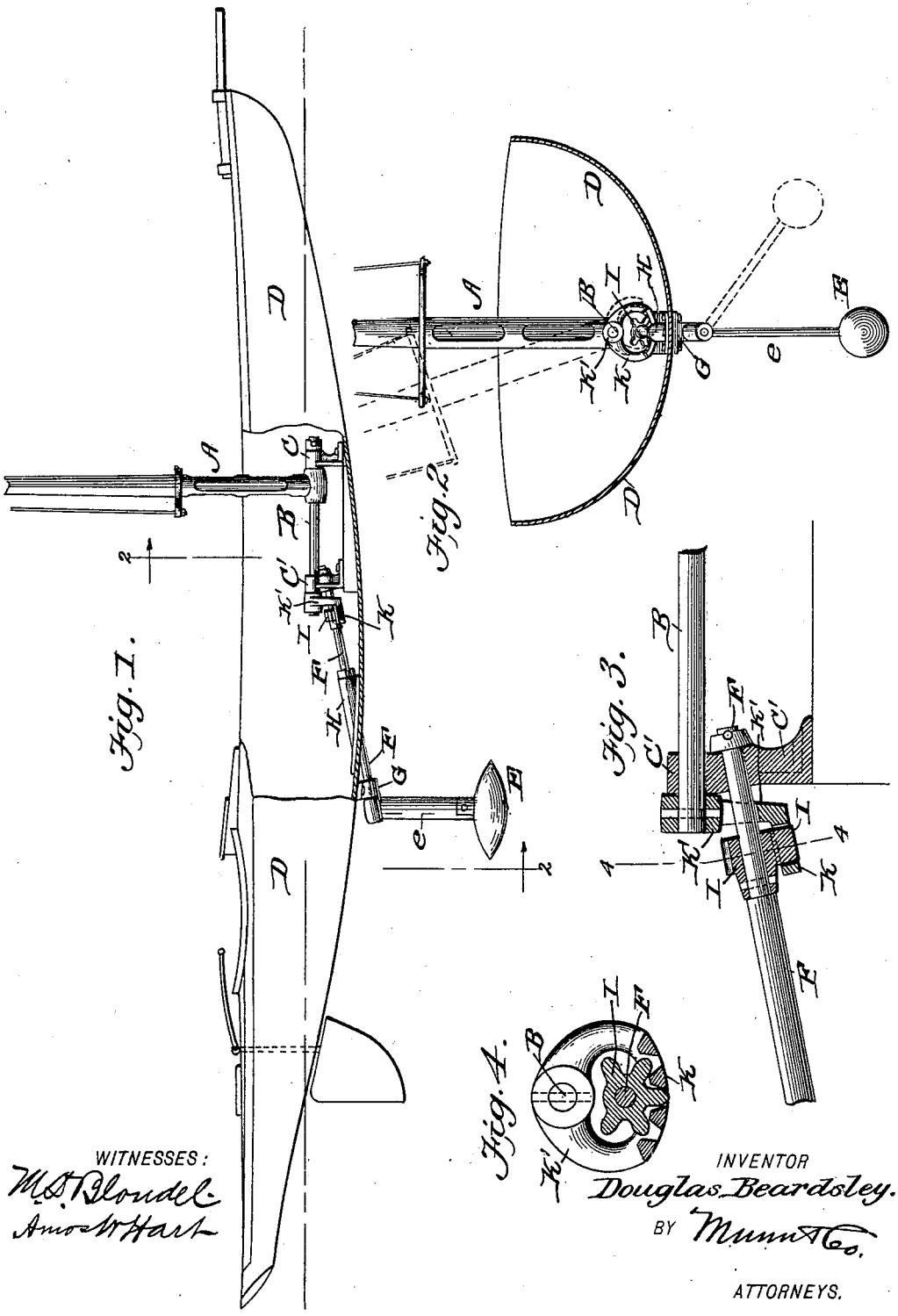
No. 648,911. Patented May 8, 1900.

D. BEARDSLEY.

SAILING CRAFT.

(Application filed Aug. 19, 1899.)

(No Model.)



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SAILING CRAFT.

SPECIFICATION forming part of Letters Patent No. 648,911, dated May 8, 1900.

Application filed August 19, 1899. Serial No. 727,773. (No model.)

To all whom it may concern:

Be it known that I, DOUGLAS BEARDSLEY, of Auburn, in the county of Cayuga and State of New York, have invented a new and useful Improvement in Sailing Craft, of which the following is a specification.

My invention is an improvement in the class of sailing craft which are provided with a swinging ballast; and it is more particularly an improvement upon the invention for which I have received Letters Patent No. 537,667, dated April 16, 1895. Such invention embodies a swinging ballast and a mast stepped in a pivoted socket and connected with said ballast, so that when the mast inclines laterally under wind-pressure resistance is offered by the ballast and not by the hull of the craft, which remains in normal vertical position. Practical experience in sailing a boat provided with this invention has demonstrated that a quicker lateral movement of the ballast is required to prevent the wind "spilling" unduly, or, in other words, that the lateral inclination of the mast shall be resisted more promptly or more strongly at the beginning, so that the maximum inclination under any but a high-wind pressure shall be as slight as possible. I have obtained this result by means hereinafter described, and I have also devised a new and improved arrangement of the rock-shaft to which the swinging ballast is attached.

In the accompanying drawings, Figure 1 is a side view of the hull of a sail-boat provided with my invention, part of the hull being broken out. Fig. 2 is a horizontal transverse section, enlarged, on line 2 2, of Fig. 1. Fig. 3 is a vertical longitudinal section of the gearing enlarged. Fig. 4 is a vertical cross-section on line 4 4 of Fig. 3.

