Feb. 4, 1964 R. L. MAHAN 3,120,211

SAILING MAST ATTACHMENT

Filed July 12, 1961

Fig. 1

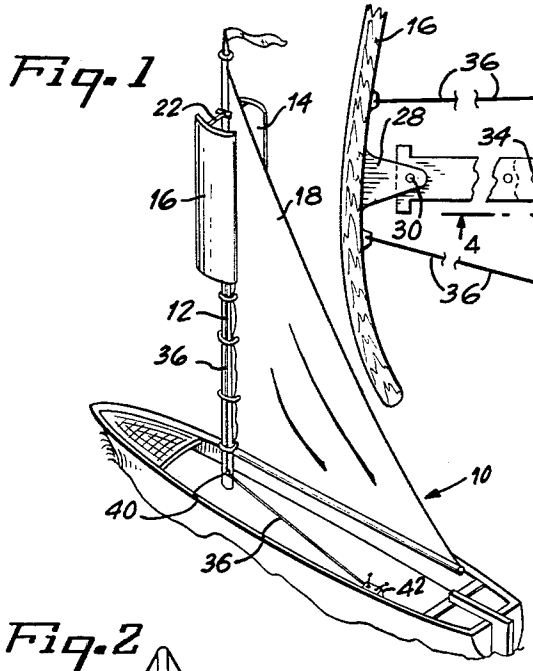


Fig. 3

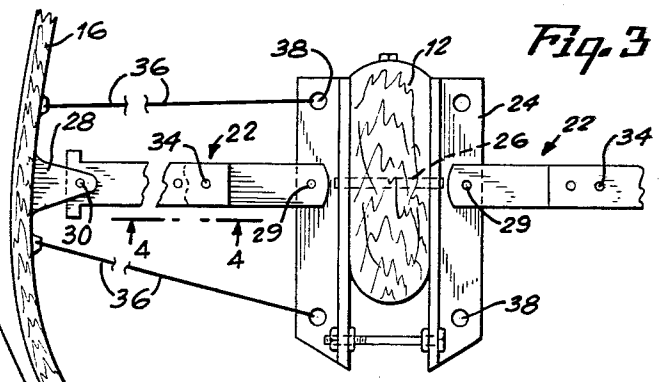


Fig. 4

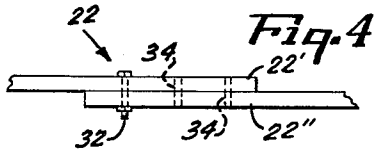


Fig. 2

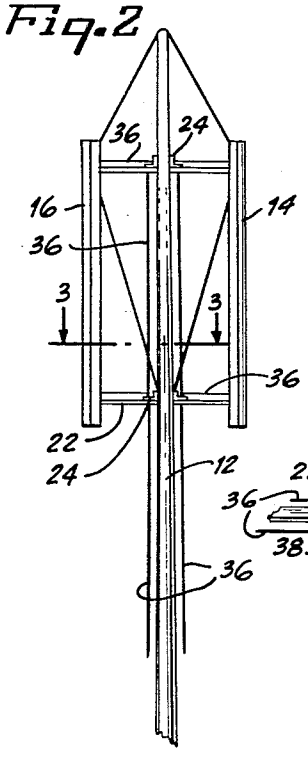
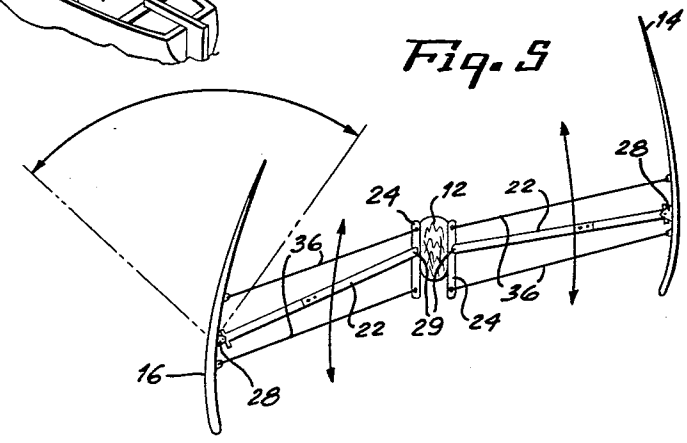


