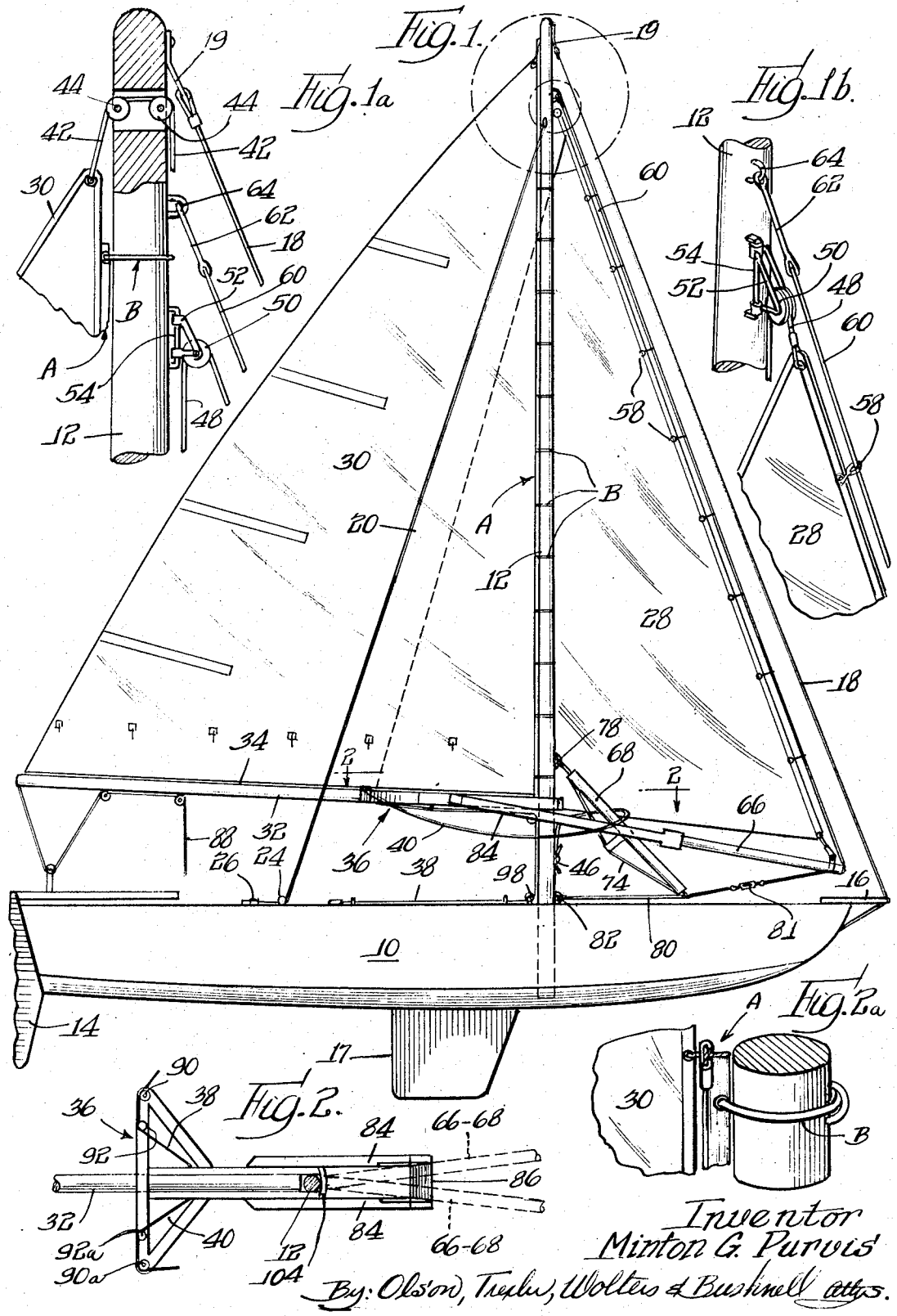
Oct. 10, 1967 M. G. PURVIS 3,345,969

SAILING RIG

Filed April 8, 1966 3 Sheets-Sheet 1



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SAILING RIG

Filed April 8, 1966 3 Sheets-Sheet 2

