

Jan. 25, 1938.

C. N. EDGE

2,106,209

SAILBOAT

Filed Sept. 7, 1935

2 Sheets-Sheet 1

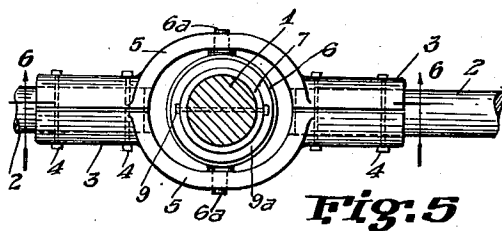


Fig. 5

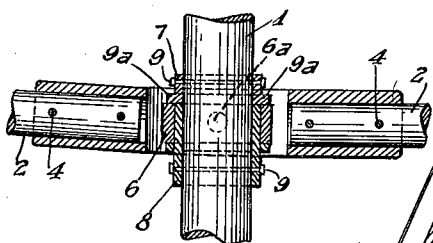
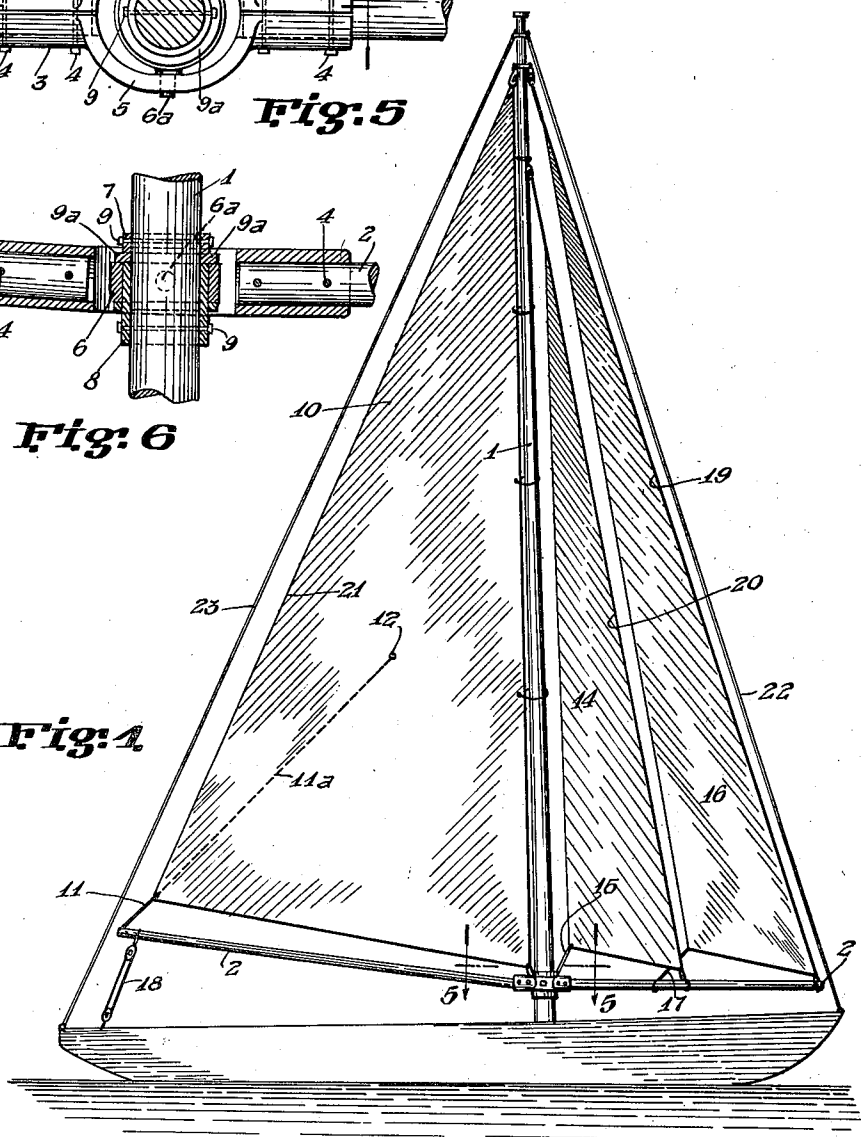


Fig. 6

Fig. 1



INVENTOR.

