

[54] SAIL FURLING

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[51] Int. Cl. B63h 9/04
[58] Field of Search 114/90, 102, 104-107,
114/112

[56]

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[57] ABSTRACT

In a sailboat having a mast, a boom, and a sail furlable upon an upright wind-up member such as a rotatable cable to which the luff of the sail is affixed, the improvement wherein the mast comprises a rigid shell providing a vertically disposed interior chamber having an extended vertical opening therein facing aft the wind-up member being disposed within the chamber and the edges of the opening furnishing lengthwise support to the luff of the sail at all boom positions.

6 Claims, 4 Drawing Figures

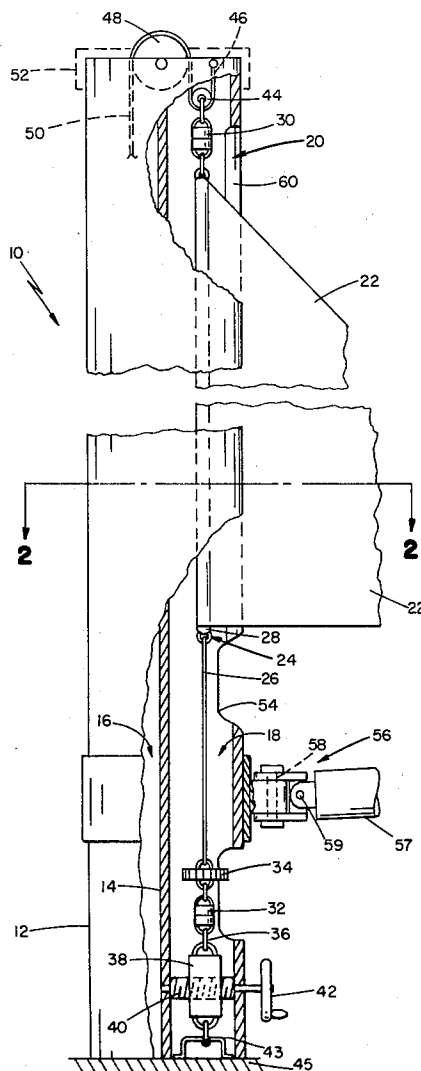


FIG 1

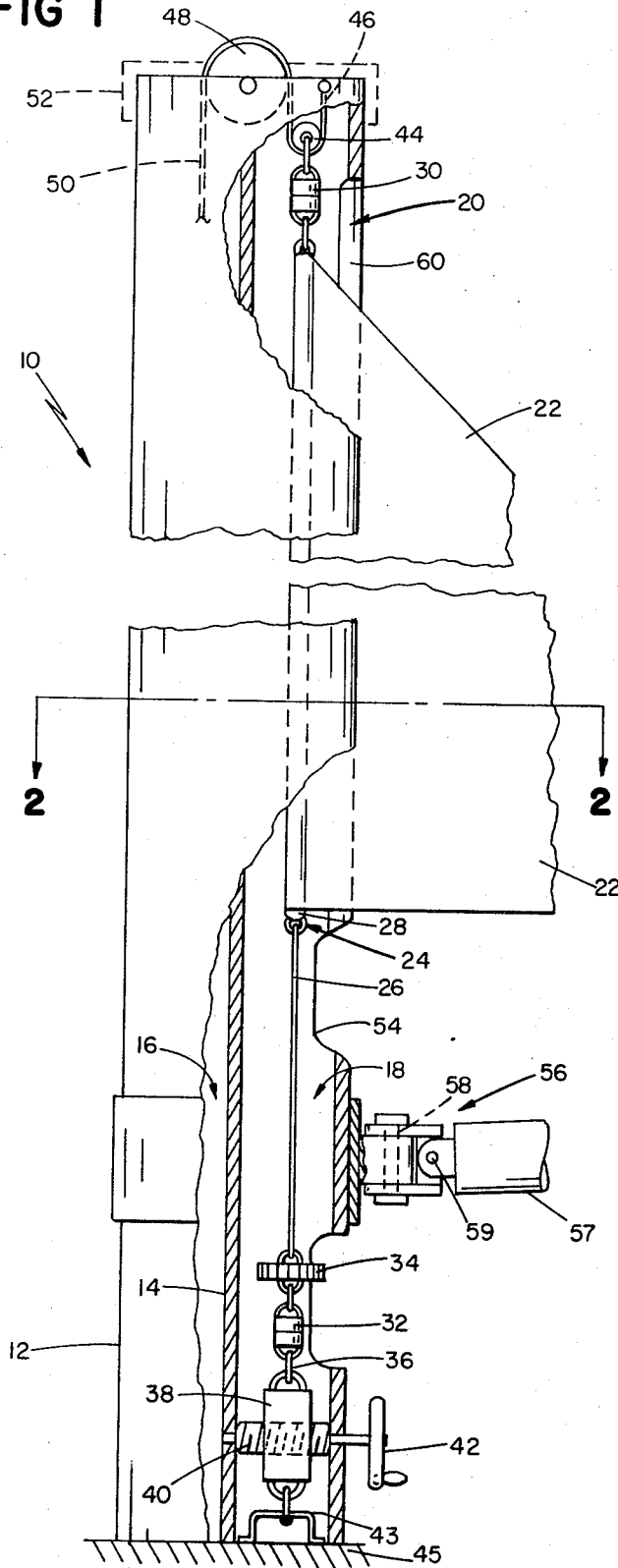


FIG 2

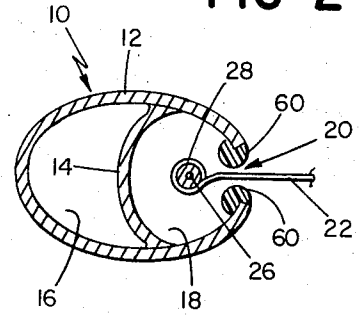


FIG 3a

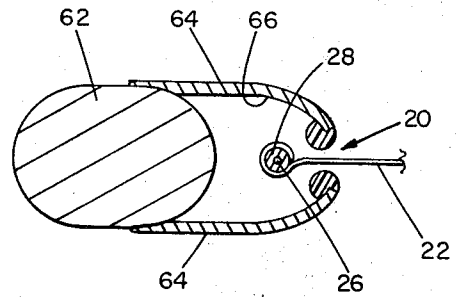
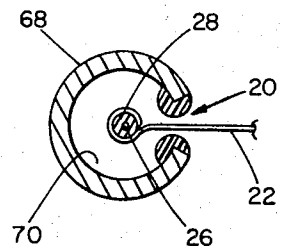


FIG 3b



SAIL FURLING

BACKGROUND OF THE INVENTION

The invention relates to sailboats and is concerned more particularly with improvements in sailboats having roller furling sails.

Roller-furling sails, set aft of the mast, have various advantages. A serious disadvantage of such an arrangement, however, is the slackening of the cable or other rotatable element to which the luff of the sail is made fast when the mast bends to the wind thus interfering with proper set of the sail which loses efficiency and, if the sail is sheeted in too tight, its drive can be made negative. This sagging to leeward also alters airflow between sails in multi-sail vessels thereby further reducing over-all efficiency.

It is a principal object of the present invention to provide a sailboat construction having a roller-furlable main sail but avoiding the above-mentioned difficulties.

SUMMARY OF THE INVENTION

