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H. C. GOODRICH.

CENTER BOARD.

No. 276,026. Patented Apr. 17, 1883.

Fig. 1.

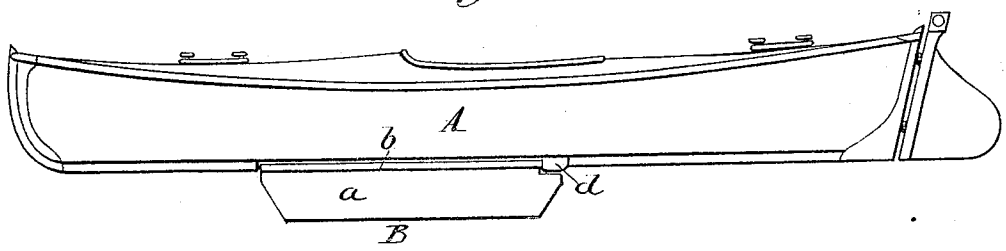


Fig. 2.

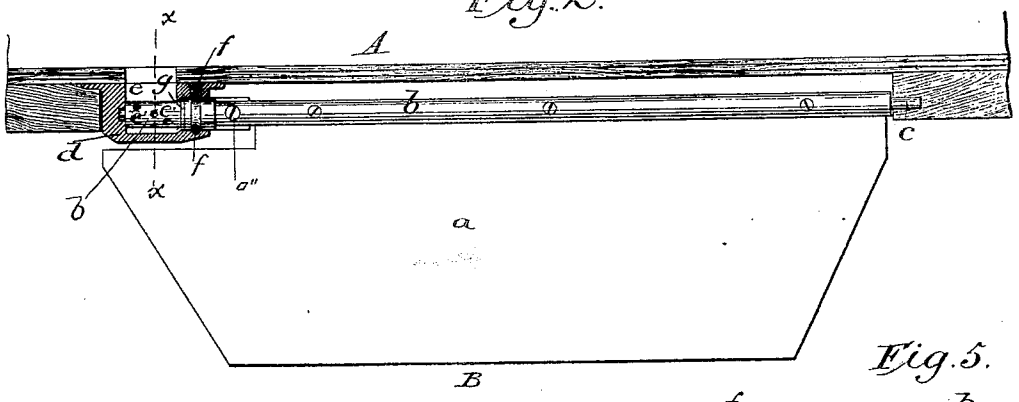


Fig. 5.

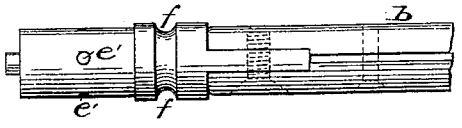


Fig. 3.

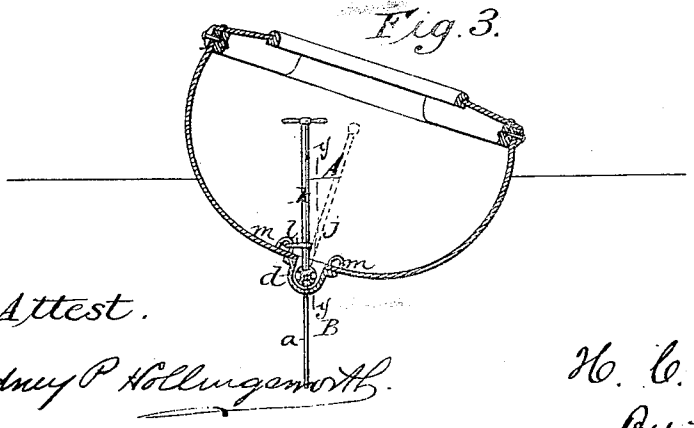


Fig. 4.



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Fig. 6.

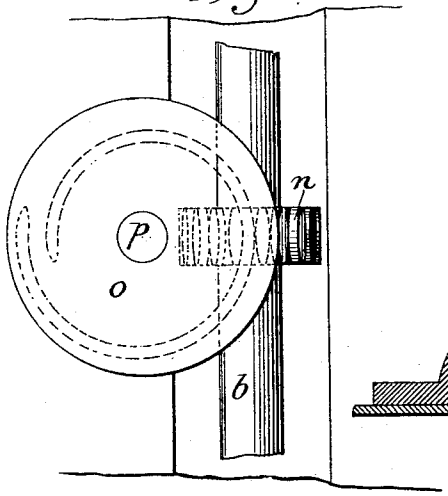


Fig. 7.

