June 26, 1962 W. H. HARLESS 3,040,690

SAIL LATCH

Filed April 11, 1960

FIG. 1

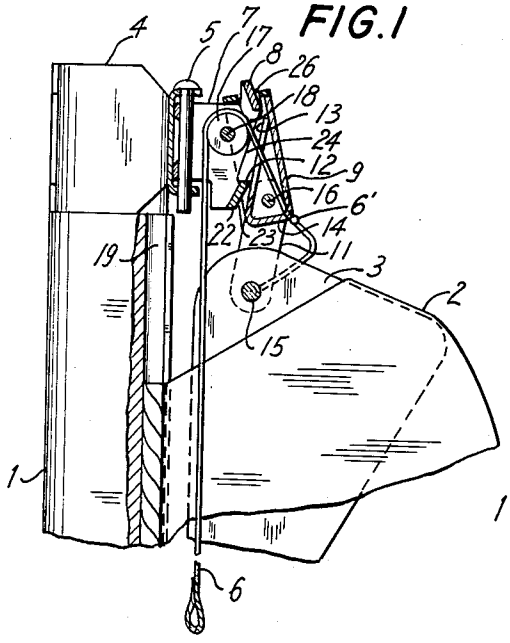


FIG. 2

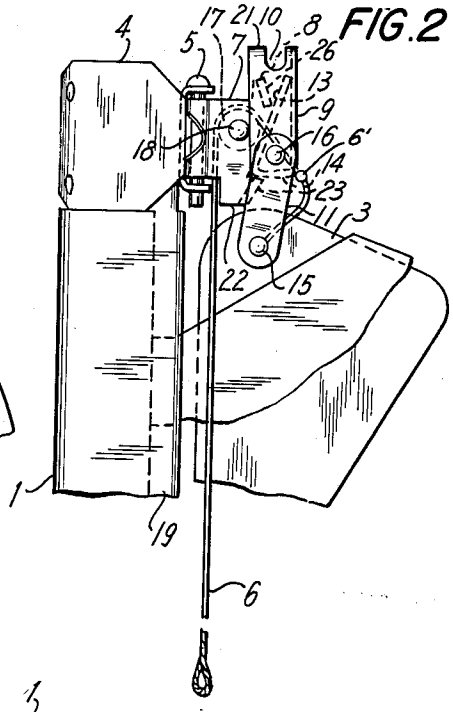
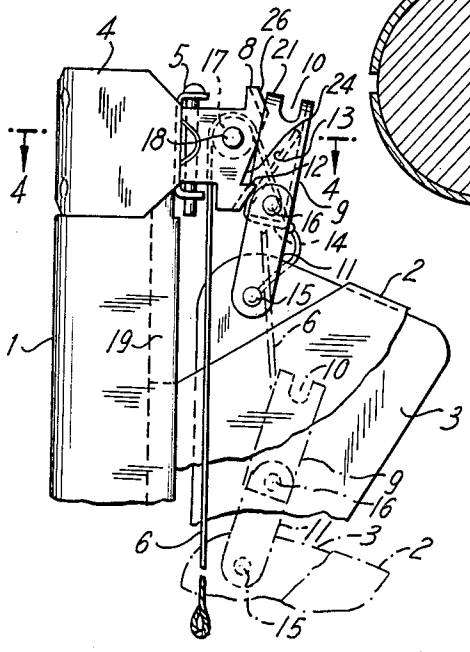


FIG. 3



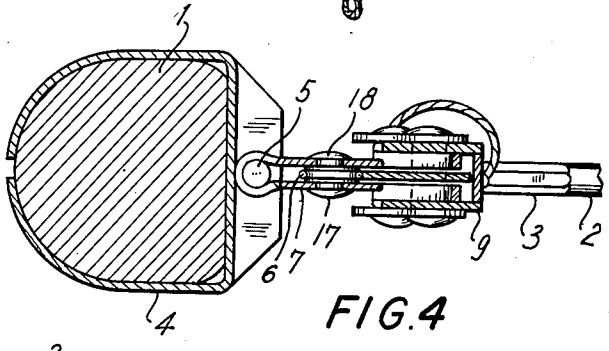


FIG. 4

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SAIL LATCH

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This invention relates in general to sails for sail boats and in particular to a new and improved sail-rigging.

At the present time the head board of a triangular fore and aft mainsail is usually fastened to the canvas at the head of the mainsail and the main halyard is secured to or near the top of the head board. The result of this arrangement is that the stresses on the halyard cause considerable elongation of the halyard under high strain conditions such as are caused by dampness or a high wind. The mainsail drops down giving the mainsail a poor "set" and this results in loss of speed which may be of extreme importance especially in the racing of said boats.

The principal object of this invention is to provide a mechanism which insures that the mainsail maintains a good "set" and even in a high wind or under damp conditions.