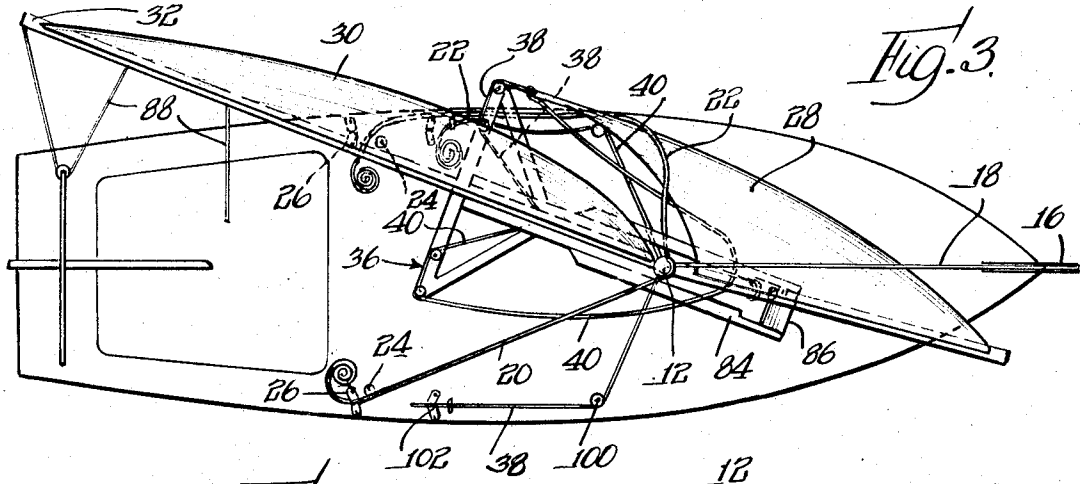

Fig. 3.

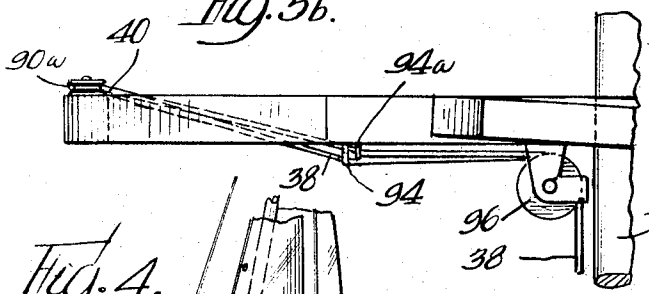

Fig. 5b.

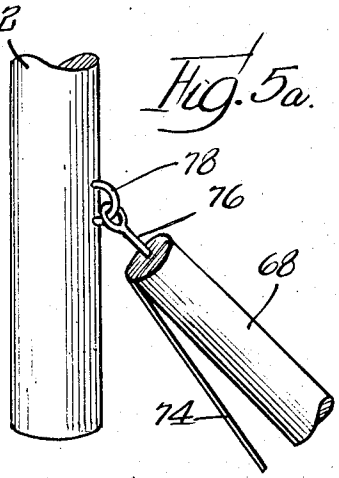

Fig. 5a.

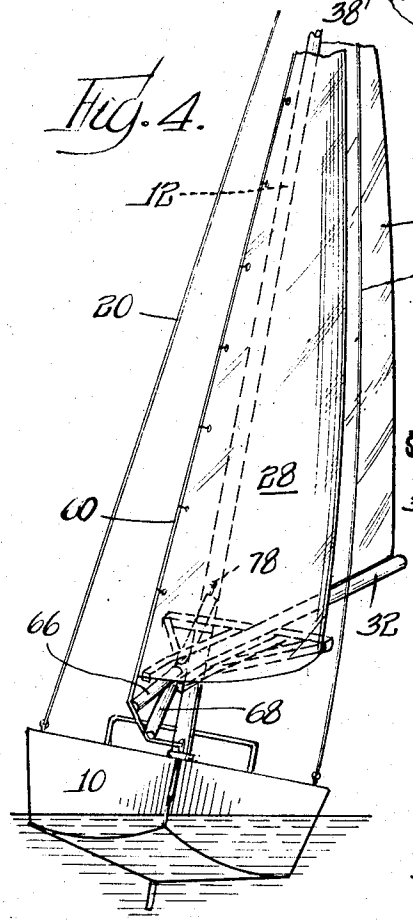

Fig. 4.

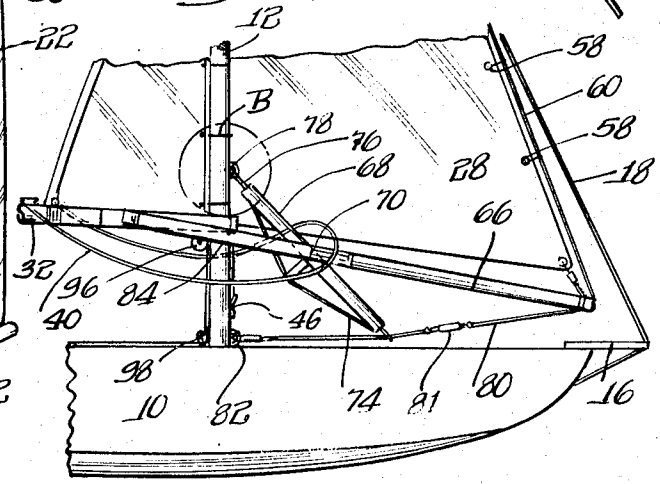

Fig. 5.

