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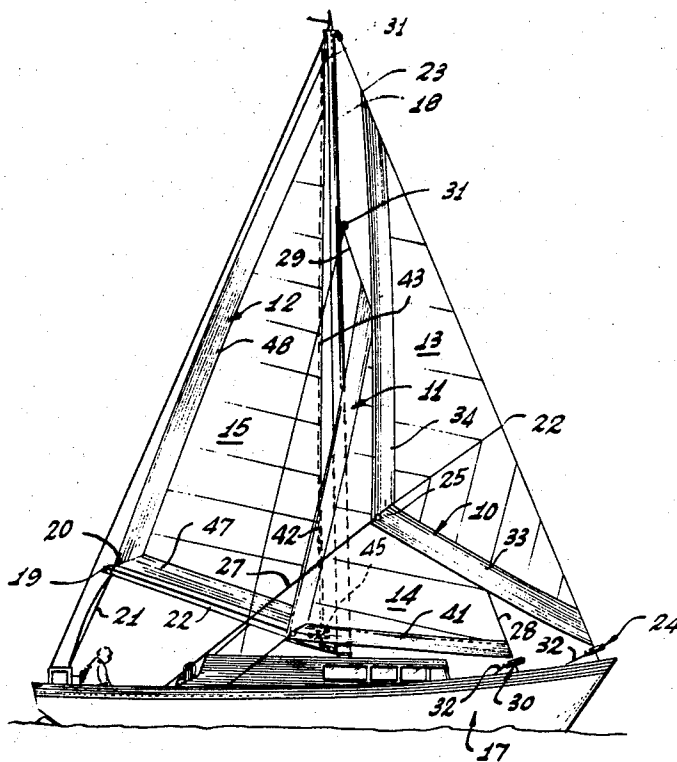
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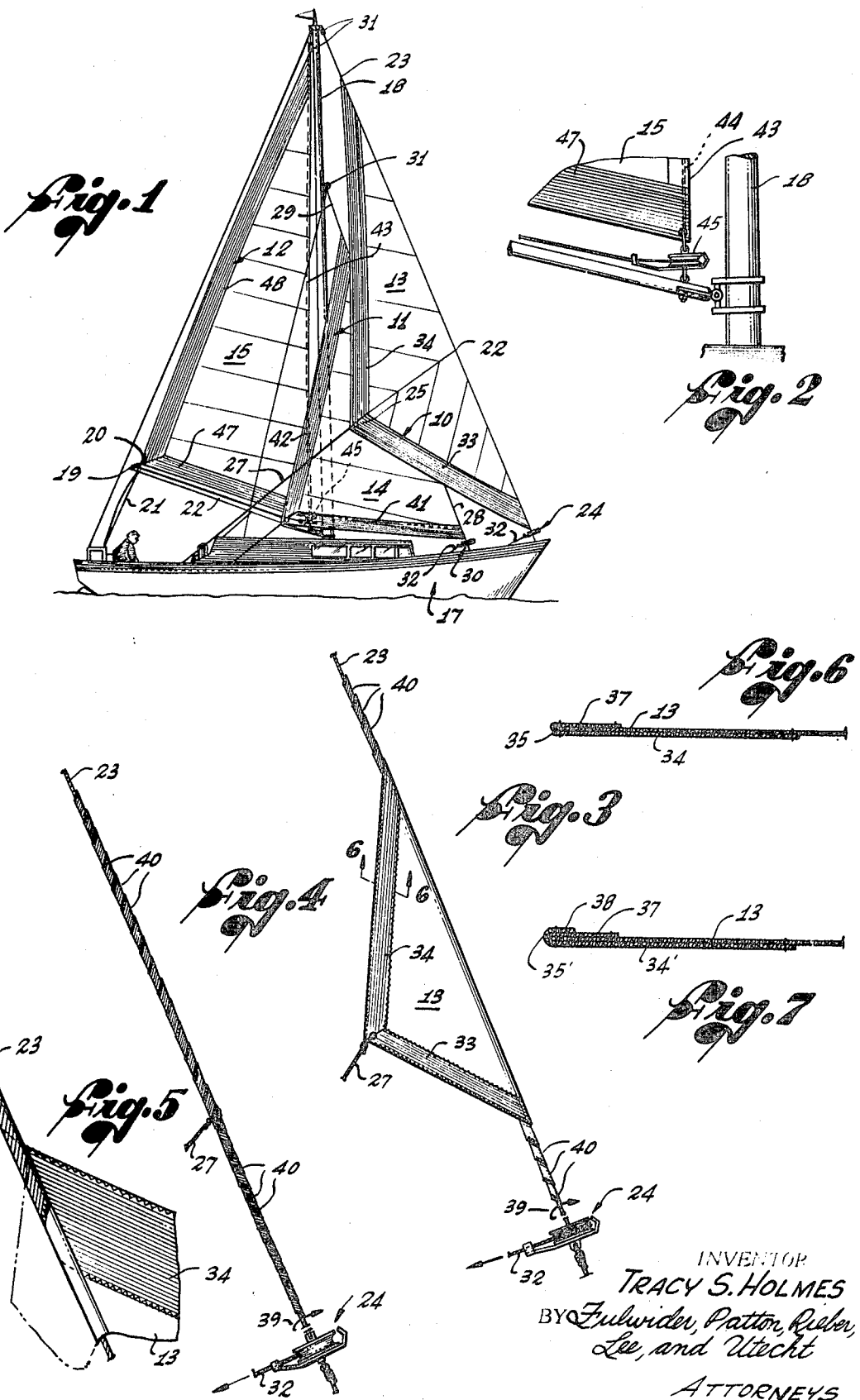
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[54] **SAIL COVER**
 11 Claims, 7 Drawing Figs.

