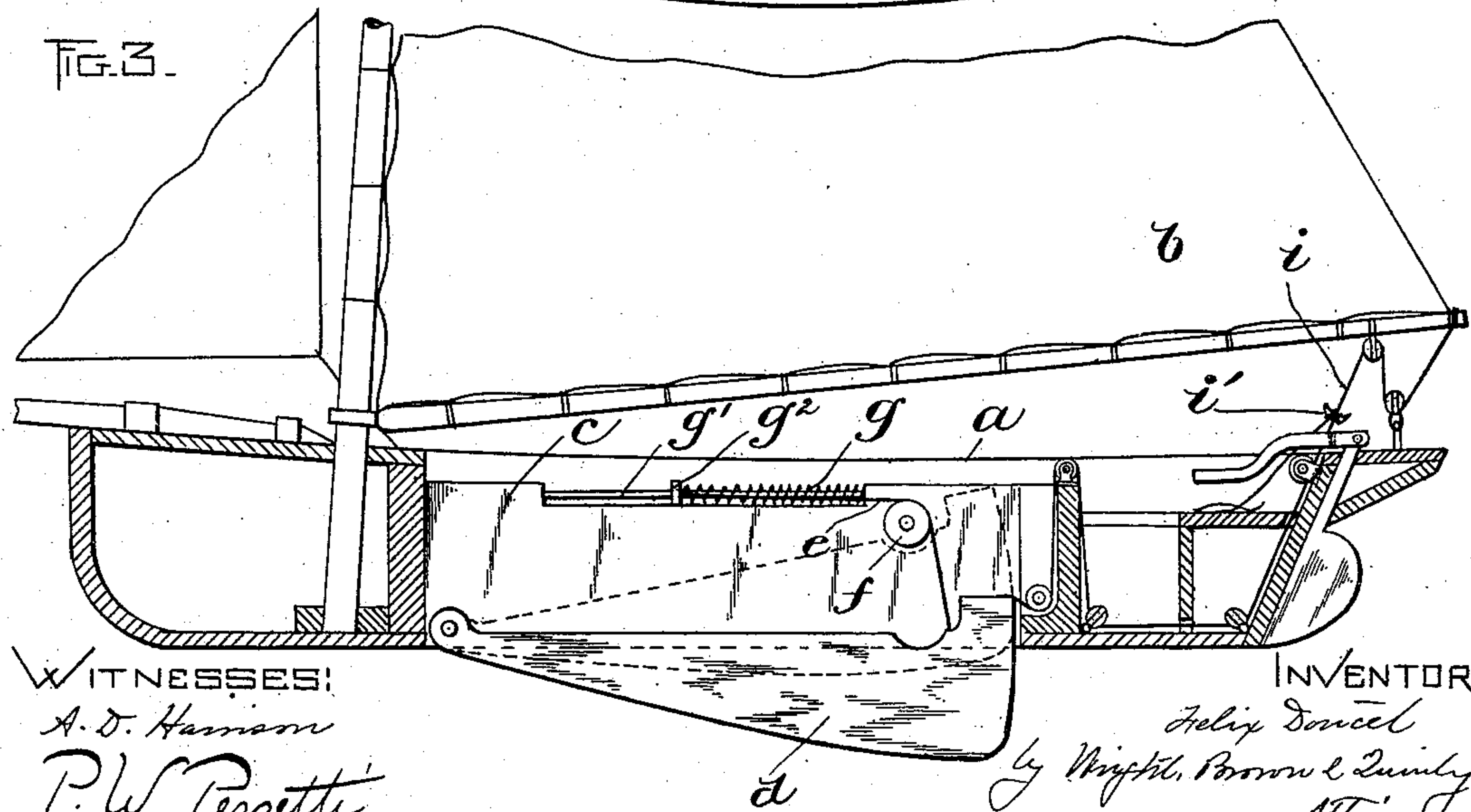
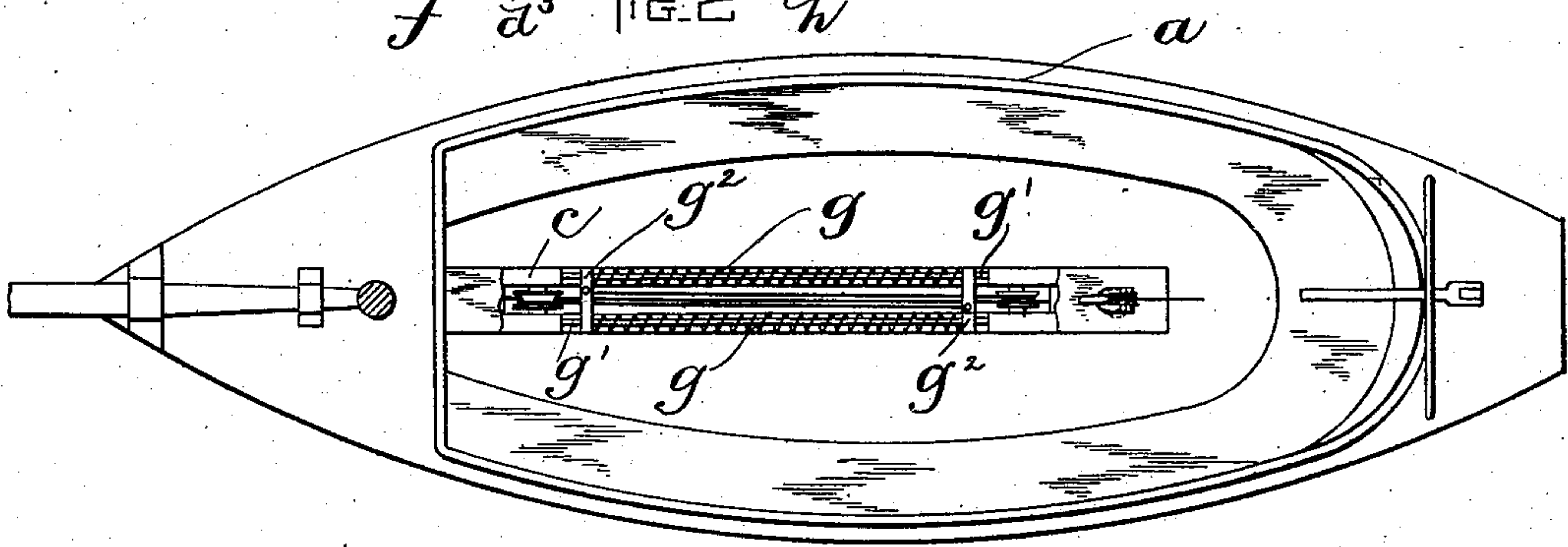