Inventor
Minton G. Purvis
By: Olson, Trexler, Wolters & Bushnell attys.

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Fig. 6.

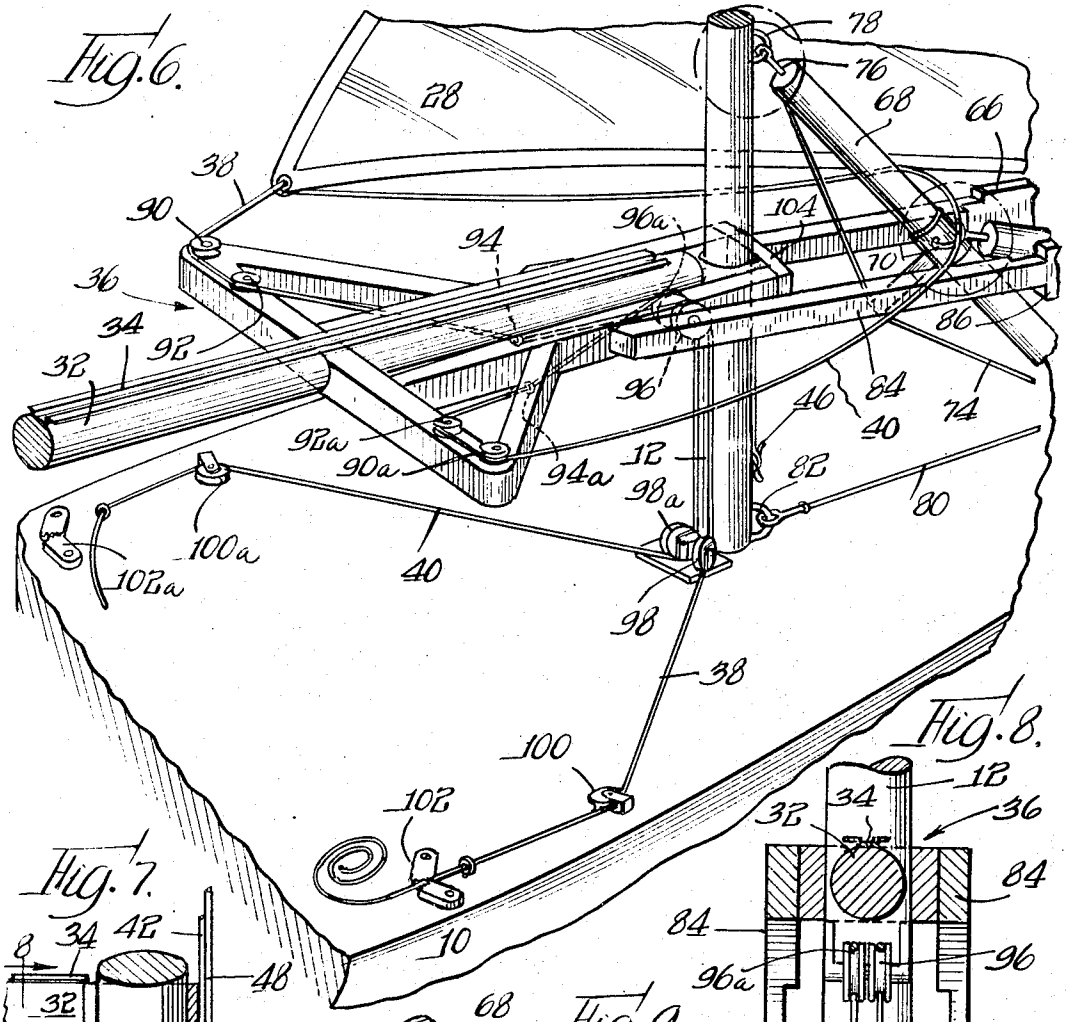


Fig. 7.

