

No. 612,209.

Patented Oct. 11, 1898.

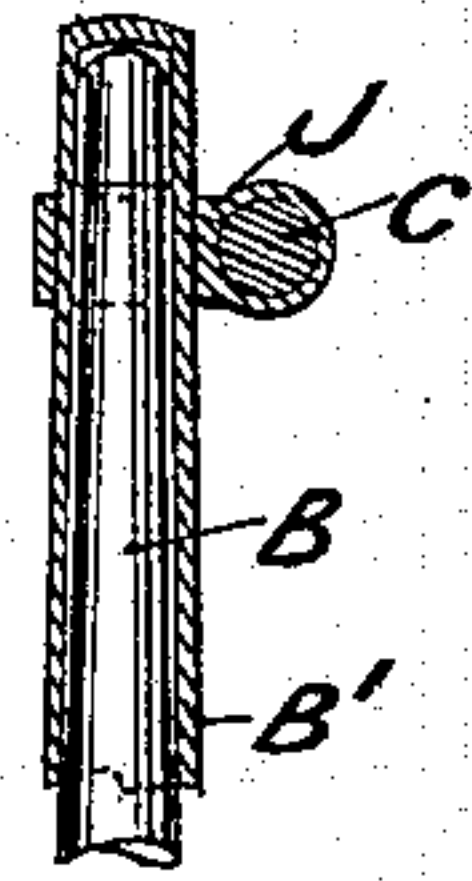