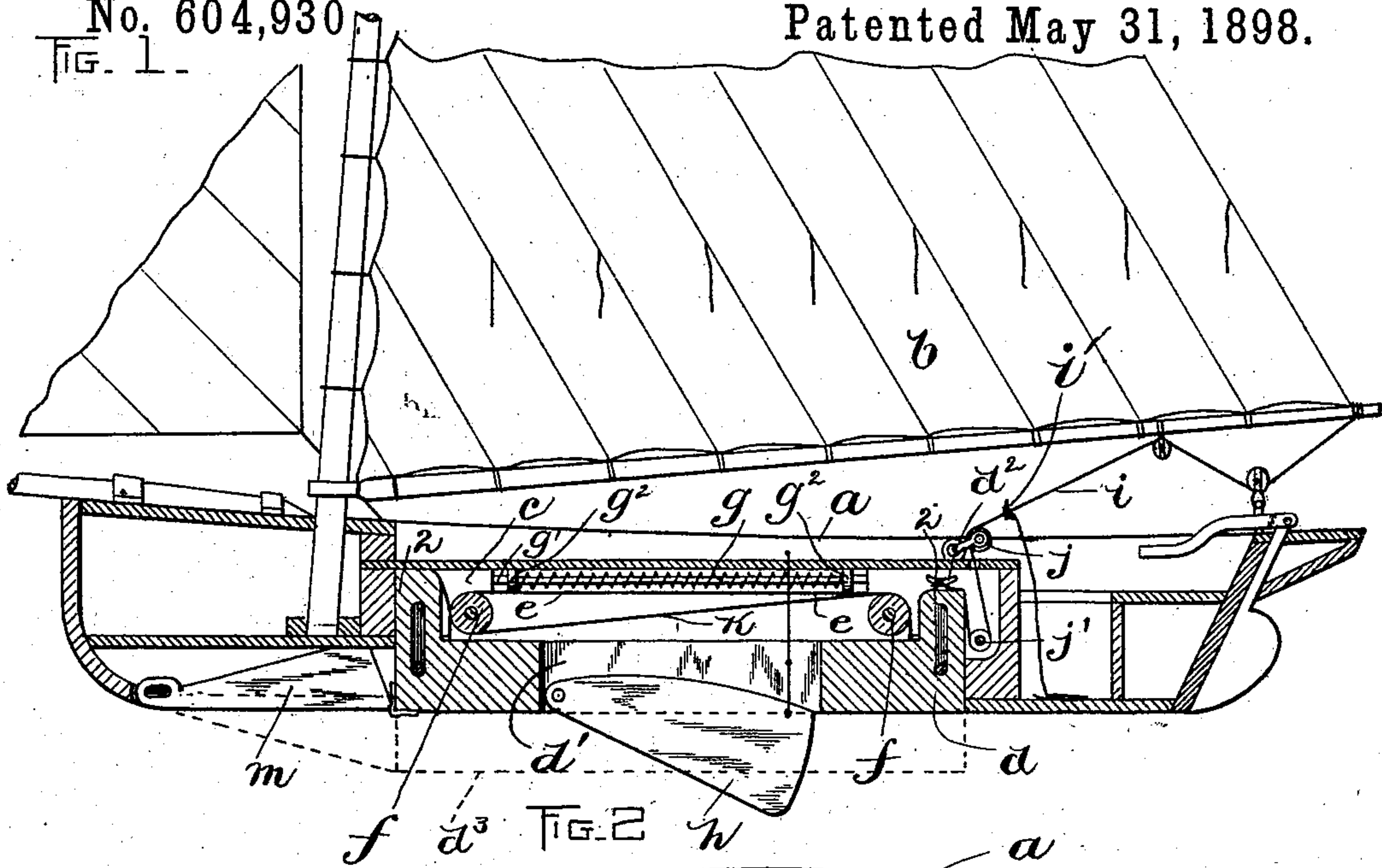