[52] U.S. Cl. 114/107
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 102-107

ABSTRACT: A sailboat having a plurality of triangular sails each provided with an integrated sail cover in the form of two elongated strips of weather-resistant cover material attached to the foot and the leech of the sail to overlie the exposed portions thereof between successive convolutions of the associated edges when the sail is furled in a conventional manner on a rotatable supporting element such as a luff wire extending along and secured to one edge thereof.





SAIL COVER

BACKGROUND OF THE INVENTION

This invention relates generally to a cover for one or more sails of a sailboat, and has particular reference to a cover for a sail that is to be mounted on the sailboat to be rolled up, or furled, about a rotatable supporting element extending along one of its side edges, for protected storage when the sail is not in use.

It is important that sails be protected when not in use because of the deleterious effects on the sail material of sun, salt water and dirt, and of exposure to wind and rain, particularly over prolonged periods of time. This is true whether the sails are composed of the traditional "canvas" i.e., special grades of finely woven Egyptian cotton, or one of the more recently introduced synthetic materials. Of these, Dacron has been, and is, widely used, and both nylon and Orlon have been tried.

Regardless of the material chosen, accepted practice dictates that the sails be furled and covered when the boat is left unattended under circumstances in which it is not practical or convenient to unbend the sails and stow them in storage bags. Typically, a large mainsail is lowered along the mast and lapped or folded on itself on top of the generally horizontal boom extending rearwardly from the mast, and then is rolled tightly and tied to the boom, and a sail cover is placed around the boom and the sail to enclose the latter securely against the entry of sun and moisture.

To protect a jib which is supported along its forward edge (luff) by a wire or rope extending from the front lower corner (tack) upwardly to the mast, the same general procedure may be used, but it has become common practice to furl the sail on the luff wire or rope by rotating the latter about its longitudinal axis, thereby wrapping the jib about its luff into a tight roll. Then a tubular or sheathlike sail cover can be hoisted along the luff wire in telescoped relation with the furled sail and secured in place thereon.

Needless to say, either of these procedures is time consuming, regardless of the type of sail with which it is used. Although time and effort are saved by furling a jib on its luff wire, the positioning and securing of the cover on the furled jib can be a troublesome task.

SUMMARY OF THE INVENTION

The present invention resides in a novel said cover that is permanently mounted on the sail itself, along at least one side edge portion of the sail but of sufficiently small area to have negligible effect on the function of the sail, and which completely covers the sail when it is furled about a rotatable supporting element along one of its side edges. More specifically, the cover comprises at least one elongated strip of weather-resistant sail cover material that is disposed on one side of the sail in overlying relation with a narrow band of the sail constituting a side edge portion thereof disposed at an acute angle with the edge about which the sail is to be furled. Since this side edge portion is wrapped helically about the sail in the furled condition, with adjacent convolutions of a helix spaced according to the angle of the edge with the supporting element, the sail cover need only be as wide as this spacing to cover the furled sail, a small overlap being provided to accommodate variations that may be expected to occur in furling and to insure tight sealing between successive convolutions of the cover strip.