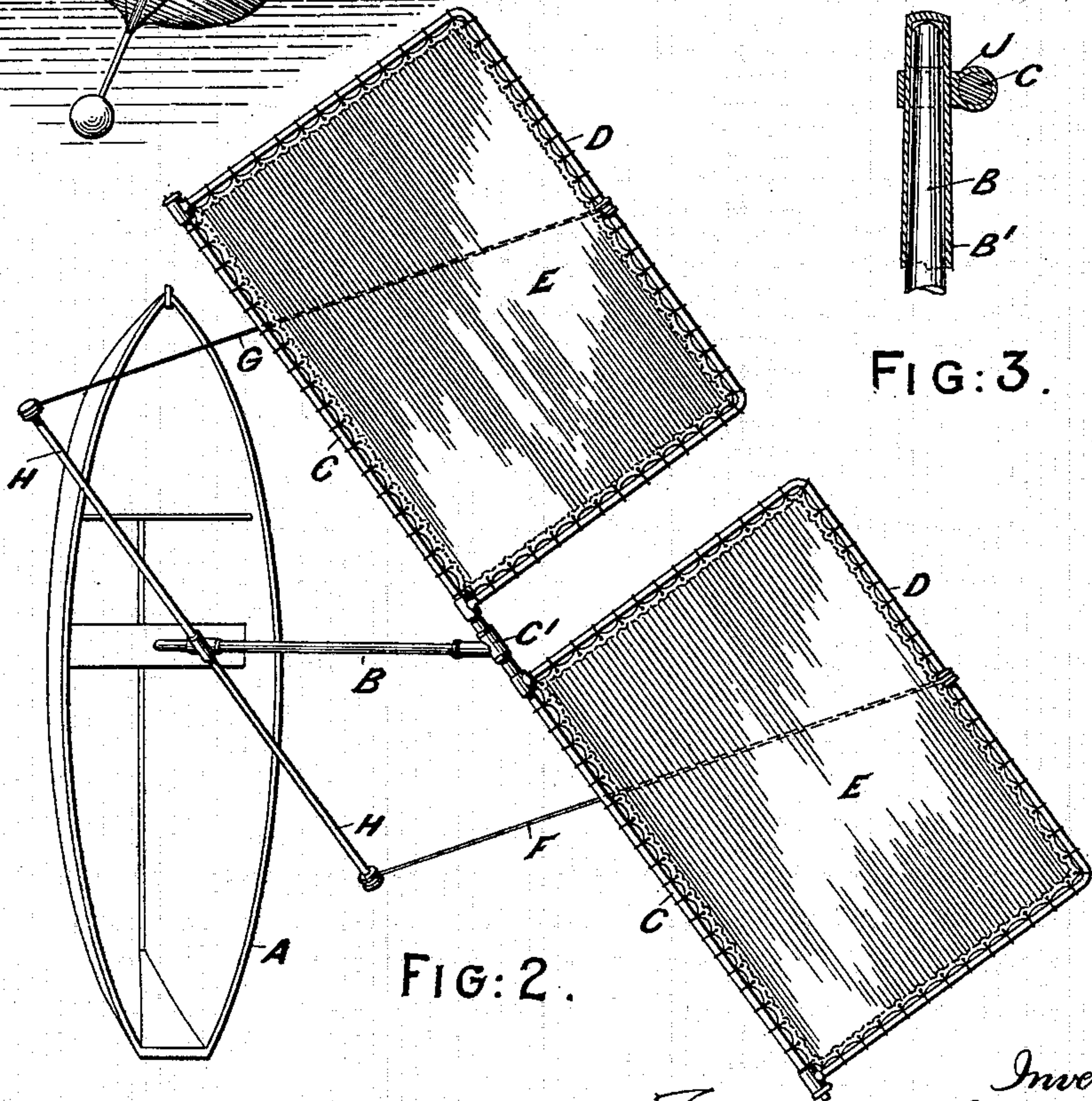
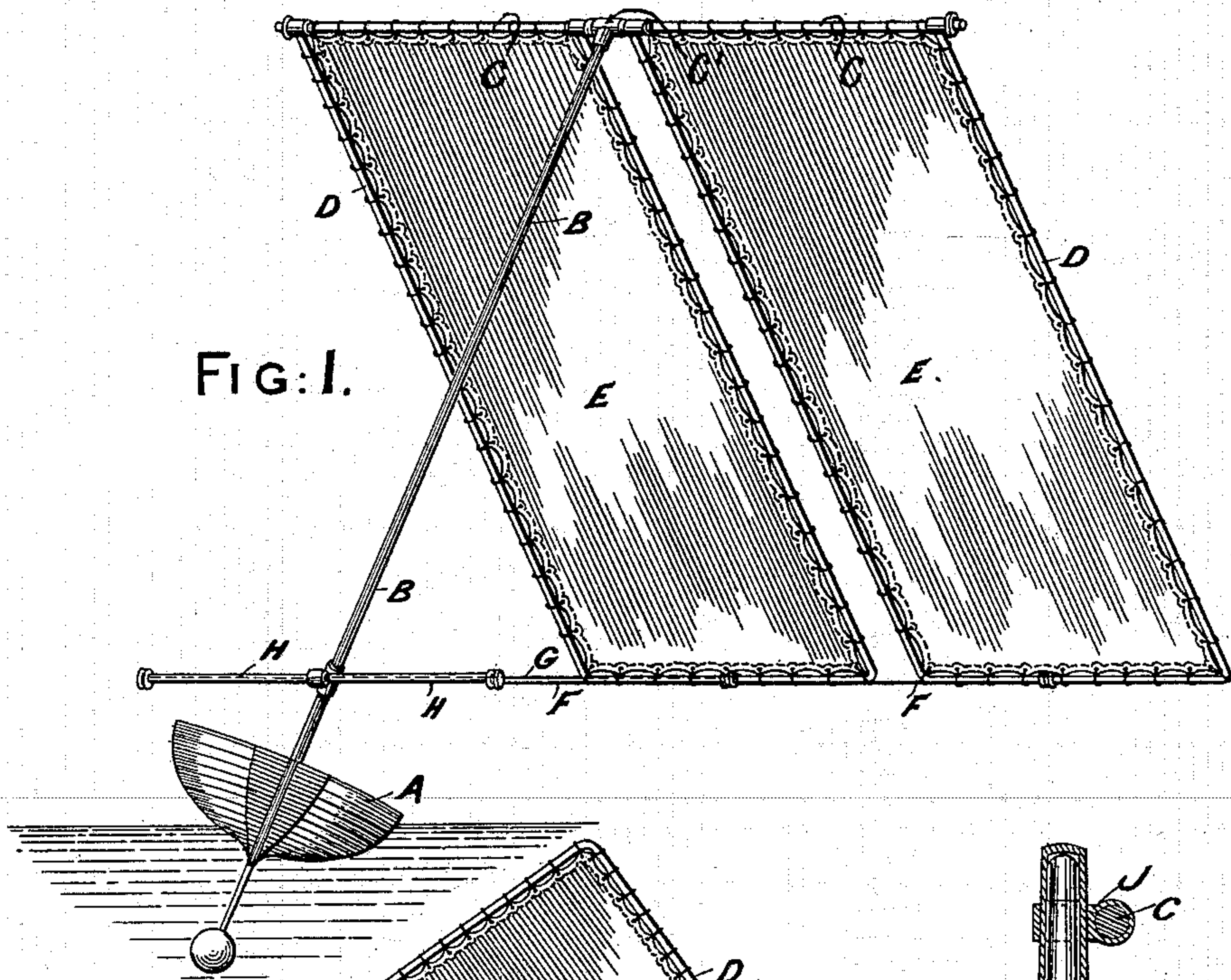
F. LJUNGSTROM.