(No Model.)

F. DOUCET.
SAIL CONTROLLED KEEL.

No. 604,930
FIG. 1.

Patented May 31, 1898.



WITNESSES:

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INVENTOR

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UNITED STATES PATENT OFFICE.

FELIX DOUCET, OF MELROSE, MASSACHUSETTS.

SAIL-CONTROLLED KEEL.

SPECIFICATION forming part of Letters Patent No. 604,930, dated May 31, 1898.

Application filed July 10, 1897. Serial No. 644,037. (No model.)

To all whom it may concern:

Be it known that I, FELIX DOUCET, of Melrose, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Boats, of which the following is a specification.

This invention relates to sail-boats, and has for its object to provide a boat whose stability may be made to vary with the wind-pressure on the sail or sails.

To this end the invention consists of a boat having a movable ballast whose movement is controlled by the sail or sails in such manner as to affect the stability of the boat, as I shall now proceed to set forth in detail and then point out in the claims hereto appended.

Of the accompanying drawings, forming a part of this application, Figure 1 represents a median longitudinal vertical section through a boat constructed in accordance with my invention. Fig. 2 represents a top plan view of the hull. Fig. 3 represents a view similar to Fig. 1, showing a modification.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, and for the present to Figs. 1 and 2 thereof, *a* indicates the hull of a sail-boat; *b* the mainsail thereof, and *c* a box or casing similar in location to an ordinary centerboard-box, but preferably occupying a somewhat greater length of the boat. In said box is arranged to operate a vertically-movable weighted keel *d*, supported by cords or chains *e e*, which pass over pulleys *f f* and are connected with horizontally-arranged springs *g g*. These springs are located in recesses in the sides of the box *c* and surround guide-rods *g' g'*, which rods are also embraced by cross-bars *g² g²*, to which the keel-supporting cords or chains *e* are attached and against which the springs abut. When the keel is lowered, the cross-bars are drawn toward each other and the springs compressed.

The keel *d* may or may not, according to requirements and the design of the boat, be provided with a centerboard *h* as an auxiliary attachment, said centerboard occupying a slot *d'* in the keel and having provisions for raising and lowering it in said slot.