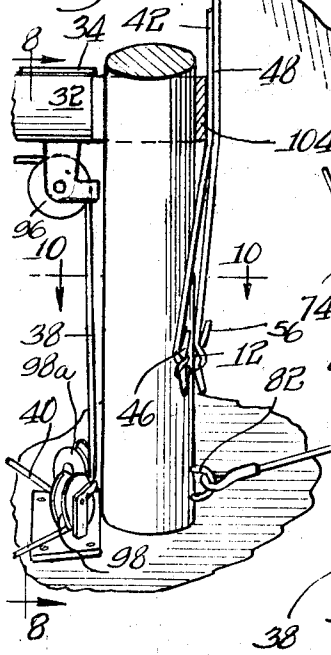


Fig. 9.

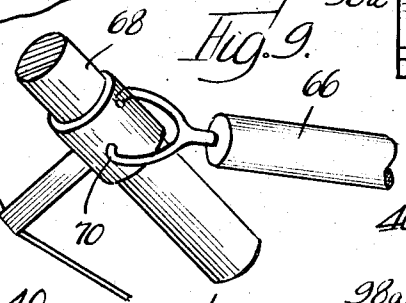


Fig. 8.

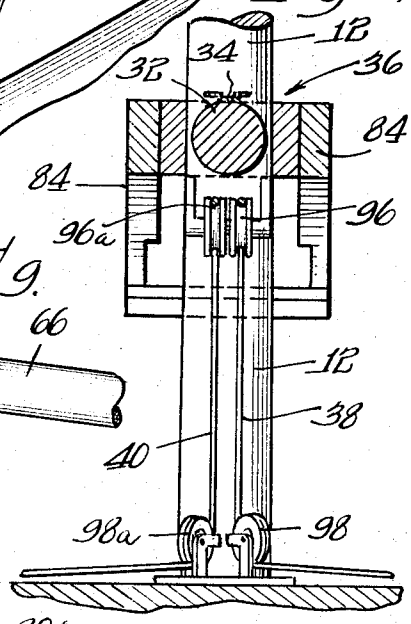
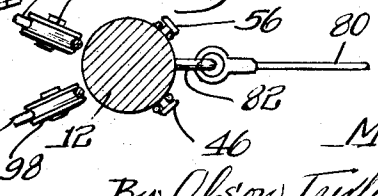


Fig. 10.



Inventor

Minton G. Purvis

By: Olson, Trapp, Wolters & Bushnell
attys.

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SAILING RIG

Minton Grier Purvis, 1947 Greenwood Ave., Wilmette, Ill. 60091

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11 Claims. (Cl. 114—102)

ABSTRACT OF THE DISCLOSURE

This invention relates generally to improvements in sailing rigs and one embodiment as disclosed herein consists of a frame carried as a unit by the forward portion of a boom, said frame including a forward extension which provides abutments engageable with opposite sides of a jib boom structure. The jib boom structure at its forward extremity is secured against unauthorized upward displacement by a device which functions independently of the boom and frame structures to secure the jib boom in its proper position against vertical shifting. The after extremity of the jib boom structure is pivotally supported at a point adjacent to and preferably forward of the mast axis, and jib sheet guiding means supported by the frame is designated to direct jib sheets to a point adjacent the mast axis and thereby preclude any substantial longitudinal shifting of the jib sheets when the boom is shifted laterally.

Conventional or standard type sailboats of the type employing fore and aft sails, which include a jib and mainsail, are designed so as to require independent trimming of each sail. Thus it is common practice to employ a main sheet which leads from the main boom to a deck fitting and a jib sheet which also leads from the jib clew to a deck fitting. It is also conventional practice to secure the tack of the jib to a forward fitting on the deck or bowsprit and to secure the peak or head portion of the jib by a halyard which leads downwardly from an upper sheave on the mast to a deck fitting or cleat. Such sailing rigs require the trimming of the mainsail independently of the jib and vice versa. One of the important objects of the present invention is to provide a sailing rig whereby once the relative setting of the jib with respect to the mainsail has been accomplished, as for example, after coming about, no further independent trimming or adjustment of the jib is required. To this end it is proposed to so design the rigging that when the mainsail is trimmed by the adjustment of the main sheet, the jib will automatically maintain its proper setting with respect to the mainsail.

A further object of the present invention is to provide new and improved sailing rig features which will maintain a substantially constant aerodynamic slot effect between the mainsail and jib, under varying sailing conditions. The aerodynamic slot effect increases the efficiency and thrust derived from the wind over that of a standard fore and aft sailing rig, using the same amount of sail area, by as much as 23 percent.

It is also an object of the present invention to provide a sailing rig which will expedite the ease with which sail adjustment and manipulation may be accomplished, thus making it easy for even inexperienced sailors to operate a sailing vessel efficiently and safely.

To this end the invention proposes the simplification of sail trimming and manipulation by the use of a single sheet connected with a mainsail boom.

