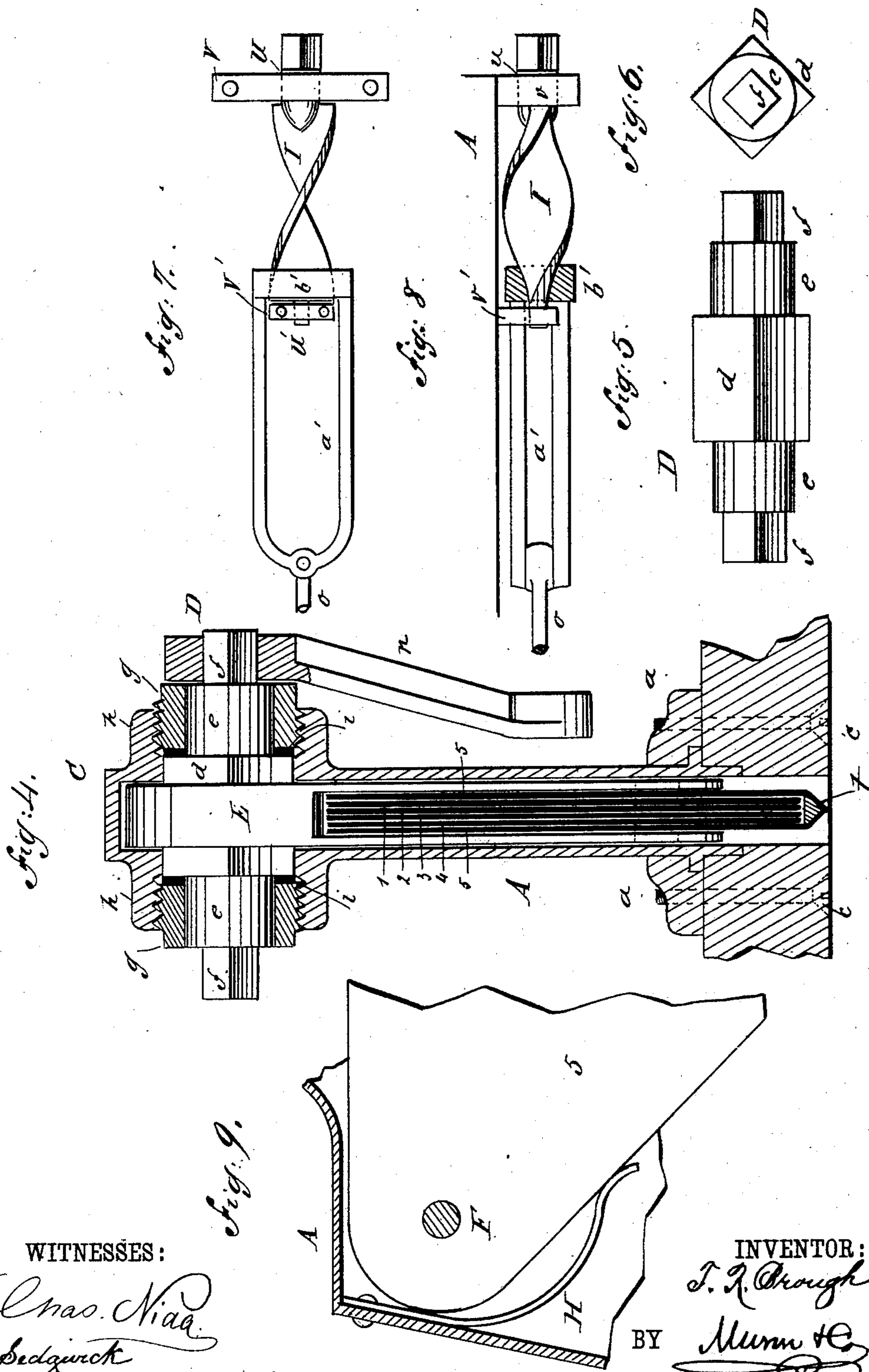
2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

THOMAS R. BROUGH, OF GANANOQUE, ONTARIO, CANADA.

