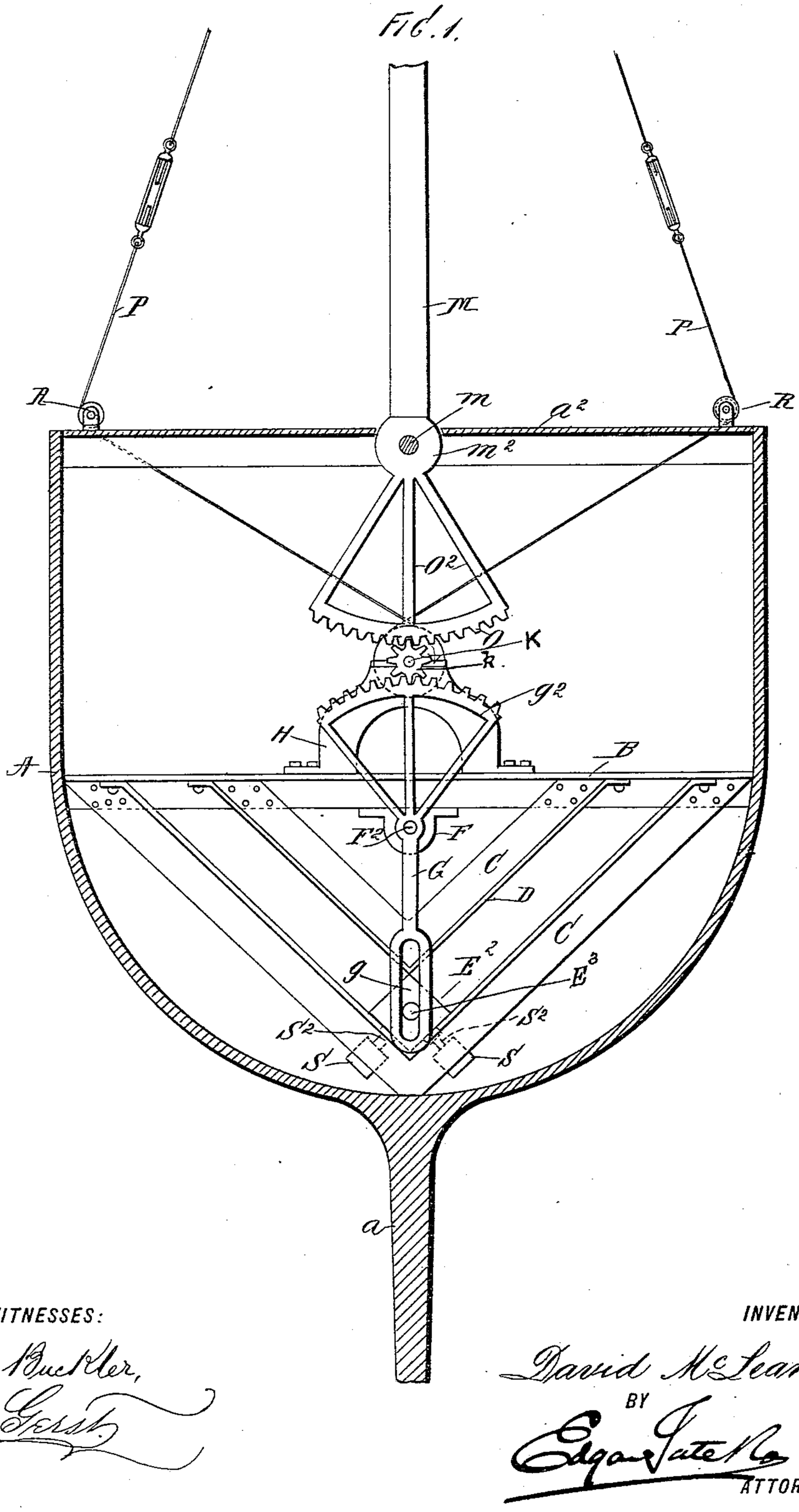
(No Model.) 2 Sheets—Sheet 1.

D. McLEAN.

DEVICE FOR SAILING YACHTS.

No. 559,983. Patented May 12, 1896.

FIG. 1.



WITNESSES:

John Buckler,

C. Smith

INVENTOR

David McLean,

BY

Edgar Tate & Co

ATTORNEYS

(No Model.) 2 Sheets—Sheet 2.