In accordance with the invention there is provided in a sailboat having a mast, a boom pivoted thereto, a sail adapted to be trimmed by the boom, a rotatable wind-up member, such as a rod or cable, associated with the mast and to which the luff of the sail is made fast and on which the sail may be furled and unfurled by appropriate rotation thereof as the sail is hauled out along the boom or retracted, the following improvement: the mast is provided with a longitudinally extending aft-facing slotted recess within which said wind-up member is rotatably housed, the recess conveniently acting as a protective container for the furled sail. The sail is hauled out and retracted through this slot and the walls of the slot support the luff of the sail and the wind-up member when the mast bends under wind-stress on the sail to prevent sagging thereof as would be the case without such support. The slotted opening has a cross-wise dimension which is less than that of the wind-up member with luff attached to prevent withdrawal thereof through the opening under stress on the sail and the edges of the slotted opening are non-fraying and shaped to retain the sail in proper set position whether fully extended or reefed and at all swung positions of the boom and flexed positions of the mast under wind load. The recess may be formed integrally with the mast structure or may be provided by attaching auxiliary members to a conventional mast.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features and advantages will appear from the following description of a preferred embodiment of the invention as illustrated in the accompanying drawings. In the drawings:

FIG. 1 is a partially broken away, fragmentary side elevation of a sailboat mast which includes the features of the present invention;

FIG. 2 is a view taken on line 2—2 of FIG. 1; and

FIGS. 3A and 3B are views similar to FIG. 2 of alternative mast constructions.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIGS. 1 and 2, there is shown a mast 10 comprising a generally oval outer shell 12 and an internal reinforcing web 14, which vertically divides the

mast's interior into fore and aft chambers 16 and 18, respectively. The chamber 18 has a vertically disposed slot 20 in its aft portion permitting sail 22 to enter chamber 18 where the luff is attached to vertically disposed wind-up member 24 comprising a luff cable 26 and optional sheath 28 therearound. The diameter of sheath 28 is chosen to be larger than the width of slot 20.

