United States Patent [19]

Huff

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[54] **MAST HANDLING**

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[52] **U.S. Cl.** **114/91**

[51] **Int. Cl.**[2] **B63B 15/00**

[58] **Field of Search** ..... 114/90, 91, 93, 39, 61, 114/102; 9/1 T; 280/414 R

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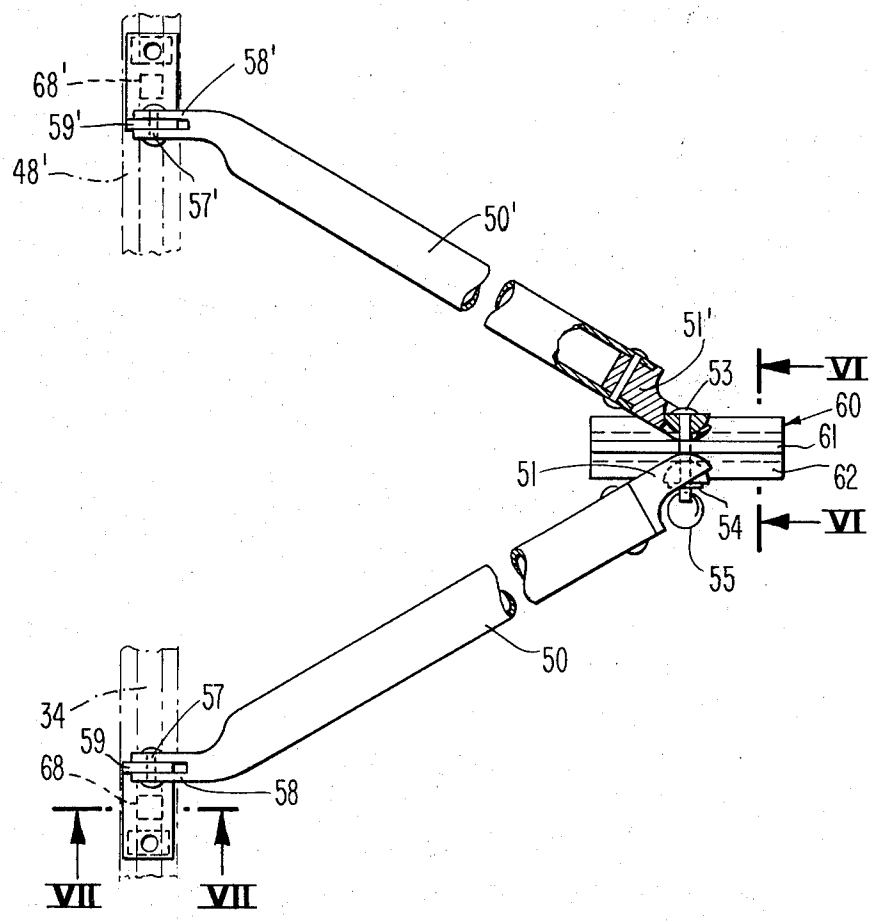
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Assistant Examiner—Gregory W. O'Connor
Attorney, Agent, or Firm—Charles A. McClure

[57] **ABSTRACT**

A safety-enhancing mast-handling arrangement for a catamaran or other sailboat with a dismountable mast. Detachable rigid steadying braces are pivotally secured at one end to the deck athwart the foot of the mast and at the opposite end are secured together in sliding engagement with the mast. With the boat supported on a trailer the mast is raised and lowered by taking up and paying out a line attached to the forestay of the mast, as by means of a winch mounted forward on an upright of the trailer.