Ordinarily, the sail to be covered will have two side edges, the foot and the leech, disposed at acute angles with the luff edge about which the sail typically will be furled, and both the foot and the leech wrap helically toward an intermediate point during furling. Accordingly, two cover strips are applied to this type of sail, and have selected widths that are correlated with the angles of the associated edges to provide a complete cover for the furled sail. Each strip may be disposed entirely on one side of the sail, but preferably bends around the edge

and has a small overlap on the opposite side for protection of the edge as well as the exposed side of the furled sail. Stitching is the preferred means of attachment.

Other objects and advantages of the invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a sailboat equipped with sails having sail covers embodying the novel features of the present invention;

FIG. 2 is an enlarged fragmentary elevational view of part of FIG. 1 showing a manner of support of the mainsail at the base of the mast;

FIG. 3 is a side elevation of the jib and its supporting elements, showing the jib partially furled on a luff wire;

FIG. 4 is a view similar to FIG. 3 showing the jib completely furled and covered.

FIG. 5 is an enlarged fragmentary view taken from the rear of FIG. 3 adjacent the upper end of the jib therein and partially broken away for clarity of illustration;

FIG. 6 is an enlarged fragmentary cross-sectional view taken along the line 6-6 of FIG. 3 and showing one manner of application of a sail cover strip; and

FIG. 7 is an enlarged view similar to FIG. 6 showing an alternative manner of application.

DETAILED DESCRIPTION

As shown in the drawings, the invention is embodied in three sail covers 10, 11 and 12 of similar construction applied to a jib 13, a staysail 14 and a mainsail 15 of a sailboat 17 of the cutter type, all three sails being supported from a single mast 18. The mainsail 15 is triangular in shape, being secured at its upper end or head to the upper end of the mast, and is shown as loose footed, that is, its lower edge or foot hangs loose and is controlled by a line 19 fastened to the clew 20 and pulled out by a line 21 attached to the free trailing end of a boom 22 projecting rearwardly from the lower end portion of the mast.

The jib 13 also is triangular and has its leading edge or luff 22 secured to a supporting element 23, which may be a wire, a rope or a rod, hereafter called the "luff wire," extending from the upper end of the mast to a connection 24 adjacent the bow of the boat, and its trailing corner or clew 25 is connected to a line 27 or "sheet" with which the angle of the jib in relation to the wind is controlled. Similarly, the staysail 14 is triangular and has its luff 28 secured to a luff wire 29 inclined downwardly and forwardly, generally parallel to the luff wire 23 of the jib, from an intermediate point along the mast to a connection 30 on the deck behind the lower jib connection 24. Another line or sheet 27 is connected to the clew of this sail.

It is to be understood that this particular rigging is shown only for purposes of illustration, and that the invention is applicable to various types of sails, being usable on one or more of the sails that may be found on any given sailboat. Moreover, the invention has been designed particularly for use with jibs and the like that often are equipped with furling gear for conventional purposes, but is usable with different types of sails after modifications of the rigging to provide furling gear for such different types of sails.

In general, the conventional furling gear typically used with jibs and the like, and herein applied to both the jib 13 and the staysail 14, comprises an upper swivel unit 31 connecting the upper end of each luff wire 23, 29 to the mast 18 and permitting free rotation of the wire about its longitudinal axis, and a drum unit (forming the connections 24 and 30) attached to the lower end of each luff wire and secured to the deck of the sailboat for rotation about the axis of the luff wire. A control line 32 is wrapped around each drum to rotate the latter and the luff wire in one direction in response to hauling on the line to unwrap it, thereby rolling and furling the sail on the luff

wire as the associated sheet 27 is released to permit such furling. Conversely, releasing the control line 32 while hauling on the sheet 27 unrolls the sail and permits it to be quickly set for sailing.

As previously suggested, it has become accepted practice to furl jibs on their luff wires when sailboats are left unattended, and to protect such furled jibs with tubular covers typically hoisted along the luff wire and secured around the furled jib. Protection of mainsails typically is accomplished by furling the mainsail in a roll over the boom and enclosing it in a protective cover.