CENTER-BOARD FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 367,593, dated August 2, 1887.

Application filed December 14, 1886. Serial No. 221,529. (No model.)

To all whom it may concern:

Be it known that I, THOMAS R. BROUGH, of Gananoque, in the Province of Ontario and Dominion of Canada, have invented new and useful Improvements in Center-Boards for Vessels, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a side elevation, partly in section, of my improved center-board. Fig. 2 is a horizontal section taken on line *x x* in Fig. 1. Fig. 3 is a side sectional elevation showing the blades of the center-board folded within the casing. Fig. 4 is a vertical transverse section taken on line *y y* in Fig. 2. Fig. 5 is a side elevation of the shaft of the center-board. Fig. 6 is an end elevation of the same. Fig. 7 is a side elevation, and Fig. 8 is a sectional plan view, of a modified form of the center-board-actuating mechanism; and Fig. 9 is a side elevation, partly in section, of a portion of my improved center-board, showing the counterbalancing-spring.

Similar letters of reference indicate corresponding parts in all the views.

My improved center-board is designed for application to canoes, skiffs, sail-boats, yachts, or any kind of sailing craft, the object being to secure increased stiffness in sailing and to facilitate the adjustment of the center-board.

My invention consists in a center-board case secured to the keelson of a boat and containing a series of blades arranged to swing on a common pivot and provided with cam-slots arranged in different positions in the different blades, and in a forked arm secured to a shaft extending through the sides of the casing and carrying a roller fitted to the slots of the blades and adapted to swing the blades on their pivots as the forked arm is turned in such a manner as to project the free ends of the blades from the center-board casing at different velocities, the lower blade being carried downward with the greatest rapidity, the upper one with the least, and the intermediate blades with a motion corresponding with their respective positions in the center-board.

It also further consists in mechanism for operating the forked arm by which the center-boards are moved, and in the combination with the blades of a spring tending to counterbalance them.

The casing A is preferably made of sheet or cast metal closed at the top, open at the bottom, and provided with ears *a*. In the keelson B of the boat is formed a slot, *b*, over which the casing A is secured by screws *c* passing through the keelson into the ears *a*. The joint between the casing A and the keelson is packed to exclude water from the vessel. The casing A is provided with an upward extension, C, for receiving the shaft D.

The shaft D is provided with a central squared portion, *d*, and with cylindrical bearings *e* on opposite sides of the squared portion *d*, and with squared ends *f* outside of the cylindrical bearings *e*. The cylindrical bearings *e* turn in bushings *g*, screwed into apertured bosses *h* on opposite sides of the upward extension, C, and packing-rings *i* are interposed between the squared portion of the shaft D and the bushings *g*. To the squared central portion, *d*, of the shaft D is fitted a forked arm, E, which extends downward into the casing A.

On a bolt, F, passing transversely through the casing A near one end thereof, and near the shaft D, are placed the blades 1 2 3 4 5, each blade being provided with a cam-slot, G, having a straight portion, *j*, and upwardly-curved portion *k*; but the slots are arranged in different positions in the different blades of the center-board, the slot of the blade 5 forming the greatest angle with the center-board, and the slot of blade 1 being more nearly parallel with the blade, the slots of the blades 2, 3, and 4 occupying intermediate positions, the angle formed by the slots of the blades being gradually increased in all the blades in succession from 1 to 5. The forked arm E extends downward on opposite sides of the series of blades, and the casing A is enlarged to admit of swinging the said arm along the sides of the blades.