3 Claims, 15 Drawing Figures



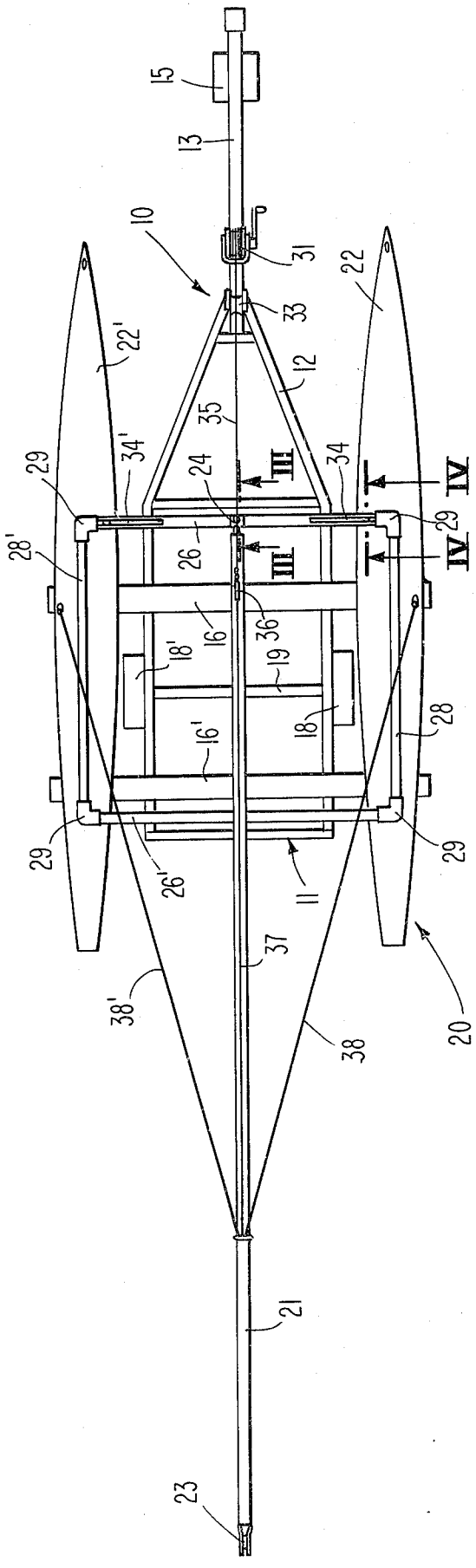

15
13
10
31
33
22
22'
12
35
34'
24
III
34
IV
29
28'
26
III'
IV
36
16
18'
19
16'
18
28
29
26'
11
37
38'
38
20
21
23

Fig. 2

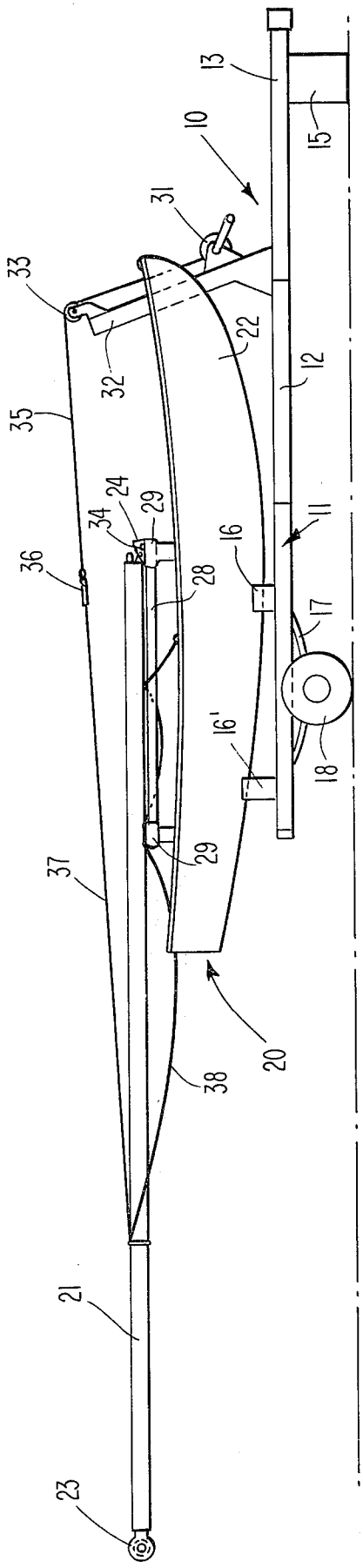
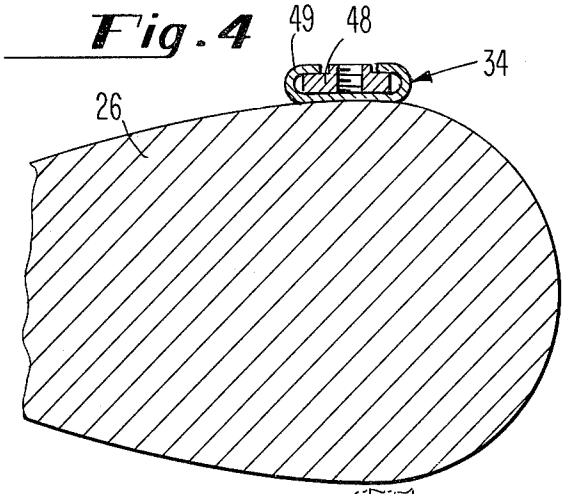