It is a further object of the invention to reduce to a minimum the extent of overlap of the jib and mainsail when the wind direction ranges anywhere from the beam to the stern of the boat; thereby increasing the amount of sail area exposed under these conditions.

It is also an object of the present invention to provide

a novel and improved sailing rig of the type referred to above which will have practical application to a wide variety of hull designs and which may be used on sailboats, iceboats, and land sailing craft with equal facility and which is applicable to marconi, gaff and gunter rigged vessels.

The foregoing and other objects and advantages will be more apparent from the following detailed description when conidered in connection with the accompanying drawings wherein:

FIG. 1 is a side elevational view of a sailboat on a starboard tack equipped with a sailing rig which is representative of one embodiment of the present invention;

FIG. 1*a* is a fragmentary elevational view of the portion of the mast and rigging included within the larger of the two dot-and-dash circles of FIG. 1, an upper portion of the mast being broken away to show the sheave arrangement for the main halyard;

FIG. 1*b* is a fragmentary perspective of the portion included within the smaller of the two circles of FIG. 1;

FIG. 2 is a fragmentary sectional plan view taken substantially along the line **2**—**2** of FIG. 1;

FIG. 2*a* is a detailed perspective view showing the manner in which the luff of the mainsail is slidable in a track secured to the mast by a series of rings;

FIG. 3 is a plan view of the sailboat shown in FIG. 1;

FIG. 4 is a front elevational view of the sailboat shown in FIGS. 1 and 3;

FIG. 5 is a side elevational view of the forward portion of the sailboat as viewed in FIG. 1, with the mainsail and forwardly extending portion of the mainsail boom removed to expose parts otherwise hidden;

FIG. 5*a* is a fragmentary perspective view of the structure included within the dot-and dash circle of FIG. 5 and FIG. 6;

FIG. 5*b* is an enlarged fragmentary view of the mainsail boom and sheave arrangement for guiding the jib sheets;

FIG. 6 is a fragmentary perspective view of a mainsail boom structure in the vicinity of the mast, with the mainsail removed more clearly to illustrate the manner in which the jib sheets are guided between the clew of the jib and the deck fittings;

FIG. 7 is a fragmentary perspective view of the lower portion of the mast in the vicinity of the deck;

FIG. 8 is a vertical sectional view taken substantially along the line **8**—**8** of FIG. 7;

FIG. 9 is an enlarged fragmentary perspective view of the portion included within the dot-and-dash circle of FIG. 6; and

FIG. 10 is a horizontal sectional view taken substantially along the line **10**—**10** of FIG. 7.

Referring now to the drawings more in detail, wherein like numerals have been employed to designate similar parts throughout the various figures, it will be seen that the present invention has been disclosed in association with a sailboat having a hull **10**, a mast **12**, a rudder **14**, a relatively short bowsprit **16** and a centerboard **17** shown at approximately two-thirds normal depth. The mast or spar **12** is braced at its forward side by a fore stay **18** extending from the forward end of the bowsprit **16** to a fitting **19** near the upper extremity of the mast, FIG. 1. The after-side of the mast **12** is supported or braced by a pair of conventional adjustable backstays, namely a starboard stay **20** and a port stay **22**. These backstays extend from a suitable fitting at the upper extremity of the mast **12** to suitable deck blocks **24**, and from these blocks the stays are adapted to be secured to one of a pair of jam cleats **26**, depending upon the tack the vessel is sailing. If the vessel is sailing on a starboard tack, as shown in FIGS. 1, 3 and 4, the backstay **20** would be cleated down, whereas the backstay **22** would be running free or slack; and if the

vessel were sailing on a port tack, the backstay **22** would be cleated, with stay **20** slack. If desired, a permanent backstay, attached to a boomkin on the stern of the boat, may be used instead of, or along with, the adjustable backstays. In addition, permanent side stays, short spreaders and shroud lines may be used, with the jib rotating or traveling just outside the side stays. The side stays must be spaced inside the jib sufficiently so as not to interfere with the operation of the jib.

The sails consist of a jib **28** and a mainsail **30**. The foot of the mainsail **30** is secured in the usual manner to a main boom **32**. The boom **32** is generally horizontally disposed and consists of an after portion to which the mainsail is secured and a forward portion extending forward of the mast **12** to which the tack of the jib **28** is secured. The boom **32** is pivotally mounted upon the mast **12** as clearly shown in FIG. 6. An aperture in the boom structure **32** serves to accommodate the mast **12**, and a triangular frame structure designated generally by the numeral **36**, later to be described, serves to accommodate the jib sheets **38** and **40**. Thus the bottom **32** pivots or swings about the axis of the spar or mast **12**. A standard sail track **34** (FIG. 6) is mounted on the top of the boom **32** to accommodate the slides on the foot of the mainsail.