SAIL FOR BOATS.

(Application filed Dec. 29, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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FIG. 4.

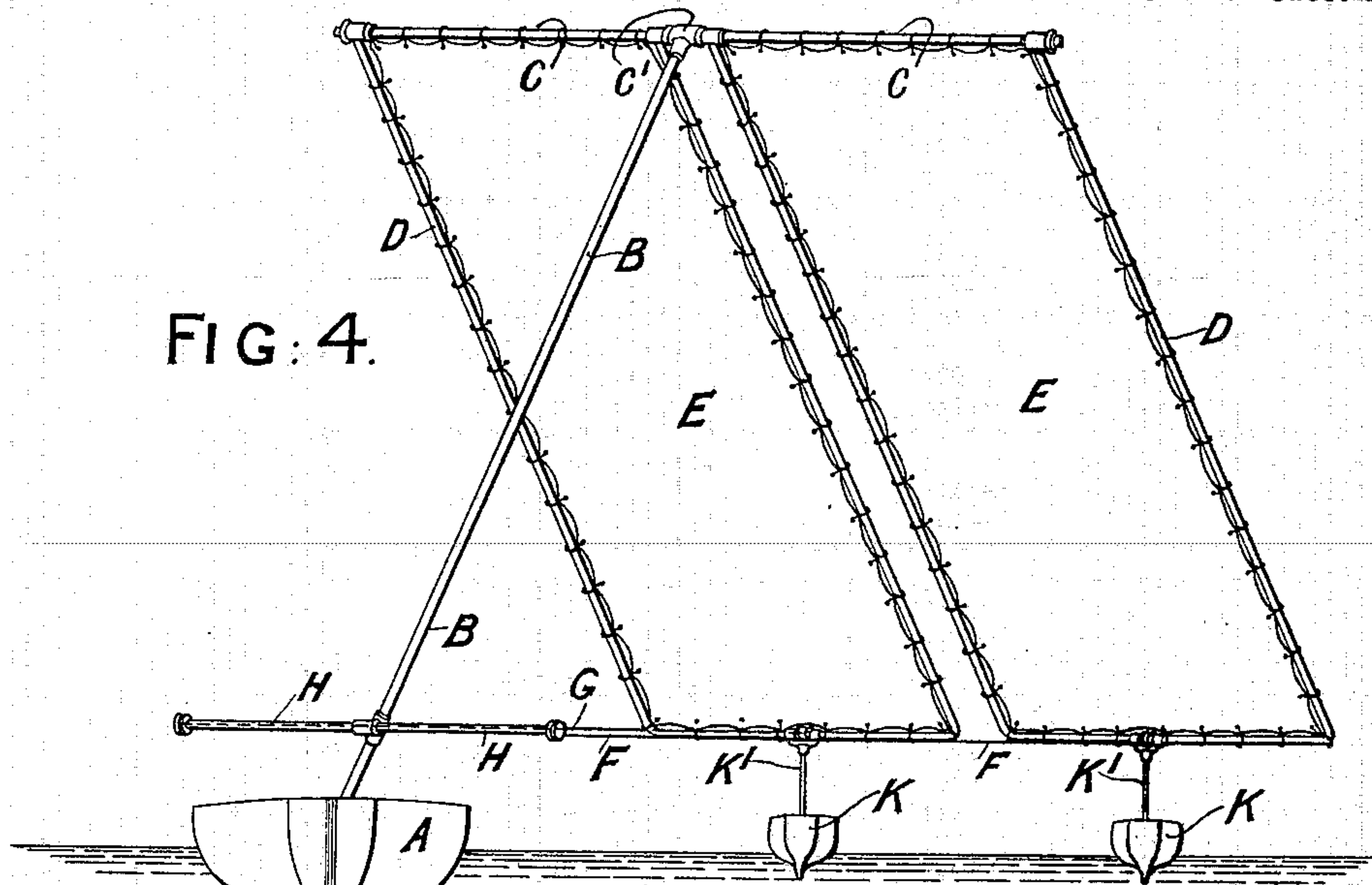
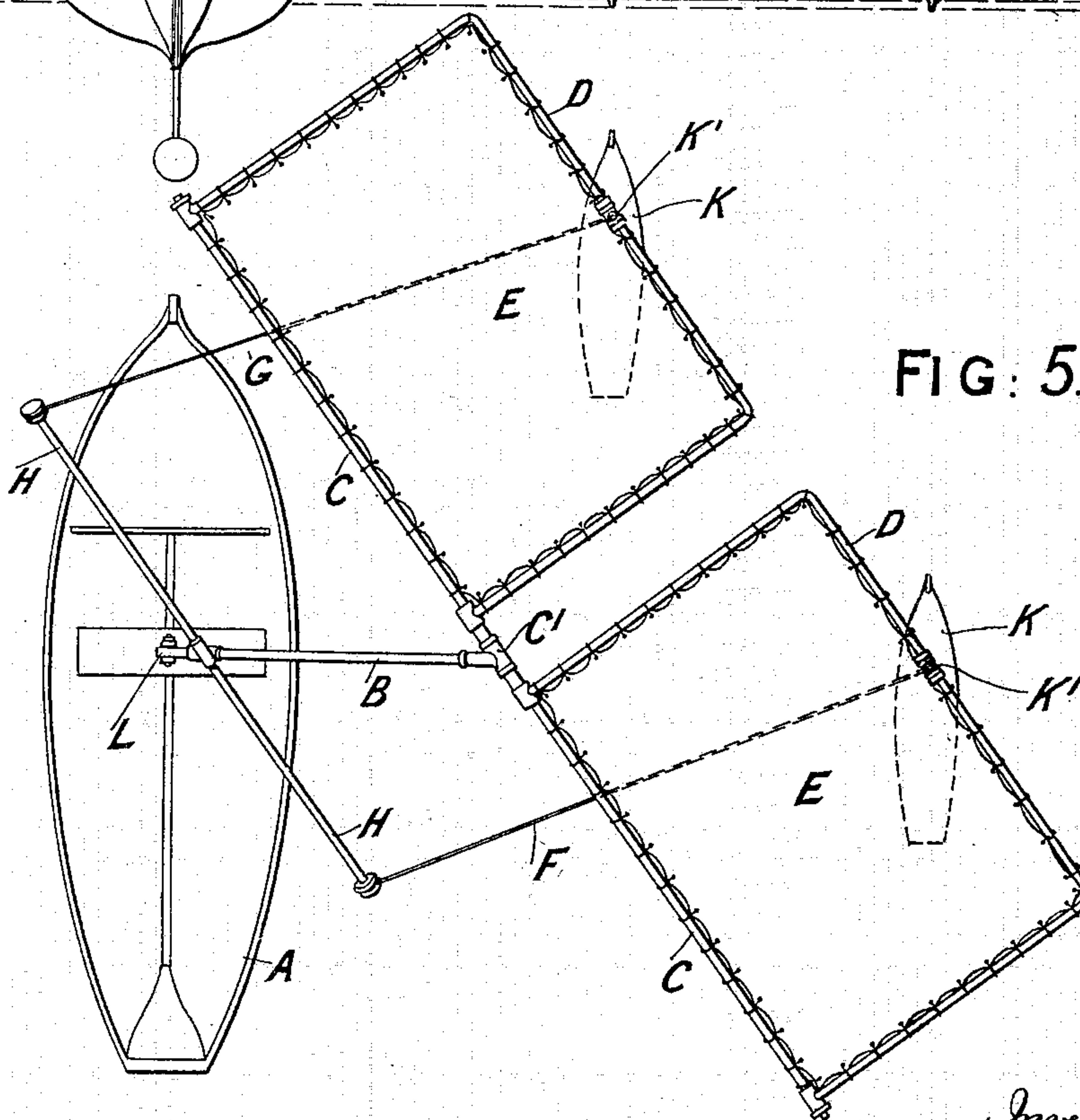