The mast or mast-socket A is rigidly connected with a rock-shaft B, whose bearings are in brackets C C′, arranged in the bottom of the boat-hull D interiorly and lengthwise with the keel, so that the mast and shaft swing and rock together. The weight E, constituting the ballast, is hung by an arm *e* from the lower and rear end of a rock-shaft F, which passes through the keel or bottom of the hull D at an angle of about twelve degrees. Said shaft F has its forward bearing in the bracket C′ at a point below the rock-shaft B, while its rear bearing G is attached to the bottom of the hull exteriorly. A stuffing-box H of suitable length is arranged to receive the shaft F where it passes through the hull, and the same is provided with lateral flanges to adapt it to be securely bolted or screwed to the hull. The means for connecting the two rock-shafts B F so that they will rotate together but at different speeds are differential gears I and K. The parts I K are practically segment spur-gears. The spur gear or pinion I is pinned on the ballast rock-shaft F at a point removed from the bearing C′ or intermediate the latter and the stuffing-box H. The gear K is a toothed flange of a hanger K′, the latter having a central opening to allow due space for the ballast rock-shaft F to pass through it and permit lateral oscillation of said hanger. The latter is pinned on the rear end of mast rock-shaft B, between the bracket C′ and gear I, so that the segment K swings when the shaft rotates, as will be readily understood. Thus when the rock-shaft B rotates more or less the segment-gear K will swing through a much larger arc and in so doing will rotate the gear I to a corresponding degree and the shaft F be thereby rotated so as to swing the ballast E through a still larger arc, as shown by dotted lines in Fig. 2. It will be perceived that, by the arrangement of the toothed portion of the segment K below the gear or pinion I, the rocking of the mast-shaft B in one direction produces an opposite rotation of the ballast-carrying shaft F. In other words, the inclination of the mast to either side swings the ballast E in the opposite direction. It will be seen that, by the construction and combination of parts before stated, the lateral swing or oscillation of the mast A, due to pressure of the wind on its sail, (not shown,) is transferred to and augmented or multiplied in the ballast E, since the latter is caused to describe a greater arc in the same time—that is to say, the ballast E moves more rapidly and swings farther than the mast, so that its resistance to the lateral inclination of the same is correspondingly increased and the sail thereby caused to stand up stiffly against the wind. This result is especially important

when the wind is comparatively light or when a puff strikes the sail, since the ballast E swings more easily or offers least resistance in the first part of its oscillation, the resistance obviously increasing in a large ratio as the arc lengthens. In any case the hull is left always practically vertical, whatever be the strength of the wind or oscillation of the mast. In other words, the boat rides on an even keel in all winds and the sail spills less in light winds and puffs. The difference between arcs described by the mast and ballast will of course correspond to the difference between the diameters of the respective gears I and K, and I prefer that K shall have at least twice the radius of the other, I.

By the arrangement of the ballast rock-shaft F as shown I not only attain the important advantage above stated, but greater efficiency, an economy and strength of construction of hull and gearing, as well as economy of space within the hull, besides lowering the center of gravity to a greater degree than heretofore.

It will be understood that the mast A is to be pivoted at the lowest point practicable. The ballast is also preferably elongated in the direction of the keel of the boat, and it may be made crescent shape in conformity with the transverse curvature of the hull D, whereby the center of gravity of the craft is slightly lowered.

While in small boats the mast rock-shaft B is arranged horizontally, as shown, since the elasticity of the mast compensates for the change in practical length of the jib-stay due to oscillation of the mast, in large craft it may be arranged at a slight inclination, so that its axis, if prolonged, would pass through the point where the jib-stay is attached to the bowsprit.

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

1. A sailing craft provided with a mast-holder which is pivotally secured within the hull, a pivoted swinging ballast, and differential-gear mechanisms connecting said mast and ballast, whereby they oscillate laterally together and the inclination of the mast causes a quicker movement and greater inclination of the ballast in the opposite direction, as set forth.

2. In a sailing craft, the combination of a mast-socket pivoted centrally to the hull, a weight or ballast hung centrally on said hull, and adapted to swing laterally, and differential transferring means which operatively connect the mast with the ballast, and transfer the oscillation of the former to the latter in an increased degree, whereby the ballast is caused to describe a much larger arc, in the same time, as shown and described.

3. The combination with the hull of a sailing craft, and a mast-socket and a rock-shaft, fixed together and the latter arranged in the bottom of the hull, lengthwise thereof, a weight or ballast hung from a rock-shaft arranged in line with the hull, exteriorly, and differential gears applied to the said rock-shafts, within the hull, and connecting the adjacent ends of the latter, whereby the oscillation of the mast rock-shaft is communicated to the ballast rock-shaft as shown and described.

4. In a sailing craft, the combination of a mast-socket, a rock-shaft to which said socket is fixed so that it may oscillate laterally, a weight serving as a ballast, and hung from a rock-shaft arranged lengthwise of the hull, a differential-gear connection between said rock-shafts, which consists of a gear on the ballast rock-shaft and a larger one on the mast rock-shaft, and meshing as shown and described.

5. In a sailing craft, the combination with the hull, of a mast-carrying rock-shaft arranged horizontally therein, a ballast-carrying rock-shaft arranged at a downward inclination and projecting through the bottom of the hull, a bracket serving as a common bearing for the adjacent inner ends of both rock-shafts, a pinion on the inclined shaft, and a segment-gear fixed on the mast-shaft and having an opening for the inclined shaft and engaging the under side of the pinion, as shown and described.

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