13
10
15
31
33
22
32
12
35
24
34
29
11
36
16
28
17
16'
18
29
37
38
20
21
23

Fig. 1

Fig. 4



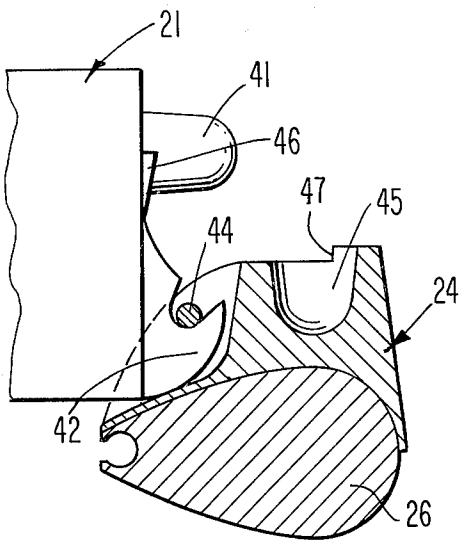
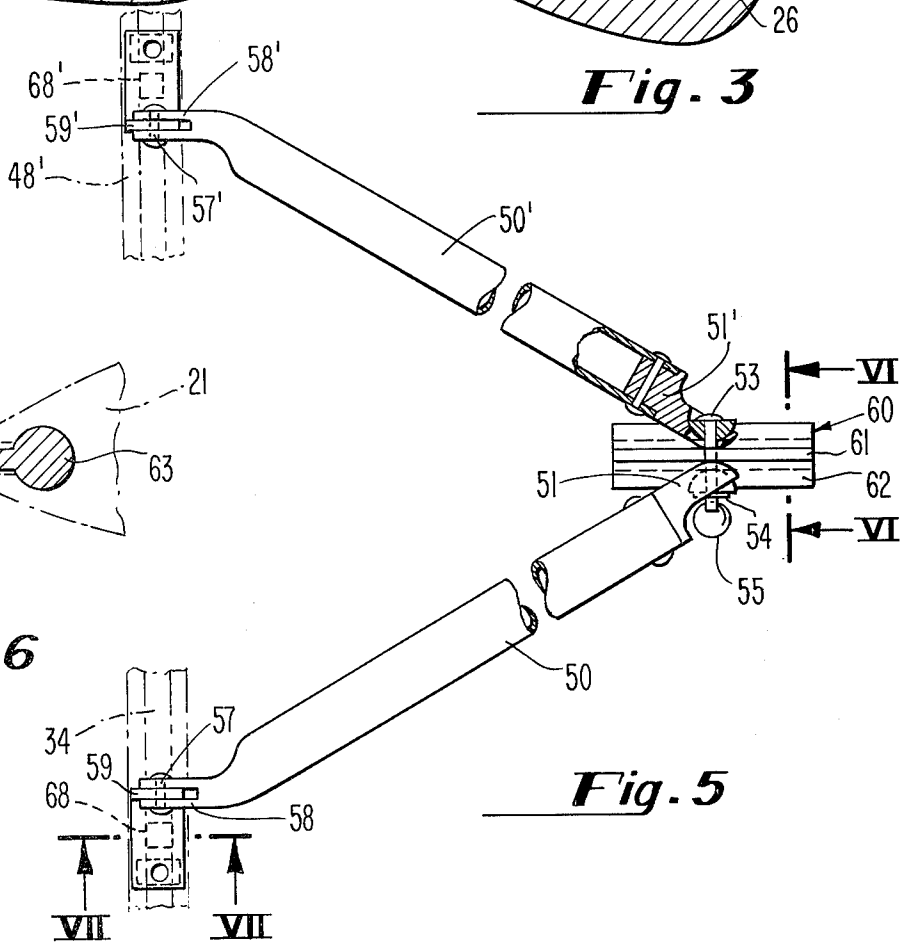