Charles Noel Edge

BY

W. K. Blum

ATTORNEYS

Jan. 25, 1938.

C. N. EDGE

2,106,209

SAILBOAT

Filed Sept. 7, 1935

2 Sheets-Sheet 2

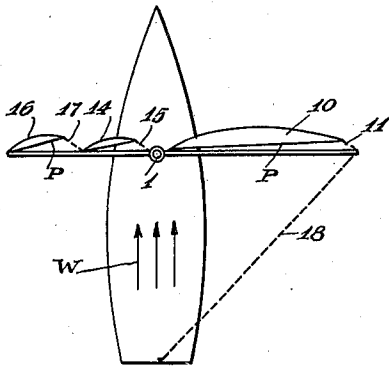


Fig. 3

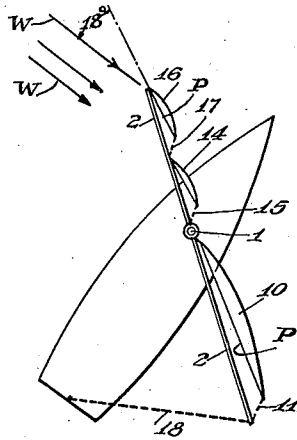


Fig. 4

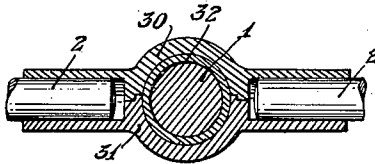


Fig. 7

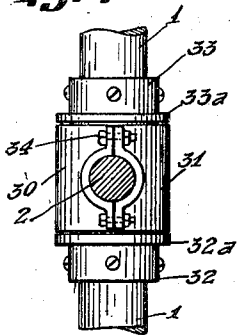


Fig. 9

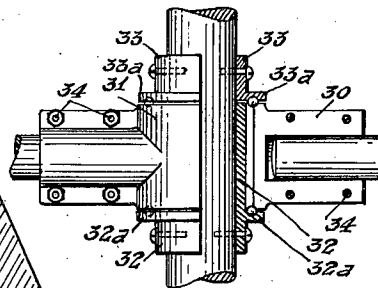


Fig. 8

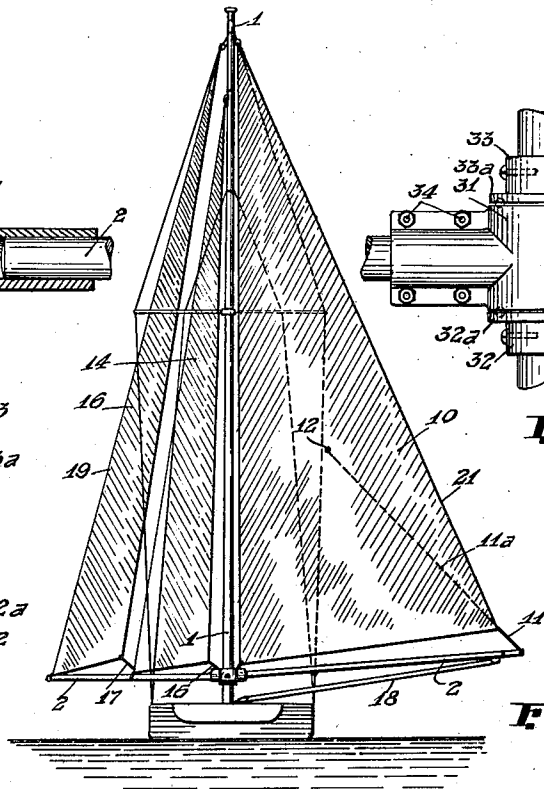


Fig. 2

INVENTOR.
Charles Noel Edge
BY *Rock Blum*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,106,209

SAILBOAT

Charles Noel Edge, Parsonage Point, Rye, N. Y.