FIG. 5.



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UNITED STATES PATENT OFFICE.

FREDRIK LJUNGSTRÖM, OF STOCKHOLM, SWEDEN.

SAIL FOR BOATS.

SPECIFICATION forming part of Letters Patent No. 612,209, dated October 11, 1898.

Application filed December 29, 1897. Serial No. 664,407. (No model.) Patented in England May 17, 1897, No. 12,168.

To all whom it may concern:

Be it known that I, FREDRIK LJUNGSTRÖM, a subject of the King of Sweden and Norway, residing at Stockholm, in the Kingdom of Sweden, have invented a new and useful Sail for Boats and other Vessels, (for which I have obtained a patent in Great Britain, No. 12,168, bearing date May 17, 1897,) of which the following is a specification.

The object of this invention is to enable sails of greater superficial area to be carried by boats and other vessels than heretofore without endangering the safety of the boat and whereby greater stability and greater speed can be obtained than has hitherto been possible, the further object being to so arrange and construct the said sails that the force of the wind thereon tends to lift the boat rather than submerge it, as has been the case hitherto, while the equilibrium of the boat is not disturbed at all or only in a very small degree. With this object in view I suspend the sails pendulumwise from a yard, the latter being capable of revolution in a plane at right angles to the mast by which the yard is supported, and I provide means, such as sheets, whereby the lower edges of the sails may be retained at a proper distance from the mast, so that the sail surface may be set at such an angle that the normal component of the wind-pressure upon the sails passes about through the center of gravity of the boat, whereby the before-mentioned objects are obtained. In some cases I fit the lower edges of the sail surface, which edges may consist of a rigid frame, with boat-shaped floats, and thereby prevent the lower edge of the sails being submerged.

In the accompanying drawings at Figure 1 I have shown an end elevation, and at Fig. 2 in plan an example, of my improved sails. Fig. 3 is a detail sectional elevation of the upper end of a mast. Fig. 4 is an end elevation, and Fig. 5 a plan view showing the sails fitted with floats.

Referring more particularly to Figs. 1 and 2, A indicates a sailing-boat, which may be of any desired construction or character, having a mast B. Upon or near the upper end of this mast B there is arranged a yard C, so fitted that it may be revolved around the said mast B, or the yard C may be rigidly fixed to

the mast B and the latter made capable of revolution in its socket in the boat.

The yard C is, as shown, carried within or passes through a tubular part C', the downward branch of which is fitted upon the end of the mast B, and is generally so arranged that the yard C is not only capable of revolution around the axis of the mast B but is also capable of revolution upon its own axis.

From the yard C there extends downwardly depending bars D, to and between which sails E are attached by any usual or convenient means—say, by lacing, as shown—and thus depend pendulumwise from the yard C.

The lower edges of the sails E are held by cords or sheets F G, so that the planes of the sails may be retained at a proper angle, and such sheets F and G may be fixed to the ends of a lower yard or cross-piece H.