One feature of this invention is that all the stress on the halyard is removed, since, the mainsail is directly secured to the mast at a predetermined portion of the mast.

Another feature of this invention is that the mainsail is secured to the mast and released therefrom by pulling the halyard in the same direction.

I have accomplished my object by the provision of a latching mechanism, one part positioned on the mast and the other part positioned on the mainsail and which is engageable when the mainsail is hoisted on the mast by a downward pull on the halyard.

In use, the mainsail is hoisted to the top of the mast by exerting force on the halyard and the halyard is then momentarily released, thus causing the latching mechanism, which has one member positioned at the top of the mast and another member attached to the head board of the mainsail to engage. When this latching mechanism is engaged there is no stress whatsoever on the halyard and the halyard need not be lashed to a cleat. The halyard may be secured as desired. Since, there is no stress on the halyard there will be no resulting strain causing the elongation of the halyard.

To lower the mainsail, the halyard is pulled in a downward direction until the latching mechanism at the top of the mainsail disengages, thereby tensionally attaching the mainsail to the halyard and the mainsail may be lowered thereby.

The latching mechanism is adaptable to be readily engageable even in an erratic and gusty atmosphere and can be engaged regardless of the movement of the head of the sail in the wind.

The latching mechanism is further provided with a hinge feature which allows for the uniform flow of the mainsail on either tack.

I believe that these and other features and objects of my invention will be best understood if the following description is viewed in light of the drawings wherein:

FIG. 1 is a partially cut-away elevational view showing a sail attached to the top of the mast head by means of a latching mechanism of one embodiment of the invention;

FIG. 2 is an elevational view of the embodiment of FIG. 1 illustrating the latching mechanism immediately after the latch has been released.

FIG. 3 is a side view of the embodiment of FIG. 1 illustrating the latching mechanism just before the latching mechanism is engaged;

FIG. 4 is a cross-sectional view taken along the lines 4—4 in FIG. 3.

Referring now to the drawings wherein like numerals designate corresponding parts in all figures of the drawing, numeral 1 represents a mast of a sailing vessel and may be of any suitable type. Numeral 2 represents a portion of a sail adaptable for use with a sailing vessel. Numeral 3 represents one form of head board which is attached to the sail 2 by any suitable means such as by sewing, and may be attached to the sail 2 as shown in the drawings. Numeral 4 represents a bracket which may be attached to the upper most portion of the mast by any convenient means and which supports the mast latching member 7 of my latching mechanism by means of a securely attached pin 5. Member 7 is therefore free to rotate substantially 180° with respect to the longitudinal axis of the mast.

In the preferred embodiment of my invention and as illustrated in the drawings the mast latching member 7 comprises a portion 22 having formed thereon a first camming surface 23 inclined away from the longitudinal axis of mast 1, that is as the camming surface 23 extends vertically, it extends away from the longitudinal axis of mast 1; and adjacent the upper surface of camming surface 23 is a horizontal second camming surface 12. Adjacent the second camming surface 12 is a third camming surface 24 which is also inclined away from the longitudinal axis of mast 1. Near the top of member 7 and adjacent the third camming surface 24 is the fourth camming surface 26 which is inclined in an opposite sense to said first and third camming surfaces 23 and 24 respectively and is inclined toward the longitudinal axis of mast 1. Adjacent the top of member 7 is a bolt or protrusion 8 which has formed on one surface thereof the aforementioned fourth camming surface 26. Protrusion 8 can be engaged by a keeper or slot 10 formed in member 9 as will be seen hereinafter. Member 7 can be substantially hollow and has hollowed out portions which provide for the positioning of a rotatable pulley 17 by means of pin 18 and which also provide passages in, out and around pulley 17 for the halyard 6 as shown in the drawings.

Cooperable with the mast latching member 7 is the sail latching member 9. The sail latching member 9 is comprised of a fifth camming surface 13 inclined in the same sense as first and third camming surfaces 23 and 24, respectively. Adjacent the bottom of camming surface 13 as viewed in the drawings is the sixth camming surface 14 which is substantially horizontal. Member 9 is somewhat channel shaped, that is in the form of a rectangular box with one face or wall missing. The absent or missing face as viewed in the drawings is left side face and this is best illustrated in FIG. 4. The top surface as viewed in the drawings has provided therein a slot 10 which can and does engage protrusion 8 of number 7 as will be seen more clearly hereinafter.