Application September 7, 1935, Serial No. 39,514

4 Claims. (Cl. 114—39)

My invention relates to a new and improved sailboat.

One of the objects of my invention is to provide a new apparatus for, and a new method of, setting and trimming the sails of a "fore and aft" rigged yacht, or other sailing vessel, by means of a continuous boom, which may be designated as a continuous axial boom. This boom runs forward and aft of the mast of the yacht, and said boom has an axial bearing in or near its center of length about the mast of the yacht, whereby said boom may be swung in a horizontal plane through an angle of approximately 180°, having the mast as the axis of turning.

The improved method and rigging can be used on a yacht or other sailing vessel having one or more headsails or on the foremast of a schooner, or on the mainmast of a stay-sail schooner.

The improved method may be used on a yacht whose sail plan extends beyond the stem or stern of the hull, by fitting a bowsprit and boomkin, in order to carry the fore and after stays clear of the continuous axial boom.

Another object of my invention is to provide an improved method whereby the sails can be set correctly for any angle of the wind relative to the axis of the hull, and said sails will then be set correctly for all angles of the wind relative to the axis of the hull.

Another object of my invention is to provide an improved method for maintaining the sails, and more particularly, triangular sails, in proper curvature, so as to maintain the proper aer-foil shape.

Another object of my invention is to maintain the sails at the angle of highest efficiency relative to the angle of the wind, irrespective of the angle of the wind to the direction of the axis of the hull.

Another object of my invention is to provide a method whereby the arch of the sails is constant at all angles of the wind relative to the axis of the hull.

Another object of my invention is to provide a constant slot between the main sail and the sail immediately fore of the main sail, such as the jib, so that the flow of air is continuous and unbroken.

Other objects of my invention will be set forth in the following description and drawings which illustrate a preferred embodiment thereof, it being understood that the above statement of the objects of my invention is intended to generally explain the same without limiting it in any manner.

Fig. 1 is a diagrammatic side elevation showing the improved rigging. In this position the boom is set to the proper position when the vessel is close-hauled on the wind.

Fig. 2 is an end elevation of Fig. 1, taken at the stern of the yacht. In this position the boom is shown in the proper position when the vessel is running off the wind.

Fig. 3 is a diagrammatic plan view which corresponds to Fig. 2.

Fig. 4 illustrates another position of the boom, corresponding to a different angle between the direction of the wind and the direction of movement of the boat.

Fig. 5 is a sectional view on the line 5—5 of Fig. 1.

Fig. 6 is a sectional view on the line 6—6 of Fig. 5.

Fig. 7 is a view similar to Fig. 5, showing a modification thereof.

Fig. 8 is an elevation, partially in section, of Fig. 7.

Fig. 9 is an end view of Fig. 8.

The invention relates particularly to a yacht of the sloop type, but it is not restricted to any particular type of sailing vessel.

In a fore and aft rigged yacht, the driving force which acts along the axis of the boat, due to the pressure on the sails, is approximately one-third due to the push of the wind on the windward side of the sails, and two-thirds due to the suction of the wind on the leeward side of the sails.

The suction of the wind on the leeward side of the sails depends almost wholly upon the proper curvature of the sails, and the lack of wind eddies which is secured by the proper formation and arching or curvature of the sails. The shape of sail which produces the maximum efficiency may be designated as the aer-foil shape. This aer-foil shape permits the wind to exert its suction effect, while the wind has a smooth flow around the sail, without the formation of any air eddies.

In sailing a vessel, it is therefore more important to consider the surface of the sails on the leeward side, than the surface of the sails on the windward side.

Experience has shown that the suction on the sails, when the planes of said arched sails have an angle of incidence of 18° to the wind, is nearly twice the suction than when said angle of incidence is 30°. It is therefore of the highest importance to devise means for keeping the effective planes of the sails at this angle of incidence to

the wind of substantially 18°, irrespective of the direction of movement of the boat.