By such an arrangement as above broadly stated and means being provided whereby the angle of the plane of the sails may be varied with respect to the vertical longitudinal central plane of the vessel—say by rotating the carrying-yards about horizontally upon the mast—I am then enabled, first, to place the sails at a proper angle with the longitudinal axis of the vessel A, and, secondly, to allow the sails E to be turned upon the upper yard C to such an angle with the horizontal plane that the wind acts upon the sails E at such an angle that the boat or other vessel A while being propelled or driven forward, as usual, will not be heeled over to any undesirable extent, although the superficial area of such sails E may be greatly in excess in proportion to the size of boat A to the area as usually employed.

The mechanical construction I employ to carry out my invention may be greatly varied according to circumstances. Thus I may form complete frames D of steel tube having canvas, fabric, or other material stretched thereon, and the fabric may be so fixed in each frame that it can at will either be caused to entirely cover the space between the frames or only partly span such space. The yards C H may be fixed to the mast B, and the latter may then be constructed to be revolved in its step in any suitable manner, mechanical or otherwise, in order to set the sails E at any required angle with the longitudinal

axis of the vessel A, or the upper and lower yards C II may be carried in brackets J upon a sleeve-tube B' upon the mast B, as shown at Fig. 3, or in other cases each yard may be
5 caused to be capable of revolution around the mast.

The lower parts of the sails E may have floats K K, as shown at Figs. 4 and 5. In this case the sails E are made of rigid sheets or
10 are stretched in complete rigid frames D and suspended pendulumwise from the yard C, all as before described with reference to Figs. 1 and 2. At the base of each sail or sail-frame I pivot a float K, the connection K', with the
15 float, being forward of the center of its length, and so that when passing through the water the lengthway axis of the floats will be maintained parallel with the boat A at all times.

The floats K may be of any desired shape or
20 form—for example, as shown, or cigar shape—and effectually prevent any submergence of the bases of the sails. I provide means whereby the mast may be inclined relatively to the boat, such as a joint at L, and whereby the
25 boat is maintained upon an even keel, as shown, while it cannot be overturned by any wind-pressure, the effect of which would only be to tend to lift the boat and perchance force the floats K deeper into the water.

30 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In sailing-boats, the combination with a mast, of a yard located at the upper end thereof and capable of revolution in a plane
35 at right angles to the axis of the said mast, bars or rods depending from and at right angles to the yard, means whereby the pendent bars may have a swinging or pendulum movement about the axis of the yard, sails stretched
40 between the pendent bars, and the yard, and means such as sheets for retaining the lower ends of the pendent rods at proper distance from the mast, and whereby the sail surface may be set at such angle that the normal com-
45 ponent of the wind-pressure upon the sails passes about through the center of gravity of the boat, as set forth.

2. In sailing-boats, the combination with a mast, of a bracket upon the upper end thereof, a tubular bearing-sleeve upon and at right
50 angles to the bracket, a yard passing through the sleeve and capable of axial rotation therein, means for axially rotating the mast in its step or bearing, and thereby revolving the yard, bars or rods depending at right angles
55 from the yard and jointed thereto, sails stretched between the bars, and means for retaining the lower ends of the pendent bars to hold the sail surface at such an angle that the normal component of the wind-pressure
60 thereon, passes about through the center of gravity of the boat, as set forth.

3. In sailing-boats, the combination with the mast, of a yard located at the upper end thereof, and mounted so as to be capable of
65 revolution in a plane at right angles to the axis of the mast, rigid frames jointed to the yard and pendent therefrom, sails stretched in the frames, and means for retaining the lower bars of such frames at a proper dis-
70 tance from the mast, and thus holding the sail surface at an angle, whereby the normal component of the wind-pressure acting thereon shall pass through the center of gravity of the boat, as set forth.
75

4. In sailing-boats the combination with a mast, of a yard located at the upper end thereof, and capable of revolution in a plane at right angles to the axis of the said mast, rigid or rigidly-framed sails, depending pen-
80 dulumwise from and at right angles to the yard, means such as sheets for retaining the sails at a proper distance from the mast, a boat-like float located at the lower edge of each sail-frame to prevent the submergence
85 of the sails, means for retaining the floats parallel with the boat, and means for allowing the mast to incline and the boat to thereby be maintained level on an even keel, substantially as set forth.

FREDRIK LJUNGSTRÖM.

Witnesses:

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W. A. MARSHALL.