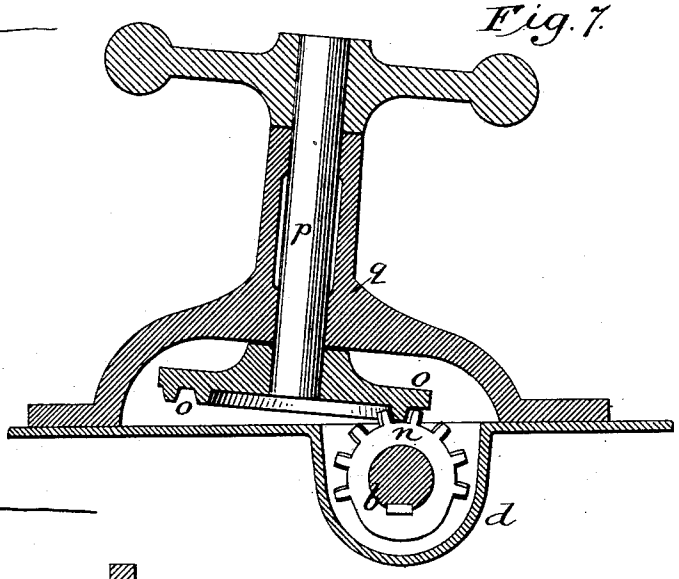


Fig. 8.

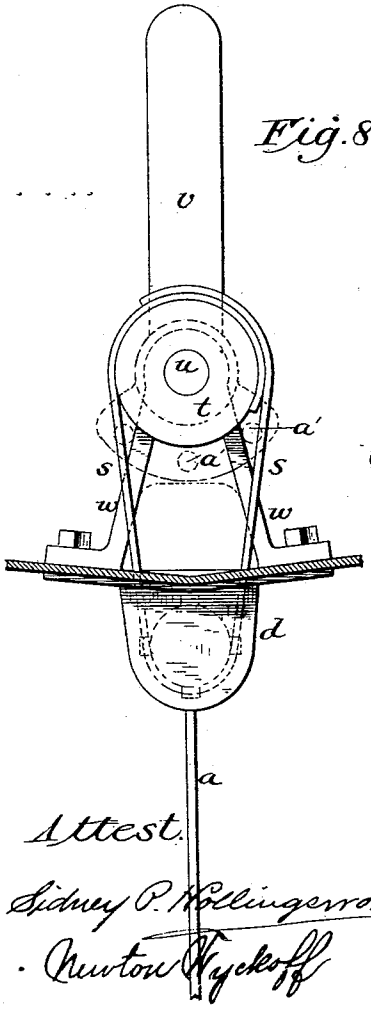
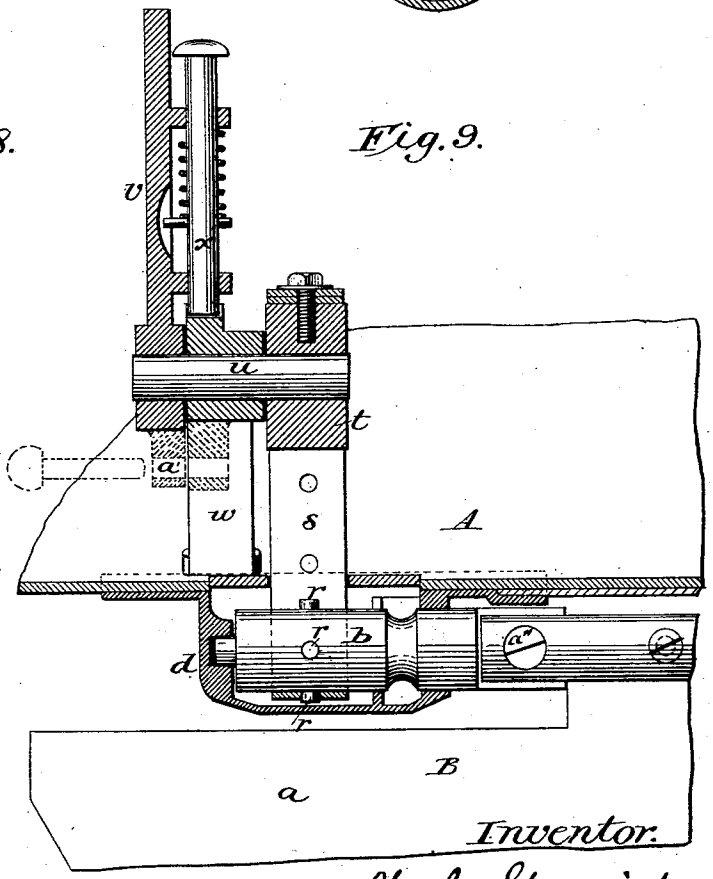


Fig. 9.



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CENTER BOARD.