Fig. 5



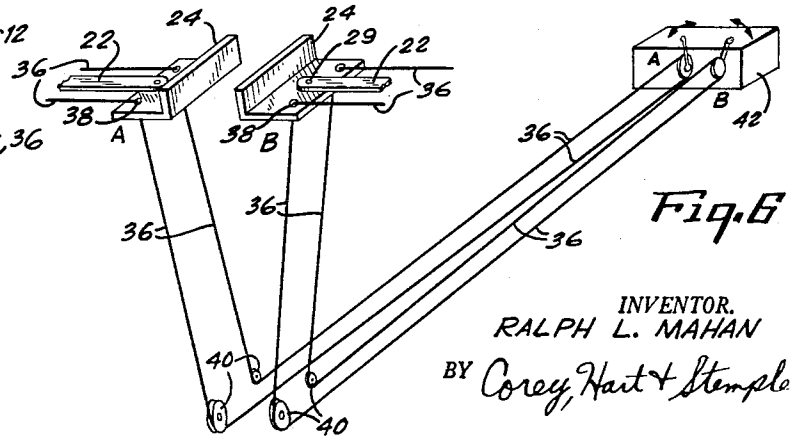


Fig. 6

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3,120,211

Patented Feb. 4, 1964

3,120,211

SAILING MAST ATTACHMENT

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Filed July 12, 1961, Ser. No. 123,557
5 Claims. (Cl. 114—102)

This invention relates to sailing craft and more particularly, to a device to be used in conjunction with a sail for advantageously manipulating the air stream with respect thereto to thereby increase the efficiency of a sailing craft.

Sailing, particularly in small pleasure or racing craft, is both hazardous and difficult even to seasoned pilots because of the vicissitudes of the wind and the cumbersome and even awkward nature of a sail. With such craft, theoretical efficiency must necessarily be sacrificed for the most efficient angles of attack cannot be utilized.

It is therefore amongst the primary objects of the present invention to provide a device to be used in conjunction with a sail for advantageously manipulating the air stream with respect thereto so as to increase the efficiency of a sailing craft.

It is another important object of the present invention to provide a device of the class described which is of simple and inexpensive construction.

It is a further object of the present invention to provide a device of the class described which may be readily controlled from the cockpit of the craft by relatively simple and inexpensive control devices.

It is a more specific object of the present invention to provide a device of the class described which will enable a sailing craft to be pointed more directly into the wind when sailing close hauled and additionally, will increase the speed of the craft.

How these and other objects are accomplished and new results obtained will be apparent from what is described in the following specification, particularly pointed out in the claims, and illustrated in the accompanying drawing wherein:

FIG. 1 is a perspective view of a sailing craft employing a control component in accordance with the present invention,

FIG. 2 is an elevational view of a mast carrying the attachment of FIG. 1,

FIG. 3 is a sectional view of the attachment taken along line 3—3 of FIG. 2, in the direction of the arrows,

FIG. 4 is a side view of a detail of a portion of the mounting for the attachment of the preceding figures, taken along line 4—4 of FIG. 3,

FIG. 5 is a diagrammatic view illustrating the various movements of the vanes, and

FIG. 6 is another diagrammatic view showing the setting mechanism for the vanes.

Referring now to the drawing, a control device in accordance with the present invention is shown herein mounted on a small sailboat designated generally by numeral **10**. As may be seen in FIGS. 1 and 2, the control device herein shown is affixed to the upper portion of mast **12** and generally consists of two curved flaps **14** and **16**, designated herein as vanes, positioned on either side of sail **18** for manipulating and guiding the air stream with respect to said sail.

The vanes shown herein are of fiberglass. However, and as will be apparent, a wide range exists for the choice of the vane material, the method of making the vane and even, to a certain degree, the ultimate shape of the vane.

As may be seen in the drawing, the vanes are positioned to act upon the upper portion of the sail, that being the portion of the sail having a changing angle of attack to the wind and hence, the critical area of the sail.