Attached to the head board 3 by means of a link 11 is sail latching member 9. Link 11 is attached to head board 3 by means of a pin 15 and to the sail latching member 9 by means of a pin 16 and is freely pivotable about both pins 15 and 16. A halyard 6 mounting a stop element 6' is attached to latching member 9 preferably by slidably passing through an opening in that member. The stop element 6' will engage the outer face of the member when a downward pull on the free end of the halyard occurs. Between element 6' and the pin 15 the halyard may present a slack portion; the outer end of which is conveniently secured in any desired manner to the pin. However, this is not necessary and it is sufficient if the halyard 6 is directly attached to the sail latching member 9 and may be attached by any suitable procedure. The halyard 6 extends from the sail latching member 9 into the mast latching member 7 over a support provided by pulley 17 positioned within member 7 and out of the bottom of mast latching member 7 and down to the deck. As previously stated, the pulley 17

attached to the sail latching member 7 by means of a pin 18 and is readily pivotable upon pin 18. As has been said the halyard 6 extends to the deck of the ship and may be attached thereto as desired.

The sail 2 is hoisted to the top of the mast 1 by a downward pull on the halyard 6. In the embodiment of the invention illustrated in the drawings, the mast 1 is provided with a groove 19 in which there slidably moves a portion of the sail 2.

The operation of the latching mechanism will be best described by considering the relative movements which occur as the sail is being hoisted to the top of the mast. In FIG. 3, the sail latching mechanism 9 and the associated link 11 are illustrated in phantom near the bottom of the figure and in this position the latching mechanism 9 and the link 11 perform no function except to link the halyard 6 with the sail 2 through the headboard 3, and the sail 2 is hoisted to the top of the mast by a downward pull on the halyard 6 which extends over the pulley 17 and down to the sail 2 by the aforesaid linkage. As, the sail latching member 9 is pulled toward the top of the mast, the inner tip portion 21 thereof first abuts the portion 22 of the mast latching member 7, this portion 21 of the sail latching member 9 then begins to ride up first camming surface 23 of portion 22 and since this camming surface 23 extends in a direction tending away from the mast 1, the member 9 pivots in a clockwise direction as viewed in FIGS. 1 through 3, as member 9 is pulled to the top of the mast. After portion 21 of member 9 has traversed the surface 23, portion 21 of member 9 cams or slides on the second camming surface or shoulder 12 of the mast latching member 7 and member 9 slides to the left as viewed in the drawings since the tension on the halyard pulls the member 9 towards the mast.

The member 9 of course can only move laterally to th left over surface 12 if it is hollow and member 9 as previously stated can be considered to be somewhat channel shaped. This lateral movement to the left of member 9 as shown in the drawings causes a counter-clockwise pivoting of member 9 and 11. As member 9 is hoisted further towards the top of the mast, portion 22 of member 7 rides in the channel formed by member 9 and the end portion 21 of member 9 now is pulled up and along the third camming surface 24 which is interrupted to allow the halyard 6 to pass therethrough to the sail latch member 9. As this occurs and since surface 24 is shaped so as to cause travel of portion 21 of member 9 in a direction away from the mast 1, the sail latching member 9 will pivot in a clockwise direction, as viewed in FIGS. 1 through 3, as it is being pulled over the surface 24 of member 7.

The lower end portion 22 of member 7 having surface 23 thereon rides in the channel formed by member 9, surface 23 comes in contact with the fifth camming surface 13 of the sail latch member 9. When this occurs the counter-clockwise rotation of member 9 produced thereby is sufficient to reverse the clockwise rotation previously mentioned due to portion 21 of member 9 being pulled up the surface 24 of member 7, and thereby the resultant rotation of member 9 is slightly counter-clockwise as viewed in the drawings. As member 9 is further pulled upward, the leading edge 21 thereof encounters the fourth camming surface 26 of the mast latch member 7. Thereafter, member 9 pivots in a more pronounced counter-clockwise direction as viewed in the drawings, as it is pulled further towards the top of the mast. Member 9 continues to pivot at its lower end as surface 13 cams on surface 23 of member 7. The leading end 21 of member 9 is then pulled to the top of camming surface 26 and when this occurs member 9 is in position to be pulled laterally toward the mast 1 and to slide over the top of portion 8.

As soon as the leading end 21 of the sail latching member 9 has reached the upper most surface of hook portion 8 of member 7, the force exerted by the halyard 6 will pull the leading edge 21 over the top of portion 8 of member 7 such that the slot 10 of member 9 will be positioned over the hook portion 8 of member 7 and if at this time the tension on the halyard 6 is relaxed, the weight of the sail will pull member 9 slightly towards the mast and principally straight down and the bolt portion 8 of member 7 will engage and fit through the keeper portion 10 of member 9 and the latching mechanism will securely latch the sail 2 to the mast 1. FIG. 1 best illustrates the latch in its latched position.

When the bolt portion 8 extends into and through the keeper portion 10 of member 9, the sail is attached to the mast through solid linking members and the sail is therefore directly attached and can easily and readily pivot in response to the wind and the angle of pivotability will be substantially 180°. There is no stress on the halyard 6 at this time.