No. 276,026. Patented Apr. 17, 1883.

Fig. 10.

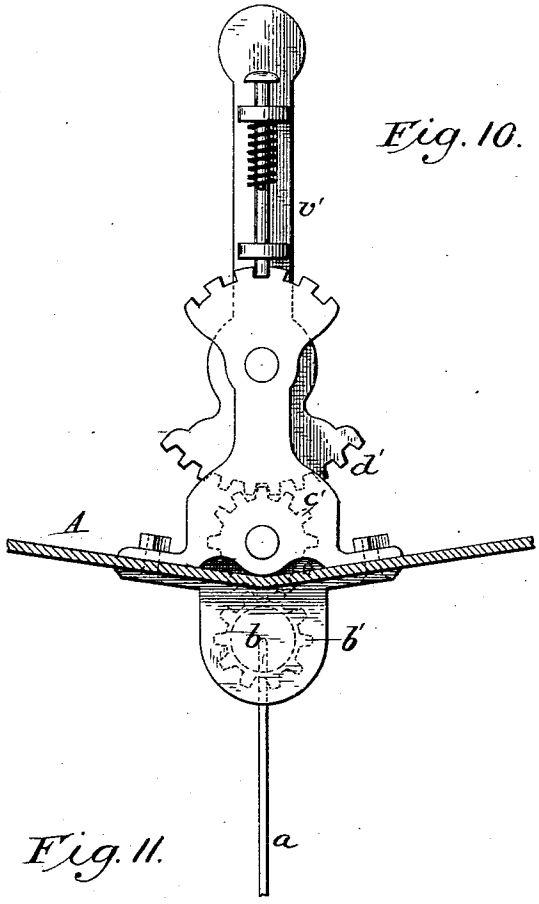
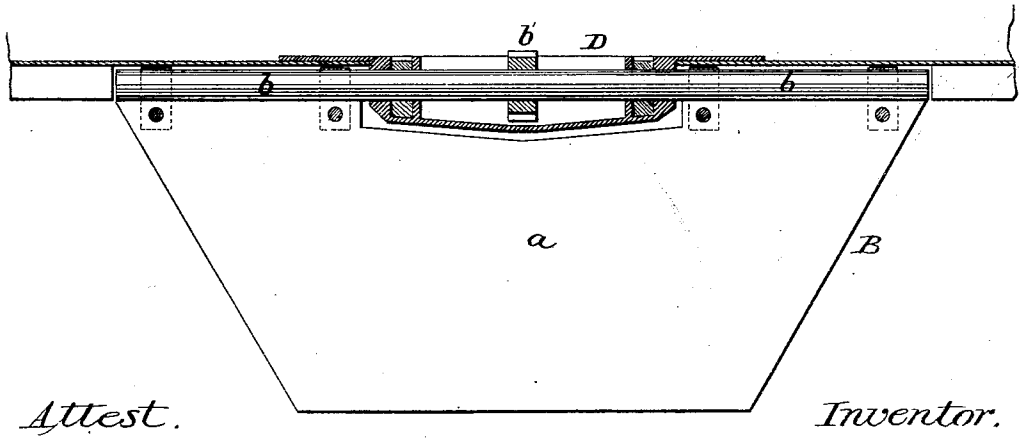


Fig. 11.



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UNITED STATES PATENT OFFICE.

HARRY C. GOODRICH, OF CHICAGO, ILLINOIS.

CENTER-BOARD.

SPECIFICATION forming part of Letters Patent No. 276,026, dated April 17, 1883.

Application filed November 27, 1882. (No model.)

To all whom it may concern:

Be it known that I, HARRY C. GOODRICH, of Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Center-Boards, of which the following is a specification.

The object of this invention is to provide a laterally-swinging center-board which may be adjusted and controlled by the navigator without the employment of rods, chains, or other obstructive devices which will impede the motion of the vessel by being carried through the water.

To this end the invention consists, essentially, in a center-board having its upper edge hinged beneath the hull, in line or substantially in line with the keel, and combined with operating devices acting upon the hinged edge of said board and extended upward within the boat in position to be operated by the attendant therein.

My invention is susceptible of embodiment in various forms, as will be hereinafter fully explained.