In accordance with the present invention, a sail cover is combined with at least one of the sails 13, 14 or 15 and is permanently mounted thereon in a novel manner which takes advantage of the characteristics of the sail, when furled, to minimize the amount of cover material required for complete enclosure of the sail, thereby minimizing the adverse effect on the sail in use, and which makes it possible to cover the sail completely as an incident to the furling of the sail about one of its edges, usually its luff. To these ends, the sail cover comprises at least one elongated strip of protective cover material of preselected width that is disposed in overlying relation with, and secured to, a side edge portion of the sail that is disposed at an acute angle with the edge about which the sail is to be furled, and is on the side of the sail that is outside when the sail is furled. Accordingly, the cover is wrapped helically about the sail during furling, and successive convolutions of the helically wrapped edge are spaced along the furled sail in accordance with the angle of the edge relative to the rotary supporting element.

The sail cover strip is made at least as wide as the spacing of adjacent convolutions, and preferably somewhat wider so as to completely cover the exposed edge portion of the sail and overlap to some extent for a secure lapped seal despite variations in position that may occur during furling. When both the foot and the leech of the sail are disposed at acute angles with the luff so as to wrap helically in opposite directions toward an intermediate point along the luff, cover strips are applied to both of these edge portions, on the same side of the sail, and are of widths that are correlated with the respective angles.

With specific reference first to the jib 13, it will be seen in FIGS. 1 and 3-5 that elongated sail cover strips 33 and 34 are attached to the facing side of this sail along both the foot and the leech, and overlie the entire lengths and substantial widths of the side edge portions of the sail along the foot and the leech. The two strips may be integrally joined at the intersection of the foot and the leech, or may meet at a miter joint or other suitable joint, and have inclined ends conforming to the angle of the luff 22 where the strips meet the luff.

Each strip 33, 34 is securely sewn onto the sail 13 along both margins of the strip and at its ends, as necessary. The specific manner of sewing is a matter of the sailmaker's choice but it should be kept in mind that the edges of the cover are to be held tightly against the sail to minimize interference with proper wind flow across the sail.

FIGS. 6 and 7 illustrate two alternative arrangements that may be used in applying the cover strips 33, 34 to the sail, the strip 34 in FIG. 6 being laid against the side edge portion to be covered, with the outer edge 35 of the cover strip substantially flush with the edge of the sail and stitched thereto along both margins of the strip. The usual thin reinforcing strip or tabling 37 is shown on the opposite side of the sail. In the preferred arrangement shown in FIG. 7, the cover strip 34' has a U-shaped bend at 35' around the edge of the sail and has a narrow, lapped edge portion 38 which overlies the tabling 37 and is stitched to the tabling and opposite side of the sail, thereby encasing the edge as well as covering the exposed portion of the furled sail. Suitable reinforcing patches may be applied to the various sails in accordance with conventional practice, and the cover strips may terminate short of the corners of the sails to avoid excessive thickness in reinforced areas.

Various weather resistant cover materials may be used for the cover strips, the most popular cover material being the

synthetic material sold as Acrylon. Other materials that have been used include relatively heavy and durable nylon, Dacron and canvas.

With the jib 13 mounted and equipped with cover strips 33 and 34 as shown in FIG. 1, it is furled simply by rotating the drum 24 in the direction indicated by the arrow 39 in FIG. 3 by hauling on the line 32 wrapped around the drum. As the luff wire 23 begins to turn with the drum, as permitted by the swivel 31 at the upper end of the luff wire, the jib begins to roll up around the wire, being securely attached thereto along the luff 22. At the same time, both cover strips begin to roll or coil helically about the luff. It should be noted that the direction of rotation of the drum should be in the same direction as the "lay" or twist of the cable or rope often used for luff wires, counterclockwise when looking down at the drum and using the usual right-hand laid wire. This avoids a tendency to untwist the wire during furling.

Since the base of the triangle of the sail 13 is attached to the luff wire 23, the first turn of the sail on the wire is the widest turn, and each successive turn is progressively narrower, leaving side edge portions 40 (FIGS. 3 and 4) along both the leech and the foot exposed after each successive convolution of the associated edge of the sail. Of course, the angle of each edge relative to the luff determines the spacing between successive convolutions, the spacing being greater with sharper angles and less with larger angles, that is, angles closer to 90°.

Accordingly, the width of the cover strip 33, 34 may be selected to correspond with the angle of the edge portion to be covered, using only as much material as is necessary to over the space between successive convolutions of the edge and to overlap to some extent. It has been found that a cover strip between 8 and 15 inches wide will be sufficient for normal sails.

Furling is completed as the clew 25 of the sail is wrapped around the luff wire 23 as shown in FIG. 4. Then the clew can be secured in place and the procedure is complete, the sail being completely covered by two cover strips 33 and 34 and thus protected from exposure to wind, sun, water and dirt, automatically as an incident to the furling of the sail.