The preferred method of securing this desirable result is diagrammatically illustrated in Fig.

1. This shows a mast 1 which may be of any conventional type. An axial boom 2 is turnably mounted relative to the mast 1, which is fixed to the hull in any suitable manner.

- In order to provide a suitable bearing for the axial boom 2, said boom may be made in two sections, fore and aft of the mast, as illustrated in detail in Figs. 5 and 6.

- The sections of the boom 2, are held in sleeves 3 of a bearing member. Bolts 4 may pass through the sections of the boom 2 and through the sleeves 3. In order to eliminate the necessity of piercing the sections of the boom 2, to the sleeves of the bearing member, said sleeves may be partially split sleeves, which can be tightened by means of external tightening bands of the well known type, so as to secure a powerful frictional grip between the bearing member and the sections of the boom. Any suitable method may be employed for tightly connecting the sections of the boom to the sleeves of the bearing member.

The sleeve 5 is of general annular shape and it is preferably integral with the sleeves 3. The sleeve 5 may be made of any suitable metal.

- As shown in Figs. 5 and 6, the sleeve 5 has holes through which pass pivot pins 6a which are integral with a ring 6. The ring 6 is held between collars 8 and 9a, which are provided with annular shoulder flanges, and which may be connected to the mast by bolts 9. If desired the collars 8 and 9a could be of split-sleeve formation, which could be clamped to the mast 1 by means of bolts or the like passing through ears of said split sleeves, so as to eliminate the necessity of piercing the mast.

- While I have diagrammatically shown a bearing for the axial boom, any suitable means can be used for turnably mounting the boom relative to the mast. The boom is preferably maintained in a plane which is fixed relative to the mast, while the boom turns, but this plane may be varied and I do not wish to be limited to this and to other details of the invention.

- The mainsail 10 is mounted on the mast in the usual manner and this mainsail is connected to the boom 2, by the foot out haul 11. This mainsheet 11 is connected so that its line of direction passes through a point of the triangular mainsail and also through the point 12, which is the center of pressure of the foot out haul 11. This is indicated diagrammatically by the broken line 11a.

- The foresail 14 is also connected to the boom by means of the foresheet 15. Said foresheet 15 is also preferably connected to a corner of the triangular foresail and it is aligned with the center of pressure of the foresail so that the line of direction of said foresheet 15 passes through the center of pressure of the foresail 14.

- The jib 16 is connected to the boom by means of the jib sheet 17, in the manner previously described, so that the jibsheet 17 is connected to a corner of the triangular jib 16, and the line of direction of jibsheet 17 passes through the centre of pressure of jib 16.

- The main sheet 18 is utilized for adjusting the angle of the boom, relative to the longitudinal axis of the hull. This main sheet 18 may be provided with pulleys and the like so as to increase the leverage of the pull which is exerted upon said master sheet. However, it is one of the great advantages of my invention that the boom can be adjusted with little or no force because it may

be mounted so that the force exerted on the boom is equal or substantially equal, fore and aft of the mast. However, and for purposes of safety, the pull on the boom is greater aft of the mast than fore of the mast, so that a pull is always exerted upon the mainsheet. The pull on the boom, aft of the mast, may be sixty per cent of the total pressure.

The jibstay 19 is connected to the forward end of the boom and it is also connected to the masthead. The forestay 20 is connected to the boom approximately midway from the mast to the forward end of the boom.

The forestay 20 is connected to the mast in the usual manner. This stay may be omitted so that an alternative "Genoa" jib may be used.

The mainstay 21 is connected to the after end of the boom, and to the masthead. The headstay 22 is connected to the stem head of the boom, and to the masthead. If the forward end of the boom extends forward of the stem of the hull, this stay 22 is connected to a bowsprit of sufficient length to carry this stay clear of the boom. The mainstay 21 and the jib-stay 19 are under tension so that the boom is maintained in any desired plane while the boom turns around the mast.