Referring to the accompanying drawings, Figure 1 represents a side elevation of a hull provided with my center-board. Fig. 2 is a longitudinal central section through a hull provided with my improved center-board on the line *y y*, Fig. 3. Fig. 3 is a cross-section on the line *x x*. Fig. 4 is a diagram showing the board in its inoperative or folded position. Fig. 5 is a top plan view of one end of the center-board and its supporting-shaft. Figs. 6 and 7 are respectively a top plan view and a vertical cross-section, illustrating a worm wheel and screw arranged as a means of controlling and adjusting the center-board, these devices being substituted for those shown in the preceding figure. Figs. 8 and 9 represent, respectively, in vertical cross-section and in longitudinal vertical section another arrangement of devices for adjusting the center-board, consisting, essentially, in the combination of pulleys and belts with a hand-lever. Fig. 10 is a vertical cross-section, illustrating an arrangement of rack and pinions for effecting the movement of the board. Fig. 11 is a longitudinal section, illustrating a peculiar manner of operating the board at its center when made of great length.

Referring to Figs. 1 to 5, A represents the hull of the boat or vessel, constructed in any ordinary manner; and B, a hinged center-board. The center-board, which is preferably of sheet metal, although it may be made of other material, consists of a flat plate, *a*, of any desired outline, secured at its upper edge to a horizontal shaft, *b*, which is secured to the bottom of the hull, usually within or against the under side of the keel, in such manner that the board may be swung laterally or athwartships, so as to assume either a depending vertical position, as represented in Figs. 2 and 3, or a horizontal position closely against the bottom of the boat, as represented in Fig. 4.

It has been my usual custom in applying a center-board to remove or cut away a portion of the keel, as indicated in Fig. 1, in order to permit the shaft *b* to sit closely beneath the planking of the hull. At one end the shaft *b* is seated in an external box or bearing, *c*, which is formed in the keel or applied to the bottom of the boat. At its opposite end the shaft *b* is inserted into one side of a socket or bearing-plate, *d*, bolted firmly to the bottom of the hull. The socket *d* is constructed with an interior chamber, *e*, surrounding the end of the shaft *b*, and communicating at the top with an opening formed through the bottom of the boat, this construction giving the occupant within the boat free access to the inclosed end of the shaft *b*.

For the purpose of preventing leakage of water around the shaft *b* into the bearing, and thence into the boat, packing of any suitable character will be applied around the shaft. A simple mode of packing this joint is represented in Fig. 2, in which it will be seen that corresponding grooves, *f*, are turned in the periphery of the shaft and the inside of the box, which latter has an opening at the top to admit of packing being inserted into said grooves. In place of or in addition to the above packing, an elastic washer, *g*, may be seated around the shaft between a shoulder thereon and a corresponding shoulder in the interior of the bearing, as represented in Fig. 2.

For the purpose of enabling the occupant of the boat to adjust and secure the center-board in position, I provide the end of the shaft *b*, within the chamber *e*, with a series of radial holes, and also provide two rods or handles, *j* and *k*, such as represented in Fig. 2. When

the rod *k* is inserted in one of said holes, as represented in Fig. 2, the attendant, grasping the upper end of the rod, may thereby swing the board sidewise in such manner as to cause the same to maintain a vertical position notwithstanding the heeling of the boat to the starboard or port.

For the purpose of securing the center-board in a vertical position, the rod *k* may be provided with the hooked arm *l*, and the boat provided with eyes or studs *m*, one on each side of the center. By engaging the hook with one or another of these staples the rod and center-board may be locked firmly in position.

When it is required to swing the center-board laterally upward against the under side of the hull, as when sailing in shallow water, or when for any reason its use is not required, the attendant makes use of both rods *j* and *k*, inserting them one after another into the successive holes in the shaft and swinging them laterally, thus causing the board to swing upward step by step until its outer edge encounters the hull, as represented in Fig. 4. It may be locked firmly in position by placing either one of the rods in the proper hole in the shaft.

While it is preferred to retain the rods *j* and *k* as a means of adjusting the center-board, because of their extreme simplicity and cheapness, other devices may be substituted for the same purpose, if preferred. Several of these devices I will now describe.

Referring to Figs. 6 and 7, *b* represents the shaft of the center-board, mounted in the manner previously described; *n*, a pinion secured firmly thereon, and *o* a horizontal disk provided with a spiral thread engaging with the pinion in such manner that it serves, when rotated, to turn the pinion and move the board, and when at rest to lock the pinion and board in position. The disk *o* is secured to the lower end of a shaft, *p*, provided with a hand-wheel or other operating device upon its upper end. The bearing for the shaft *p* may be constructed in any suitable manner; but in the present instance it consists of a bracket, *q*, provided with sustaining-feet which are bolted to the bottom of the hull. It will be observed that in making use of this device it is only necessary to revolve the hand-wheel, and that the locking of the center-board in position is effected automatically and without special attention on the part of the operator.