D. McLEAN.

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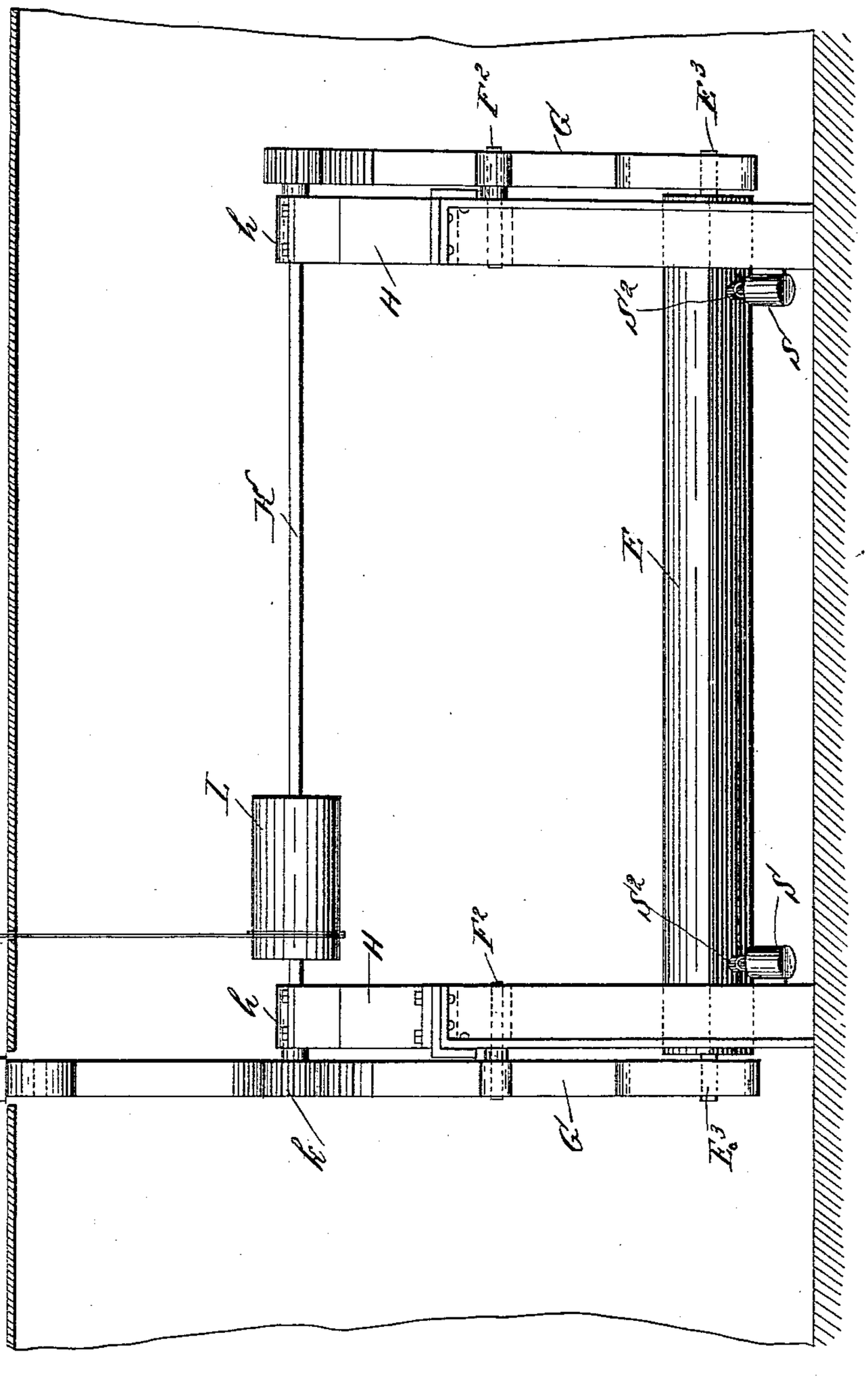

FIG. 2.

WITNESSES:

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C. Gerth.

INVENTOR

David McLean,
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UNITED STATES PATENT OFFICE.

DAVID McLEAN, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-THIRD TO DANIEL P. OLMSTEAD, OF SAME PLACE.

DEVICE FOR SAILING YACHTS.

SPECIFICATION forming part of Letters Patent No. 559,983, dated May 12, 1896.