As has been disclosed, during the sequence wherein member 7 and member 9 become engaged, member 7 has a portion thereof riding in the channel formed by member 9. This occurs as soon as end portion 21 of member 9 rides over camming surface 12 of member 7 and since the force on the halyard keeps member 9 bearing against member 7, it can be seen that any erratic movements of the sail will result in members 7 and 9 moving in unison and therefore will be guided and can be engaged under the most unfavorable conditions.

To disengage the latching mechanism all that is necessary is to apply a tensional force to the halyard 6 and the latch member 9 will further ride up the first camming surface 23 of portion 22 of member 7 at its own fifth camming surface 13 and the upper end 21 of member 9 will move upwardly and slightly clockwise as viewed in the drawings, thus disengaging the keeper portion 10 from the bolt portion 8. This movement will continue until the bottom or sixth camming surface 14 of member 9 reaches the second camming surface or shoulder 12 of member 7 and the tension exerted through the halyard 6 will pull the sixth camming surface 14 of member 9 laterally toward the mast 1 over the second camming surface 12 of member 7 until the leading edge of the surface adjacent the surface 14 or bottom tip of member 9 abuts against the surface 24 of member 7, thus causing a significant clockwise rotation of member 9. This is best illustrated in FIG. 2 wherein the latch has reached its highest point elevationally and is effectually disengaged from the member 7. Tension is now relaxed on the halyard 6, and the weight of the sail 2 pulls on the linking member 11 and the member 9 and causes member 9 to further rotate clockwise and thereby pull itself entirely free from any danger of relatching and the sail 2 is lowered conventionally.

The mast latching member 7 and the sail latching member 19 which are illustrated, are what I believe to be the best embodiment of my invention. Therefore structural changes in members 7 and 9 can be made without departing from the scope of my invention. For example it is not essential that camming surfaces 23, 24 and 26 of member 7 be inclined. If the camming surfaces 24 and 26 were co-planar and perpendicular to camming surface 12 all of member 7, an operable embodiment of my invention would be provided. Also, the protrusion 8 of member 7, has obvious equivalents, the most apparent being a slot formed in the top surface of member 7 and spaced from the right edge of member 7 as viewed in the drawings.

Member 9 also has obvious equivalents, a few of which can be discussed. First, it is not necessary that member 9 be somewhat channel shaped although it is preferred. The channel insures that members 7 and 9 can engage even in erratic weather and is an added feature. Also, the protrusion engaging slot 10 has many equivalents.

Various other design and arrangements of the parts may be resorted to. While it is preferred to have mem-

ber 7 attached to the support or mast, and member 9 secured to the sail or other unit to be retained in position, it is apparent that the reverse might be true. In other words, member 7 could be reversed and secured to the unit, while member 9—likewise reversed—could be secured to the mast or other support. In either event, the projection 8 of member 7 provides a bolt, and the notch or slot 10 of member 9 furnishes a keeper for that bolt. Both members cooperating with each other provide the latch assembly.

Thus, among others, the several objects of the invention, as aforedefined, are achieved. Obviously, numerous changes in construction and rearrangements of the parts may be resorted to, without departing from the spirit of the invention as defined in the claims.

What is claimed is:

1. A latching mechanism for releasably latching a sail to an associated mast comprising, a first latching member, pivot means for attaching said first latching member to said mast for lateral swinging movements thereto, a second latching member, means for attaching said second latching member to said sail, means attached to said second latching member for hoisting said sail on said mast, said first and second latching members engaging responsive to operation of said hoisting means to support said sail on said mast for swinging movements around the axis thereof.

2. A latch assembly for association with a mast to retain a sail in predetermined position with respect thereto as it is shifted to that position by a halyard, said assembly comprising a pair of members, a bolt forming a part of one member, a keeper forming a part of the other member, means whereby one of said members may be associated with a mast, means whereby the second of said members may be associated with a sail, and a halyard to

cause the members to move axially from positions separated from each other by a great extent to positions adjacent each other in response to a pull being exerted on the halyard, engaging surfaces forming parts of said members to guide their movement adjacent each other and cooperating cam zones forming parts of such surfaces to align and supportingly engage the bolt of one member with the keeper portion of the other member.

3. An assembly as defined in claim 2, the member providing the bolt being securable to the mast with the bolt extending in an upward direction, and the member providing the keeper being secured to the sail with said keeper likewise extending upwardly.

4. An assembly as defined in claim 2, means providing a pivot mounting the member associated with the mast, and said pivot permitting said members to swing through an arc of substantially 180° with respect to its support.

5. In an assembly as defined in claim 2, said members when disengaged being independently swingable around the axis of said mast, a halyard support forming a part of said one member, the second member being connected with one end of said halyard and said guiding surfaces including cooperating faces forming parts of said members and the halyard support with said faces extending axially of said mast to dispose parts of said members in operative alignment as said halyard causes them to assume positions short of engagement with each other.

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