Although the demensions and position of the vanes will differ depending upon the size and type of craft under consideration, generally speaking the vanes should be about one third of the height of its respective sail in height and about one fifth of the chord of its respective sail in width.

Each vane is maintained in spaced relationship with the mast by an adjustable spreader **22** which is pivotally supported at **29** by mounting plate **24** and which, in turn, is held to the mast by bolts, as **26**. For the type of craft under consideration here wherein the sail is about thirty feet in height, each vane should be spaced about two feet from the sail. Each vane is provided with a bell crank **28** on its innerside so that it may be pivotally mounted at **30** on its respective spreader for reasons hereinafter appearing.

Spreader **22** consists of two separable members, **22'** and **22''**, normally held together in a superposed state by bolt **32**. Each of said members has a series of bolt receiving bores **34** formed therein for alignment with the bolt receiving bores of its opposite number. If it is desired to bring the vane closer to the sail, spreader components **22'** and **22''** are unbolted, retracted with respect to each other and then bolted together again. If it is desired to increase the distance between vane and sail, the above procedure is reversed.

Each vane may be easily set in position with respect to the sail, or have its setting changed, by means of an elongate loop of cable **36**, which is held taut, and whose ends are fastened to the vane on either side of bell crank **28** for reasons hereinafter appearing. The cable extends to the cockpit of the vessel passing through apertures **38** formed in mounting plate **24** on its way thereto. It may be seen that the two arms of the elongate loop turn about pulleys **40** at the base of the mast where they angularly leave the mast for the cockpit of the vessel. A control box **42** is provided in the cockpit by means of which one or the other of the elongate cable arms may be drawn upon for effecting changes in the position of said vane. Suitable means are provided for locking the cable in place once the desired setting has been obtained. The cable ends may be split so that the cable extends to both the upper and lower portions of the vane and each vane may be provided with upper and lower spreaders and mounting plates, as is shown in FIG. 2.

It will be realized that the above arrangement permits the vane to be pivoted about spreader **22** and additionally, permits spreader **22** to be pivoted about the mast. Hence, a wide variety of settings is made possible by the above described arrangement. The various movements of the vane are illustrated in FIG. 5. It will be noted that in the embodiment described herein, each vane is controlled independently of the other which, of course, need not be the case.

It will be realized that by reason of the air stream guides or controls of the present invention, a sailing craft may be sailed closer to the wind than heretofore possible, thus making the craft a more efficient vessel. With a conventional sailing craft not having means for guiding the air stream, a stalling or luffing condition is created when the craft is brought too close to the wind. This is due to the formation of a dead air pocket around the portion of the sail adjacent the mast because of the interference of the mast with the air stream. By positioning an air stream guide, as described herein, on the windward side of the sail and adjusting the same to create a positive pressure distribution, the dead air pocket is eliminated thereby permitting the craft to sail very close to the wind without stalling. A vane on the leeward side of the sail is provided to reduce air turbulence and increase laminar flow and negative pressure distribution.

It is to be understood that the invention is not confined

to the particular use or form herein shown, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit thereof and therefore, the right is broadly claimed to employ all equivalent instrumentalities coming within the scope of the appended claims and by means of which the objects of the invention are attained and new results accomplished, as it should be apparent that the particular embodiment herein shown and described is only one of the many that can be employed to attain these objects and accomplish these results.

I claim:

1. An air control device for craft having a sail comprising a rigid vane concave along its horizontal section toward said sail, said vane movably mounted adjacent to and in spaced relationship to said sail, and means for moving said vane independently of said sail through generally vertical planes to a desired fixed position to redirect wind to a stronger driving direction relative to said sail.

2. An air control device for craft having a sail, boom and mast comprising a rigid vane concave along its horizontal section toward said sail, said vane movably mounted adjacent to and in spaced relationship to said sail, said vane ending substantially above and not being connected to said boom, and means for moving said vane independently of said sail through generally vertical planes to a desired position to redirect wind to a stronger driving direction relative to said sail.

3. The device of claim 2 wherein two said vanes are provided, one on each side of said sail.

4. The device of claim 2 wherein said vane is pivotally mounted to said mast to be movable in a circular path around said mast.

5. The device of claim 4 that additionally comprises control means for effecting said movements.

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