Application filed January 7, 1896. Serial No. 574,601. (No model.)

To all whom it may concern:

Be it known that I, DAVID MCLEAN, a subject of the Queen of Great Britain, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Devices for Sailing Yachts, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof, in which similar letters of reference indicate corresponding parts.

The object of this invention is to construct yachts or other and similar sailing vessels in such manner and provide the same with masts which are supported in such manner as to avoid the necessity of carrying the amount of weight or ballast usually employed in such vessels, a further object being to enable such vessels to "reach" or "to beat to windward" on an even keel, thus making them "point higher" and preventing the waste of force by the objectionable "bow-wave," as it is nautically known, which is an unavoidable and retarding feature of the sailing of such vessels when heeled over by wind-pressure. Instead of the usual tons of ballast-lead, which is usually bolted to the keel, the ballast is carried inside and is arranged to slide from side to side as the pressure of the wind on the sails demands. The mast instead of being rigid is supported on a pivot at the deck-line, and the use of steel for masts and other spars will render this possible without any undue weakness at this point. The lower portion of the mast is fitted with gearing, which connects with a geared shaft operating a drum, by which the supporting-rigging is adjusted to suit the sway of the mast, and at both ends of the shaft other gears connect with the ballast, the latter being arranged so as to slide in a V-shaped slot, and is caused to move either to the port or starboard side of the vessel, as the circumstances demand, and air-cushions are also provided to prevent jamming when the wind dies out suddenly or when coming about quickly.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which—

Figure 1 is a vertical cross-section of the hull of a yacht provided with my improvement, the latter being shown in full lines; and Fig. 2, a longitudinal portion of the hull, showing a side view of the improvement in full lines.

In the drawings forming part of this specification, A represents the hull of a yacht or other vessel provided with the usual keel a and a deck a^2, and arranged transversely of the hull and about midway of the depth thereof and at suitable distances apart are strong angle-iron plates or bars B, to the bottom of which are secured triangular angle-iron plates C, by means of which inclined spaces D are formed, which communicate at the bottom. I also employ a movable ballast E, which consists of a heavy bar of lead or iron, and which is provided at each end with angular extensions E^2, which are adapted to fit in the inclined spaces D and to slide therein, and said extensions E^2 are provided at each end with tendons E^3.

Secured centrally of the bars B and at the lower side of each are keepers F, in which are placed shafts or bolts F^2, on each of which is mounted, outside of the bars B and the triangular pieces C, a bar G, at the lower end of which is a slot g, in which the tendons E^3 operate, and connected with the upper end of the bar G is a segmental gearing g^2. Secured to the upper side of each of the bars B is a standard H, each of which is provided with a housing h, through which passes a shaft K, on which is mounted a drum L, and on one end of the shaft K is mounted a gear-wheel or pinion k, which operates in connection with the segmental gear g^2, and this pinion or gear-wheel is arranged directly under the mast M.

The lower end of the mast M is pivotally supported at m on a bolt which passes through a head m^2 formed thereon, and secured to or formed on the lower part of said head is a segmental gear O, which is rigidly connected with said head by strong braces O^2, and the segmental gear O is adapted to operate in connection with the pinion or gear-wheel k, and connected with the upper end or top of the mast (not shown) are stays or braces P, consisting of cords or ropes which are passed downwardly and outwardly around pulleys R, which are properly secured in position at or

near the sides of the deck, and thence through and below the deck, where they are connected with the drum L. I also secure to the lower pieces C, and near the lower ends thereof, air-cushions, which consist of tubular casings S, provided with pistons and piston-rods S^2, at the outer ends of which are formed heads which are adapted to form a cushion for the ballast E and to prevent the jolt and jar which would otherwise be occasioned when said ballast drops quickly into the bottom of the inclined slots or spaces D.

The operation will be readily understood from the foregoing description when taken in connection with the accompanying drawings.

It will be understood that at each lateral movement of the mast the ballast E will be raised or moved through the slots or passages D in the same direction, and that said ballast will always operate to return the mast to the vertical position, and because of this arrangement the hull will always rest upon an even keel, or substantially so, and thus the advantages hereinbefore set out will be secured.