The jib 16 is bent and hoisted on the jibstay 19 in the usual manner, but it is not connected to the hull.

The jib sheet 17 is adjusted so as to give the jib 16 the proper arch and draft, so as to approximate the aer-foil shape, and the jib 16 remains constantly in this position and configuration through all maneuvers of the yacht, requiring no attention.

The foresail 14 is bent and hoisted on the forestay 20 in the usual manner, but said foresail is not connected to the hull. If the forestay 20 is omitted, the foresail 14 is set flying.

The foresheet 15 can be adjusted so as to give the foresail 14 the proper configuration and draft, and the foresail 14 retains this configuration in all maneuvers of the yacht, requiring no attention.

The mainsail 10 is of the usual loose-footed type, and it is bent and hoisted on the mast in the usual way.

Fig. 1 shows the approximate position of the boom when the yacht is close-hauled on the wind, that is, when the wind is approximately in line with the longitudinal axis of the hull.

As previously stated, the preferred angle of incidence between the wind and the sails is then approximately 18°.

Fig. 2 shows the same yacht, running off the wind, with the boom making an angle of approximately 90° with the longitudinal central axis of the hull, as the rigging is then substantially a square rigging, when the ship is sailing in the same direction as the wind. All the sails can thus be trimmed simultaneously to any point of sailing between the points of sailing illustrated in Fig. 1 and in Fig. 2, by means of the mastersheet 18.

In Figs. 3 and 4, the direction of wind is illustrated by the arrow W. Fig. 4 shows an angle of 18° between the direction of the wind and the effective planes of the sails, indicated by straight lines P, in Fig. 4. Figs. 3 and 4 also show how slots of proper dimensions are constantly maintained between the respective sails so that the air current which impinges upon each sail can flow around the same, without interfering with

the suction effect which is produced on the other sails.

Figs. 7-9 show a metal collar 32 connected to the mast by bolts or clamps and having a shoulder flange 32a. A collar 33 having a shoulder flange 33a is connected to the mast by bolts or clamps. A split sleeve, comprising members 30 and 31 is mounted on anti-friction bearings, between shoulders 32a and 33a. The sleeve members 30 and 31 have lugs through which bolts 34 pass, and when these bolts are tightened, the boom sections are clamped between extensions of sleeve members 30 and 31.

The improved method provides the following advantages:—

1. The sheets of the respective sails can be adjusted when the boom is in the convenient position, substantially parallel to the axis of the hull.

20 Since the boom cannot rise relative to the mast, the proper arch or configuration of each sail can be maintained at all times.

In an ordinary sloop, when the arch of the sail is reduced, by tightening the sheet, the boom rises and no tightening is possible except when sailing very close to the wind and when the boom is directly over the boat and the point of attachment of the sheet. Hence the improved rigging affords maximum efficiency at all times, whereas the ordinary sloop is efficient only when sailing very close to the wind.

2. The use of the wish-bone strut is eliminated, as the triangular sail can be maintained in proper curvature by sheeting the sail to the revolving boom, by a point on the boom which is in direct line with the point of the triangular sail, and also with the center of pressure of the sail.

3. The flow of air between the jib and the mainsail is a continuous flow line, and the wind from the jib is not projected upon the leeward side of the mainsail. The same advantage is secured between any two adjacent sails, thus securing continuous and unbroken air flow.

4. The lower end of the forward jibstay can be moved laterally towards the direction of the wind so that the general plane of the jib can have a very much sharper angle of incidence than the mainsail.

The vertical sail plan of the whole rig then forms a virtual arch, the plane of the jib having a sharper angle of incidence to the mainsail. This also permits a truer slot action, forward of the mainsail, on the leeward side.

5. The yacht may be maneuvered on all points of sailing by one man as all sails are trimmed simultaneously by one sheet.

6. The balance of the fore and after sails allows the yacht to be jibbed under any wind conditions without shock and reduces the strain on the master sheet so that heavy ropes and purchase tackles can be eliminated.