The luff of the mainsail **30** is guided by conventional slides on a track A. The track has a T-shaped metal backing and is secured to the mast **12** by metal rings B. The track is attached by rings to the mast **12** so that the mainsail may swivel about the mast. In addition, this arrangement allows the mainsail to be raised or lowered without interfering with permanent side stays or spreader bars which may be attached at any location along the sides of the mast. The head or peak of the mainsail is secured to a halyard **42** which passes over a pair of pulleys **44** mounted at the upper extremity of the mast **12**, FIG. 1*a*. From the forward sheave **44** the halyard **42** leads downward to a cleat **46** mounted on the mast **12**, FIG. 7.

The raising and lowering of the jib **28** is controlled through the agency of a jib halyard **48**. As shown in FIGS. 1*a* and 1*b*, the jib halyard **48** is secured at one extremity to the peak of the jib **28** and passes over a sheave **50** supported by a bracket or fitting **52**. The bracket **52** is pivotally supported by a fitting or rod **54** fixed to the forward side of the mast **12**. This pivotal support permits lateral shifting of the sheave **50** for reasons later to be explained. From the sheave **50** the halyard **48** extends downward and may be secured to a cleat **56** mounted on the forward side of the mast **12** as clearly shown in FIG. 7. The luff of the jib **28** carries conventional fittings **58** designed to be snapped upon a jib stay **60**. The upper extremity of the jib stay **60** is secured in a fixed position through the agency of a fitting **62** and a complementary fitting **64** secured to the forward side of the mast **12**, FIG. 1*b*. The tack of the jib **28** as well as the lower extremity of the jib stay **60** are secured to the forward extremity of the jib boom **66**.

The after extremity of the jib boom **66**, FIGS. 1 and 5, is pivotally coupled with a second or complementary jib boom **68** through the agency of a fitting **70**, shown more clearly in FIG. 9. It will be noted that the jib boom **68** is strengthened against lateral displacement or bending through the agency of a conventional jumper-stay arrangement designated by the numeral **74**. The after or upper extremity of the jib boom **68** is secured to the forward side of the mast by a fitting **76** which is pivotally coupled to the mast **12** through the agency of a complementary fitting **78**, FIG. 5*a*. The lower or forward extremity of the jib boom **68** has a fixed coupling with a cable **80** extending between the forward extremity of the jib boom **66** and a fitting **82** secured to the lower portion of the mast **12** as clearly shown in FIGS. 5 and 6. The angle which the jib boom **68** makes with the portion of the cable **80** extending from the mast is approximately 45°. The jib booms **66** and **68** are maintained under compression through the agency of the taut cable **80** and the jib stay **60**, previously referred to. A conventional turnbuckle **81** may be employed to control the tension in the cable **80**. In other words, the jib booms **66** and **68** are tied together as a unit by this arrangement, thus resisting forces tending to shift the forward extremity of the jib boom **66** upward or downward, and at the same time permitting a required degree of lateral shifting of this jib boom about the mast, in a manner to be described.

Employing two jib booms instead of one allows easier passage of the jib over the top of the jib booms and shortens the required length of the main boom extension **84**. The previously described bracket **52**, FIG. 1*b*, and its pivotal support **54** serve to facilitate lateral displacement of the jib **28**. The lateral shifting of the forward extremity of the jib booms **66** and **68** with respect to the axis of the boom **32**, as explained above, assures the maintenance of the desired air slot between the jib and the mainsail. As a result, the mainsail and the jib may be shifted about the axis of the mast or spar **12** on both port and starboard tacks without disturbing or changing the air slot referred to above. In addition to providing the proper air slot between the sails, the above described structures cooperate to provide a substantially perfect air foil under all conditions. In FIG. 2 the frame structure **36** is provided with an arcuate metal band **104** to facilitate the coupling of the frame structure with the lower portion of the mast **12**. This metal band is hinged or otherwise secured to the frame structure **36**. It prevents the main boom **32** from shifting away from the mast **12**. Both the mainsail halyard and the jib halyard are positioned externally of the member **104**.