A great reduction in weight is gained in two ways by connecting ballast directly with the mast, the usual loss by immersion will be avoided, and more power can be obtained by an equal weight, and the vessel is enabled to "point higher" to windward and to "foot faster" by reason of the ballast being removed to the opposite side of the center of gravity when the pressure of wind on the sails tends to bear down on the hull. The movement of the ballast is intended, as will be understood, to counteract this pressure, and thus retain the hull in an upright position, so that the more pressure there is the farther the ballast is removed from the opposite center of gravity, and the only fixed ballast carried will be just sufficient to properly balance the hull.

Another advantage which results from this construction is in windward work. When beating to windward under usual conditions, an angle of forty-five degrees is often exceeded. When an angle like this is maintained, the keel is at a disadvantage in holding the hull to the windward, the water escaping under the keel thus allowing the boat to slide off to leeward; but by beating to windward on an even keel, no water can escape thereunder, and the yacht must necessarily point higher, which is the principal object to be gained in a yacht-race. It is also well known that when heeled over a yacht loses the advantages which are the principal results of fine lines and perfect form. Instead of cutting through the water with her bow her quarter tears through it, causing commotion in the water known as the "bow-wave," which is always an objectionable feature and simply represents so much wasted energy which would not exist while sailing on an even keel.

It is evident that changes in and modification of the construction herein described may be made without departing from the spirit of my invention or sacrificing its advantages, and I reserve the right to make all such alterations therein and modifications thereof as fairly come within the scope of the invention.

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

1. A yacht or other vessel provided with a pivoted mast, and a movable ballast, which is in operative connection with the lower end of said mast, and said mast being also provided with stays which connect with the upper end or top thereof, and which are also connected with a drum below the deck which is in operative connection with the lower end of the mast and with said movable ballast by means of an interposed gear-wheel, substantially as shown and described.

2. A yacht or other vessel provided with a mast, which is pivoted at or below the deck, and to the lower end of which is secured a segmental gear, which is in operative connection with a corresponding segmental gear, to which is secured a depending bar which is movably connected with ballast which is supported in such manner as to be free to swing from one side of the hull to the other, substantially as shown and described.

3. A yacht or other vessel provided with a mast, which is pivoted at or below the deck, and to the lower end of which is secured a segmental gear, which is in operative connection with a corresponding segmental gear, to which is secured a depending bar which is movably connected with ballast which is supported in such manner as to be free to swing from one side of the hull to the other, and stays connected with said mast and passing around pulleys at each side of the vessel and through the deck thereof and connected with a drum which is in operative connection with said segmental gears, substantially as shown and described.

4. A yacht or other vessel, the hull of which is provided with cross-bars rigidly secured therein to the lower sides of which are secured downwardly-depending triangular frames or angle-irons between which are formed slots or passages, in which are placed or supported a movable ballast, segmental gears pivotally connected with, and supported by each of said cross-bars, and at the outer side thereof, each of which is provided with a depending bar having a slot in the lower end thereof adapted to receive tenons formed on the ends of the ballast, standards connected with, and supported by said cross-bars each of which is provided with a housing, a shaft mounted in said housings, on each end of which is a pinion or gear-wheel adapted to operate in connection with said segmental gears, and a mast pivotally supported at or near the deck and provided at its lower end with a segmental gear which is adapted to operate in connection with one of said gear-wheels or pinions, substantially as shown and described.

5. A yacht or other vessel, the hull of which

is provided with cross-bars rigidly secured therein to the lower sides of which are secured downwardly-depending triangular frames or angle-irons between which are formed slots or passages, in which are placed or supported a movable ballast, segmental gears pivotally connected with, and supported by each of said cross-bars, and at the outer side thereof, each of which is provided with a depending bar having a slot in the lower end thereof adapted to receive tenons formed on the ends of the ballast, standards connected with, and supported by said cross-bars each of which is provided with a housing, a shaft mounted in said housings, on each end of which is a pinion or gear-wheel adapted to operate in connection with said segmental gears, and a mast pivotally supported at or near the deck and provided at its lower end with a segmental gear which is adapted to operate in connection with one of said gear-wheels or pinions, and said mast being provided with stays which are connected with the upper portion thereof and which are passed around pulleys near each side of the vessel, and through the deck thereof, and connected with a drum mounted on the shaft, on which said pinions or gear-wheels are mounted, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 6th day of January, 1895.

DAVID McLEAN.

Witnesses:
C. GERST,
L. M. MULLER.