Passing next to Figs. 8 and 9, *b* represents the center-board shaft arranged as in the preceding figures, but provided at its inner end with a series of teeth, *r*. A perforated belt, *s*, encircling the end of the shaft and engaging with the teeth, is attached at its upper end to a vertical pulley, *t*, mounted on one end of a horizontal shaft, *u*, which is in turn provided with an upright operating-lever, *v*, so that upon moving the lever motion is communicated from the pulley and belt to the shaft of the center-board, causing the board to swing to the right or left, according to the direction in which the lever may be moved. The shaft *u* receives support from a bracket or standard, *w*, bolted fast within the hull, as shown. As a means of locking the operating parts in position to hold the board a hand-lever may be provided with a spring-bolt, *x*, arranged to engage in a notched segment formed upon the standard *w*, as shown in Fig. 9; or, as indicated in dotted lines in Figs. 8 and 9, the lever may be provided with a series of holes, *a'*, to receive a fastening-pin, which will be passed through one or the other of said holes into a corresponding hole in the standard *w*, for the purpose of locking the lever in position. If preferred, any other suitable locking device may be employed.

Passing next to Fig. 10, *b* represents the shaft of the center-board, provided on one end with a segmental pinion, *b'*, which connects, through an intermediate pinion, *c'*, with an operating-pinion, *d'*. The pinion *b'* is formed on the lower end of a hand-lever, *v'*, sustained by a bracket or other suitable support bolted to the hull, so that upon moving the lever motion will be transmitted through the intermediate parts to the center-board. The object of the employment of the intermediate pinion, *c'*, is to permit motion to be communicated from the lever to the lower pinion without enlarging the socket or bearing-plate in an objectionable manner; but in special cases the intermediate pinion may be dispensed with and the pinion *d'* arranged to engage directly with the pinion *b'*. The hand-lever may be provided with a sliding locking-bolt or a locking-pin, as in Figs. 8 and 9, or any other suitable provision may be made for securing the same in the required position.

It will be observed that under each and all of the arrangements described above the operator within the boat is enabled to control the position of the center-board at will by means of the internal operating devices, and that these devices are of such character that they have no projecting or protruding parts to obstruct the motion of the vessel.

I am aware that a laterally-swinging center-board has been applied externally to a vessel and operated by means of rods, chains, and other external devices extending from the sides of the center-board and offering resistance to the motion of the vessel. This arrangement I do not claim. My construction differs from all others at this time known, in that my board is operated from the interior of the vessel by means acting at the hinged edge or joint without being exposed on the exterior.

While it is preferred in most cases to give the center-board a support at each end, and to apply the operating devices at one end, it may in special cases be required to use a board of great length, in which event I propose to extend the shaft at its middle through a box or bearing, D, in the manner represented in Fig. 11, and to apply the operating devices at the center. These operating devices may be of either of the various forms illustrated in the drawings, or of any other equivalent form.

The shaft *b*, by which the center-board is sustained, may be constructed of a round or angular form in cross-section, and in one or more pieces, as preferred. It has been my usual custom to construct the shaft of two half-round bars applied on opposite sides of the board and secured by means of connecting rivets or screws passed transversely through the same, as indicated in the drawings. The shaft may, however, be made solid and the board applied to its exterior, if preferred.

It will be observed that by moving the single screw *a''* that portion of the shaft which carries the center may be disconnected from the remainder, whereupon it may be instantly removed with the board from the boat. The remaining portion filling the opening in the socket or bearing prevents the passage of water into the boat.

Having thus described my invention, what I claim is—

1. In combination with a hull, an external laterally-swinging center-board and internal operating devices, substantially as shown, acting upon the board at or near its hinged edge.

2. In combination with a hull, an external laterally-swinging center-board provided with a journal at its upper edge, a socket, substantially such as shown, encircling the journal and provided with an internal chamber affording communication between the interior of the boat and the journal or shaft, and devices, substantially as shown, to control the rotation of the journal.

3. The center-board provided with a longitudinal journal, in combination with the socket encircling said journal and provided with an opening in its top, and adapted, as described, for attachment to a boat.

4. In combination with the hull and the socket applied thereto, the transversely-swinging center-board provided with the perforated journal, and the two adjusting rods or handles detachably applied to said journal, as shown.

5. In combination with the hull and the hinged transversely-swinging center-board, applied substantially as shown, the internal rod, *k*, connecting with the hinged edge of the board, and means, substantially as shown, for locking said rod in position to hold the center-board.

6. A hull, in combination with an external laterally-swinging center-board hinged to said hull, and a shaft or journal extended through a water-tight bearing in the bottom of the hull and connected with the upper edge of the center-board, substantially as shown.

HARRY C. GOODRICH.

Witnesses:

FRANK HENRY,

J. G. LETTELEIR.