In conventional sailing rigs, the tack of the jib is usually secured in a fixed position to the bow of the boat or the forward end of the bowsprit, as for example the bowsprit **16** shown in FIGS. 1 and 5. With such conventional sailing rigs, in order to maintain the proper setting of the jib with respect to the mainsail, an adjustment of the angle of the mainsail with relation to the wind will require an adjustment of the angle of the jib setting also, in order to obtain maximum sailing efficiency. By employing the arrangement of the jib boom unit **66** and **68**, as described above, the lateral shifting of the mainsail boom causes a corresponding shift of the jib boom unit **66** and **68** with consequent lateral shifting of the tack of the jib. It will be seen from FIG. 3 that when the vessel is sailing on a starboard tack, the tack of the jib will be positioned on the starboard side of the center line of the vessel. The jib boom unit **66** and **68** is operatively associated with the mainsail boom **32** through the agency of a pair of parallel frame members **84** secured at one extremity to the frame structure **36** as clearly shown in FIG. 6. The free extremities of the longitudinal parallel frame members **84** may be tied together by a transverse frame member **86**. It will be understood from the foregoing that the main boom **32**, the triangular frame structure **36**, and the parallel frame members **84** are all firmly attached together and move together as a unit as the boom **32** is shifted from one sailing position to another.

A limited degree of lateral shifting of the jib boom unit **66** and **68** wth respect to the boom **32** is desired. Thus, as shown in FIG. 3, with the vessel sailing on a starboard tack, the jib boom unit **66** and **68** is slightly out of axial alignment with the boom **32**. The extent of this lateral displacement of the jib boom unit **66** and **68** with respect to the boom **32** is determined by the inner opposed surfaces of the parallel frame members **84**, as illustrated in FIG. 2. The jib boom unit **66** and **68** may be positioned either to port or starboard of the boom axis, depending upon the tack which is being sailed. If the vessel is sailing upon a starboard tack as shown in FIG. 3, the jib boom unit **66** and **68** will be inclined slightly to port of the boom axis, whereas if the vessel is sailing on a port tack, they will be inclined slightly to starboard of the boom axis. With this arrangement, the aerodynamic slot between the jib and the mainsail is maintained in such a manner as to enhance the sailing effi-

ciency of the vessel. In the area where the maximum aerodynamic slot effect is required, when the wind direction ranges anywhere from a close reach to a beam reach, the angle between the longitudinal axis of the main boom **32** and the longitudinal axis of the jib boom unit **66** and **68** is approximately 7°. When the wind direction ranges anywhere from the beam reach to the stern of the boat, the angle between the two booms is not of any importance to sailing efficiency, and the angle changes from 7° on a beam reach to 5.5° when the wind is from the stern of the boat. If a very long jib boom unit is to be used on a ship, then no angle need be maintained between the axis of the main boom and the axis of the jib boom unit as there will then be a sufficient distance between the jib and mainsail, and the distance between frame members **84** can be decreased. However, with the standard proportions of jib and mainsail used, an offset angle of about 7° will be required to maintain the proper spacing between the jib and mainsail due to the aerodynamic curvature of each sail.

From the foregoing description, it will be understood that the present invention contemplates a sailing rig in which the setting of the jib with respect to the mainsail is maintained in a novel manner. By having the boom **32**, the triangular frame structure **36**, the parallel frame members **84**, and the jib boom unit **66** and **68** movable as a unit about the axis of the mast **12**, with provision for slight axial misalignment or angular displacement of the jib boom unit with respect to the main boom, increased sailing efficiency may be obtained without independently adjusting the setting of the jib with respect to the mainsail at frequent intervals; once the initial setting of the jib with respect to the mainsail has been accomplished. The setting or trim of the mainsail **30** is controlled in the usual manner by a main sheet **88**.

Attention is now directed to the manner in which the jib sheets **38** and **40** lead from the clew of the jib **28**. This may best be observed in FIG. 6, wherein it will be seen that the jib sheet **38** leads from the clew of the jib to a pulley or sheave **90** carried by the triangular frame structure **36**, and thence to another pulley **92**. From the sheave or pulley **92**, the jib sheet **38** passes through a conventional fair lead **94**, then crosses over to the starboard sheave **96** of a double pulley carried on the underside of the frame structure **36**. From the sheave **96**, the jib sheet **38** passes downward to a pulley **98** mounted on the deck of the vessel, and from this point the sheet passes through another deck sheave or block **100** to a conventional jam cleat **102**. When the vessel is sailing on a starboard tack as shown in FIG. 6, the jib sheet **38** is trimmed and secured in position by the jam cleat **102**. The other jib sheet **40**, which at this time is running free, extends from the clew of the jib **28** to a sheave **90***a* and thence to a second sheave **92***a* and through a fair lead **94***a* carried by the triangular frame structure **36**. From this point, the jib sheet **40** crosses over jib sheet **38** and thence to the port sheave **96***a* on the double pulley mounted underneath the frame structure. The jib sheet **40** extends downward to a sheave **98***a* mounted on the deck of the vessel and then to a deck block or sheave **100***a*. A jam cleat **102***a* functions similarly to the previously mentioned jam cleat **102**, when the vessel is sailing on a port tack. With this arrangement, the jib sheet which is used to trim the jib will always be located on the windward or high side of the vessel where it is much easier and safer to cleat and uncleat. In conventional sailing rigs, it is common to lead the operative jib sheet to the leeward or lower side of the vessel. Thus the present invention contemplates so positioning the operative jib sheet that it may be cleated or uncleated on the high side of the vessel. This arrangement contributes materially to the convenience with which the working or operative jib sheet may be handled.