At one end of the keel *d*, upon a cleat *d²* or other fastening device, is attached the sheet

i of the mainsail *b*, and an arrangement of upper pulley *j* and lower pulley *j'* is provided for said sheet, whereby the drawing of the mainsail causes the sheet to pull downwardly on the movable keel against the tension of the springs *g*.

k designates a cord or chain attached at its after end to the keel *d* at the base of the upwardly-projecting portion 2, which forms part of the after end of the keel, while at its forward end it is attached to the keel at the top of the corresponding portion 2, formed on the forward end of the keel. The said rope or chain *k* passes over the after pulley *f* and under the forward pulley *f'*, as shown. It will be seen, therefore, that the two ends of the keel always move in a parallel manner, for when the after end is depressed it pulls downwardly upon the after end of the rope or chain *k*, and this produces an equal downward pull upon the forward end of the keel. When the keel raises, the action is reversed.

The forward end of the keel is preferably provided with a hinged leaf or extension *m*, which forms a nose for said keel when the latter is lowered from the raised position shown in Fig. 1 to the broken-line position *d³*.

A modified and simplified embodiment of my invention is represented in Fig. 3, wherein the ballast consists of a weighted keel *d*, pivoted at its forward end to the boat after the manner of an ordinary centerboard. The main-sheet *i* is attached to the keel in the same manner as that above described, and illustrated in Figs. 1 and 2, and the keel is supported by a cord or chain *e*, passing over a pulley *f* and attached to a cross-bar *g²* between two springs *g*.

The strength and tension of the keel-supporting springs in both of the above-described forms of my invention are preferably so regulated that the keel is normally just supported in its raised position, and any considerable pull exerted on the main-sheet will then operate to lower the keel. The keel therefore automatically adjusts itself to the amount of wind-pressure on the sails, occupying a depressed position when the pressure is great. Hence the stability of the boat increases with the increase of wind-pressure and decreases with the decrease thereof. In practice the

sheet *i* of the mainsail or other sail which is connected with the keel *d* may of course be paid out or drawn in, so as to trim the sail to any desired position independently of the position of the keel. For this purpose a belaying-block *i'* or other suitable device is provided, to which the upper portion of the main-sheet may be secured, the block or cleat being attached to a keel-lowering cord or chain forming the lower or inboard portion of said sheet.

The movable keel which I have described is not necessarily the only ballast or the main ballast carried by the boat, as said keel may be made an auxiliary attachment to a fixed keel; nor is the number of movable keels on a boat restricted to one, as two or more of either the pivoted or sliding type may be employed.

The advantages of my invention will readily appear, chief among them being the added safety imparted to a boat constructed with the movable keel. Danger from squalls, particularly with small sail-boats, which ordinarily arises from "tying the sheet" or from leaving the sails hoisted, will be almost, if not entirely, obviated. My invention also admits of the weight of ballast being reduced from what has heretofore been necessary.

It will be understood that I have not attempted in the foregoing description to set forth all the forms in which my invention may be embodied nor all the modes of its use.

I claim—

1. A sail-boat having a movable keel or ballast, and means controlled by the sail for de-

pressing said keel with respect to the hull of the boat.

2. A sail-boat having a movable keel or ballast, and means controlled by the sail for raising and depressing said keel with respect to the hull of the boat.

3. A sail-boat having a movable keel or ballast, means for supporting said keel in a normally-raised position, and means controlled by the sail for depressing said keel.

4. A sail-boat having a movable keel or ballast, springs for supporting said keel in a normally-raised position and means controlled by the drawing of the sail for depressing said keel against the tension of said springs.

5. A sail-boat having a movable keel or ballast, springs connected therewith and supporting said keel in a normally-raised position, a sail, and a sheet connected with said sail and said keel, and adapted by the pressure of wind upon the sail to depress the keel against the tension of said springs.

6. A sail-boat having a movable keel or ballast, means such as a cord or chain whose drawing will tend to depress said keel, and an adjustable sheet connection between the sail and said keel-depressing means.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 9th day of July, A. D. 1897.

FELIX DOUCET.

Witnesses:

C. F. BROWN,
A. D. HARRISON.