Similar cover strips 41 and 42 on the staysail 14 are applied in the same manner and act in the same way to cover the staysail as an incident to furling of the latter on the luff wire 29 in response to rotation of the drum 30. It is to be noted that the angle of the foot of this sail with its luff 28 is larger, so successive convolutions of the foot will be more closely spaced along the luff wire when the sail is furled. This permits the strip 41 to be made narrower, if desired. It will be evident that an edge of a sail that is disposed at an angle of 90° with the furling element will roll up substantially upon itself, and cover strip need not necessarily be provided on such an edge.

Although it is not customary practice to provide furling gear for a mainsail, the mainsail 15 in FIGS. 1 and 2 has been equipped with furling gear to illustrate how the present invention may be applied to such a sail. As shown most clearly in FIG. 2, the leading edge or luff 43 of this sail also is attached to a luff wire 44 secured to the top of the mast 18 by a swivel 31 (FIG. 1) and connected at its lower end to the drum 45 of a furling unit. Thus, the mainsail can be furled about the luff wire in the same manner used for the jib 13 and the staysail 14, and cover strips 47 and 48 are attached to its foot and leech to cover the exposed side edge portions of the sail when it is furled. In all other important respects, the sail cover may be the same as the covers for the other sails.

From the foregoing, it will be seen that the present invention provides an integrated protective sail cover of weather-resistant material for any sail that has at least one edge that wraps helically around the outside of the sail when the latter is furled about a rotatable connecting element, and needs only a width of cover material capable of completely covering the exposed edge portions of the sail in the furled condition. Accordingly, the invention makes it possible to eliminate the time-consuming and troublesome operations heretofore required to protect a sail left in place on the boat, and accom-

plishes this important advantage in a relatively simple and inexpensive way.

I claim:

1. In combination with a sail having one side edge connectable to an elongated rotatable supporting element and two additional side edges disposed at acute angles relative to said one side edge to be wrapped helically around said supporting element as the latter is rotated to furl said sail thereon, a sail cover comprising two elongated strips of sail cover material disposed on the same side of said sail and overlying the side edge portions of said sail along said two additional edges, said strips being fastened to said side edge portions and being at least as wide as the spacing of successive convolutions of the associated edge, thereby to cover said sail when the latter is furled on said element.

2. The combination defined in claim 1 in which said one side edge is the luff of said sail and said additional side edges are the foot and the leech, said strips extending along the full lengths of said foot and said leech and being wider than the spacing of said successive convolutions to overlap when the sail is furled.

3. The combination defined in claim 2 in which said strips are disposed entirely on said same side and have edges substantially flush with the associated sail edges.

4. The combination defined in claim 2 in which said strips have U-shaped bends extending around said associated sail edges and lapped edge portions overlying part of the other side of the sail for complete protection of said sail edges.

5. The combination defined in claim 1 in which said strips are on the order of 8 to 15 inches wide.

6. The combination defined in claim 1 in which said strips are composed of substantially heavier material than the material of said sail.

7. In combination with a sail having a first side edge con-

nectable to an elongated rotatable supporting element and at least one additional side edge disposed at an acute angle with said first side edge to be wrapped helically around said supporting element as the sail is furled thereon, a sail cover comprising an elongated strip of sail cover material disposed on one side of said sail and overlying a preselected width of the edge portion of said sail along said additional side, said strip being secured to said sail and said preselected width being correlated with said angle to cover the exposed portion of said sail when the latter is furled.

8. The combination defined in claim 7 in which said strip is wider than the normal spacing between adjacent convolutions of said edge when said sail is furled about said first side, whereby successive convolutions of said strip overlap each other.

9. The combination defined in claim 7 in which said sail is triangular and has two of said additional side edges forming a leech and a foot, said first side edge being a luff connectable to a luff wire, and in which said sail cover comprises two elongated strips of said sail cover material extending along said leech and said foot on the same side of said sail and each being slightly wider than the normal spacing between adjacent convolutions of the associated edge when said sail is furled about said luff, whereby said strips are coiled helically about the luff with successive convolutions of each strip in overlapping relation to completely cover the furled sail.

10. The combination defined in claim 7 in which said strip is between 8 and 15 inches wide.

11. The combination defined in claim 7 in which said strip has a U-shaped bend around said additional side edge and a narrower lapped edge portion secured to the other side of said sail to protect said additional side edge.

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