The luff cable 26 extends between upper and lower swivels 30 and 32, respectively. A pinion 34 is mounted on the cable 26 above the lower swivel 32. A shackle 36 joins the swivel 32 to block 38. The block 38 is mounted on horizontal worm 40 so that the fore and aft position of the block 38 may be set rotation of hand wheel 42 which drives worm 40. The block 38 is anchored to ring 43 attached to a portion 45 of the vessel. The ring 43 has a flat open portion so that to permit fore and aft movement of the block. Alternatively the hold down for the block may be omitted entirely and hold the strain down by the journals which support worm 40.

The upper portion of upper swivel 30 is attached to pulley 44. Halyard 46 is made fast at the mast head as shown and extends around pulley 44, then up over sheave 48 and down again (either inside or outside of the mast) as at 50. A conventional mast cap 52, carrying the other needed mast head fittings, may be provided.

Near the lower end of the mast 10 a hand hole 54, which communicates with chamber 18, is provided for access to remove the fittings from within the mast. Adjacent hand hole 54 the gooseneck 56, furnishing hinged attachment of the boom to the mast and which includes the first gooseneck pin 58 and pivot 59, is attached to the mast.

The lips of slot 20 are smooth to avoid damaging the sail 22. As an additional precaution, a non-abrasive cushioning material 60 (FIG. 2) may cover the lips.

In operation, the sail 22 may be furled upon the elongated rotatable member 24 by such an expedient as driving the pinion 34 by any suitable means. The furled sail is thus stored within the chamber 18 of the mast 10. Upon unfurling and setting the sail 22 for use, the luff remains captured within the chamber 18 and is supported by the walls thereof against sagging if the mast bends or flexes because of wind pressure on the sail since the luff cable and the sheath 28 cannot pass through the slot 20. It is thus clear that with the construction described the luff of the sail is prevented for sagging off as the mast bends to leeward, thereby maintaining the sail's efficiency and reducing interference with the airflow between sails in a multiple sail boat. The set of the sail remains substantially constant at all reefed positions and all swung positions of the boom by reason of the engagement of the slot edges with the sail holding the luff at a position very close to the vertical axis about which the boom swings defined by the pin 58. Because of this, effects on the trim of the sail of swinging of the boom to different positions is minimized. Adjustment fore and aft of the bottom end of the wind-up member 24 by mechanism 40, 42 also helps the sailor trim the sail to optimum set for any given condition of wind velocity, reef and swung boom position.

From the foregoing description, it will be apparent to those skilled in the art that numerous mast configurations are adaptable to provide the benefits of the pres-

ent invention. As examples, two such configurations are illustrated in the sectional views of FIGS. 3A and 3B. In FIG. 3A a conventional solid mast 62 has been provided with a vertical slotted chamber 66 by means of extra shell 64 affixed thereto and extending aft to accommodate the luff cable 26 and sheath 28. In FIG. 3B a hollow mast 68 of circular cross section and a single interior chamber 70 is shown. With appropriate materials and the stronger circular cross sectional shape, it is then possible to avoid the requirement of an internal reinforcing web within the mast as in FIG. 2.

Other embodiments of this invention will occur to those skilled in the art and that fall within the scope of the following claims.

I claim:

1. In a sailboat having a conventional stayed mast which in use is essentially stationary, vertical and stepped on the center line of the boat, a sail, a rotatable wind-up member supported by the mast and to which the luff of the sail is made fast and on which the sail may be furled and unfurled by appropriate rotation thereof as the sail is hauled out or retracted, the improvement wherein
said wind-up member is flexible,
the mast is provided with a longitudinally extending aft-facing slotted recess within which said wind-up member is housed and through the opening of which the sail is hauled out and retracted, said

wind-up member with said luff attached having a diameter greater than the width of said opening so as to be held therein by engagement with the edges of said opening, the walls of said recess providing support for said wind-up member to keep it in contact with the mast during bending or flexing of the mast under wind pressure on the sail and said sail engaging an edge of said slotted recess at all settings thereof.

2. The combination of claim 1 wherein the edges of said opening are smooth and non-fraying and shaped to retain the sail in proper set position, whether fully extended or reefed, at all swung positions of the sailboat with respect to the wind and flexed positions of the mast under wind load.

3. The combination of claim 1 wherein said slotted recess acts as a protective container for the sail when furled.

4. The combination of claim 2 wherein said slotted recess is formed integrally with the mast structure.

5. The combination of claim 1 wherein said slotted recess is provided by auxiliary members attached to a conventional mast.

6. The combination of claim 1 including means to adjust the position of the lower end of said wind-up member in a fore and aft direction.

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