By having the upper pulleys **96**–**96***a* (FIGS. 6 and 7) and the lower pulleys **98**–**98***a* positioned in proximity to

the axis of the mast **12**, the lateral shifting of the mainsail boom **32** results in no appreciable movement of the working or operating jib sheet, such as in the case with the operative main sheet **88**, shown in FIG. 3. In other words, the mainsail boom may be subjected to lateral displacement or adjustment without altering, to any substantial degree, the preset relationship of the jib with respect to the mainsail. Once the jib is set with relationship to the mainsail when the wind is from any direction on one side of the boat between the bow and the stern, it need not be changed until the boat comes about and the wind is from any direction on the other side of the boat. This is to be contrasted with present day conventional rigging wherein any change in the lateral adjustment of the mainsail boom with respect to the wind direction requires an additional corresponding adjustment of the jib.

The specific structural features disclosed and described herein are representative of one embodiment of the invention. However, it should be understood that other modifications and changes are contemplated without departing from the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A sailing rig including a mast, a mainsail, a jib, a mainsail halyard, means associated with the upper portion of said mast for receiving and guiding the mainsail halyard, a jib halyard, means for guiding the jib halyard, a substantially horizontal mainsail boom, said boom being swivelly coupled with the lower portion of said mast, a section comprising a forward extension of the boom which is fixedly secured to the boom, jib tack accommodating means laterally shiftable as an incident to the movement of said forward extension, means operable independently of said boom and forward extension for securing said jib tack accommodating means against unauthorized upward displacement, jib sheet means connected at one extremity with the clew of said jib, means for securing the free extremity of a jib sheet in a fixed position to maintain the setting of the jib, and a mainsail sheet connected with the main boom.

2. A sailing rig as set forth in claim **1**, wherein the jib tack accommodating means comprises a jib boom structure, the forward extremity of which is connectable with the jib tack and is laterally shiftable, and the after extremity of which is secured against lateral displacement.

3. A sailing rig as set forth in claim **2**, wherein the after extremity of the jib boom structure is pivotally supported.

4. A sailing rig as set forth in claim **2**, wherein abutment means is provided in association with the forward extension of the mainsail boom to limit the extent to which the forward extremity of the jib boom structure may be shifted laterally beyond a vertical plane coincident with the mainsail boom axis.

5. A sailing rig as set forth in claim **1**, wherein jib sheet guiding means is provided for directing the jib sheets from the jib clew to an area which proximates the vertical mast axis thereby nullifying any substantial longitudinal shifting of said jib sheets when the mainsail boom is shifted laterally.

6. A sailing rig as set forth in claim **5**, wherein the jib sheet directing means proximating the mast axis includes vertically spaced rotary guides mounted adjacent said mast.

7. A sailing rig as set forth in claim **5**, wherein frame means is associated and movable as a unit with said boom, and jib sheet guiding members are supported by said frame means to receive said jib sheets directly from the jib clew at points intermediate said jib clew, and points proximating the mast axis.

8. A sailing rig as set forth in claim **2** wherein means is provided for pivotally supporting the jib boom structure forwardly of the mast axis.

9. A sailing rig as set forth in claim **5**, wherein the jib sheets traverse each other athwart ship whereby to enable

the trimming and the setting of the jib from the windward side of a vessel equipped with said sailing rig.

10. A sailing rig as set forth in claim **7**, wherein the frame means includes a section in the nature of a cross arm structure which traverses the boom and is secured in a fixed position thereto.

11. A sailing rig as set forth in claim **1** including sail track means for accommodating slides carried by the luff of the mainsail, and means for coupling said track means to the mast so as to permit lateral shifting of said track means with respect to the mast periphery.

References Cited

UNITED STATES PATENTS

2,106,209	1/1938	Edge	114—39
2,147,501	2/1939	Ryder	114—102
3,205,849	9/1965	Thorndike	114—102

MILTON BUCHLER, *Primary Examiner.*

T. M. BLIX, *Assistant Examiner.*