In the arm E, at its free end, is inserted a pin, *l*, upon which is placed a roller, *m*, whose diameter is equal to the width of the slots G, and when the arm E is swung toward the pivotal bolt F of the blades, the blades 1 2 3 4 5 are all moved down simultaneously, but at different rates of speed, due to the different positions of the slots G in the successive blades, the movement of the different blades being graduated, so that when the center-board is projected from its case by the movement of

the arm E each blade is moved, so that a proportionate amount of its surface is exposed. The lower blade, 5, is made hollow and of sufficient width to receive within it the blades 1 2 3 4 when the center-board is closed within the case, and the lower corner of the free end of the blade 5 is open to permit of the escape of water and to prevent the settling therein of substances carried by the water.

To one of the squared ends of the shaft D is fitted a short arm, *n*, to which is pivoted a rod, *o*, having upon its opposite extremity an eccentric strap, *p*, which surrounds an eccentric, *q*, pivoted on a stud, *r*, projecting from the side of the casing A. To the eccentric *q* is secured a hand-lever, *s*, by which the eccentric is turned in one direction or the other to open or close the center-board. When the lever *s* is moved toward the shaft D, the arm *n* is pushed forward. The arm E is consequently carried forward, and the roller *m*, by its engagement with the blades projects them more or less, as may be desired. If the arm E is pushed so as to project the blades as far as possible, the roller *m* rests in the end of the slots G nearest the pivotal bolt F and sustains the blades in a projected position. When the lever *s* is moved as far as possible in the opposite direction, the roller *m*, in passing along the slots G, raises the blades upward into the casing A, and when the roller enters the curved ends *k* of the slots the blades are locked in a closed position.

To partly counterbalance the blades, a curved flat spring, H, is secured to the end of the casing A, and is allowed to bear against the end of blade 5 near the pivotal bolt F. The hollow blade 5 is preferably provided with a V-shaped lower edge, *t*, and V-shaped end *t'*, to facilitate its passage through the water as it is projected in the manner already described and carried through the water by the vessel.

In the modified form of actuating device shown in Figs. 7 and 8 a screw, I, of quick pitch is provided with journals *u u'*, which turn in boxes *v v'*, secured to the side of the casing. To the rod *o* is secured a yoke, *a'*, having a cross-bar, *b'*, in which is formed a curved slot adapted to fit the screw I, so that, as the screw is turned in one direction or the other, the yoke *a'* and rod *o* will be drawn backward or pushed forward. The journal *u*, outside its bearings, is squared to receive a wrench by which the screw I may be turned. The screw

in this case is the equivalent of the eccentric *q* shown in Figs. 1 and 2.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a center-board, the combination of a series of blades pivoted on a common pivot and each having a cam-slot, the slot of each blade being inclined at a different angle from the slot of every other blade, a pin working in the said slots, and means for operating the pin, substantially as herein described, whereby provision is made for moving all the blades simultaneously, but at different rates of speed, as set forth.

2. In a center-board, the combination of a series of blades pivoted on a common pivot and each having a cam-slot, the slot of each blade being inclined at a different angle from the slot of every other blade, a rock-shaft, an arm on the said shaft engaging the slots of the blades, and means for operating the said rock-shaft, substantially as herein shown and described.

3. In a center-board, the combination of the casing A, the pivotal bolt F, the blades 1 2 3 4 5, provided with cam-slots G, the forked arm E, carrying the roller *m*, received in the slots G, and means for imparting motion to the said arm E, substantially as described.

4. The combination, with a series of pivoted center-board blades, of a hollow lower blade adapted to contain the upper blades, substantially as described.

5. The combination, with a series of pivoted blades, of a counterbalancing-spring attached to the center-board case and bearing upon the blades, substantially as described.

6. The combination of the casing A, provided with the upward extension, C, the blades 1 2 3 4, and the hollow blade 5, provided with cam-slots G, the pivotal bolt F, the shaft D, the forked arm E, carried by the said shaft, the roller *m*, carried by the forked arm E and received in the slots G, the arm *n*, secured to the outer end of the shaft D, the rod *o*, pivoted to the arm *n*, and means, substantially as shown and described, for imparting motion to the rod *o*.

THOMAS R. BROUGH.

Witnesses:

JAMES C. ROSS,
ROBERT LOWRIE.