7. When running free, the headsails take the place of the spinnaker, thus eliminating the loss of time and the arduous labor of setting the spinnaker. Likewise, when running free, all sails are jibbed simultaneously in a few seconds, eliminating loss of way, loss of time, and the labor of resetting the spinnaker.

8. In a squall the release of the master sheet permits the boom to turn in a direction parallel to the direction of the wind, thus reducing danger of capsizing.

9. The yacht cannot be caught in irons.

10. The yacht may be brought to a standstill in practically any position by turning the boom

so that the pressure of the wind is opposed to the direction of movement of the boat, so that it is not necessary to round up to the mooring.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes and omissions can be made without departing from its spirit.

For example, the boom may be mounted turnably on the mast in a very simple manner, by perforating the boom, so that it can be slipped over the mast, which can be supplied with any suitable bearing collar or collars.

Likewise, the boom may be reinforced, if it is made of wood, preferably by connecting tension wires to the boom from one end to the other. These tension wires may be located at the underside of the boom. The boom can be reinforced in any other suitable manner.

As shown in the drawings, the adjacent edges of adjacent sails are permanently spaced in all positions of the boom, with reference to a line which is parallel to the axis of the boom, so as to maintain permanent slots between the sails, and to prevent the wind of a sail from being projected upon the leeward side of the sail which is directly behind the rear edge of said sail.

Since the tops of the sails are directly connected to the mast, the sails can be adjusted by turning the boom alone, said boom is readily accessible and it can be turned by hand.

I claim:

1. A sailing vessel having a mast and also having a boom which is turnable relative to said mast, sails turnably and directly connected to said mast and also connected to the boom fore and aft of the mast, said sails being turnable in unison with the boom around the axis of the mast, said sails being sheeted to the boom, and a main sheet connecting the boom to the hull of the vessel, said sails having arched configurations, said sails having their adjacent edges permanently spaced from each other along a line which is parallel to the longitudinal axis of the boom, in all positions of said boom.

2. A sailing vessel having a mast and also having a boom which is turnable relative to said mast, sails turnably and directly connected to said mast and also connected to the boom fore and aft of the mast, said sails being turnable in unison with the boom around the axis of the mast, said sails being sheeted to the boom, and a main sheet connecting the boom to the hull of the vessel, said sails having arched configurations, said sails having their adjacent edges permanently spaced from each other along a line which is parallel to the longitudinal axis of the boom, in all positions of said boom, the areas of said sails on the boom aft of the mast, being a sufficient proportion of the total sail area so that the pull of the sails aft of the mast is about sixty per cent of the pull of all of said sails.

3. A sailing vessel having a mast and a boom which is turnable around the axis of said mast, sails turnably and directly connected to said mast and also connected to the boom fore and aft of the mast, said sails being turnable in unison with the boom around the axis of said mast, said sails being sheeted to the boom, a main sheet connecting the boom to the hull of the vessel, said sails being triangular and having arched configurations, said sails having their adjacent edges permanently spaced along a line which is parallel to the axis of the boom, in all positions of the boom, the sheets which connect the sails to the boom being connected to the corners of said triangular

sails and being substantially aligned with the centres of pressures of said sails.

4. A sailing vessel having a mast and also having a boom which is turnable around the axis of said mast, sails turnably and directly connected to said mast and also connected to the boom fore and aft of the mast, said sails being turnable in unison with the boom around the axis of the mast, said sails being sheeted to the boom, and
10 a main sheet connecting the boom to the hull of

the vessel, said sails having arched configurations, said sails having their adjacent edges permanently spaced from each other along a line which is parallel to the longitudinal axis of the boom, in all positions of said boom, the adjacent sails being sufficiently spaced so that the wind of each of said sails is not projected upon the leeward side of the sail which is directly behind the first-mentioned sail.

CHARLES NOEL EDGE. 10