Fig. 3



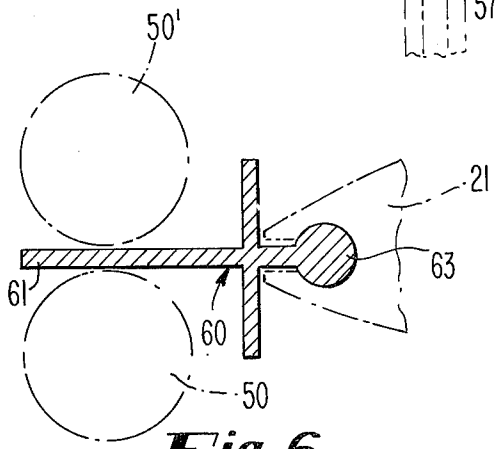
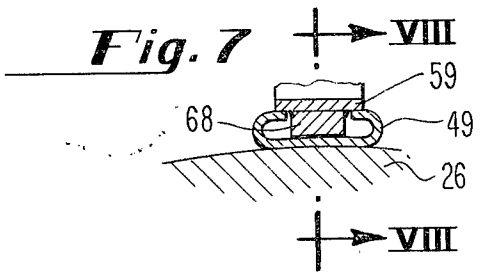


Fig. 6

Fig. 5

Fig. 7



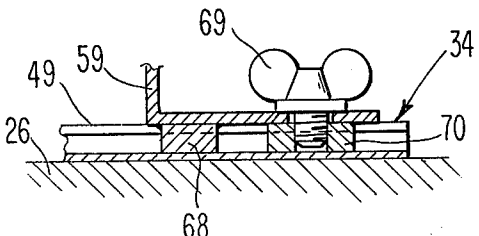
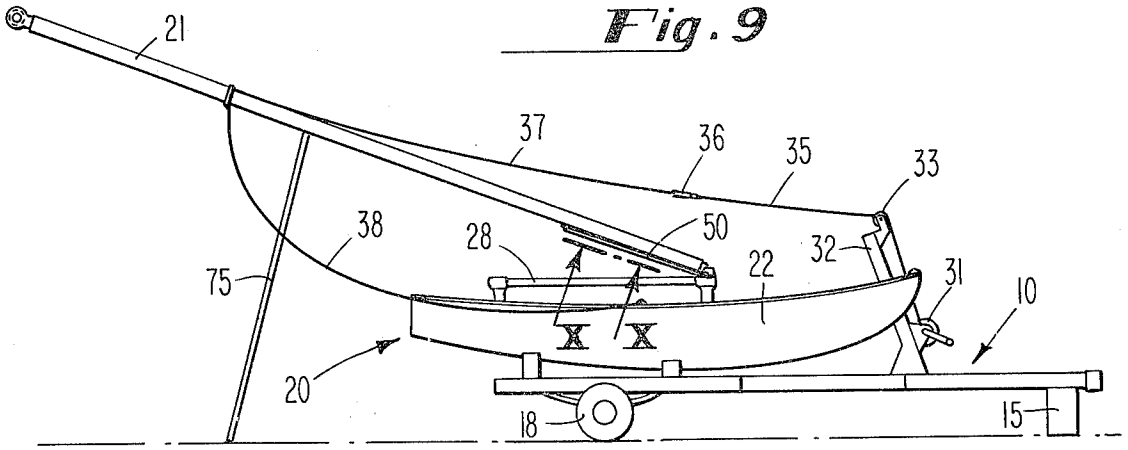


Fig. 8

Fig. 9



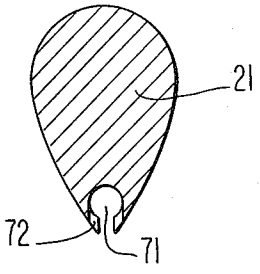


Fig. 11

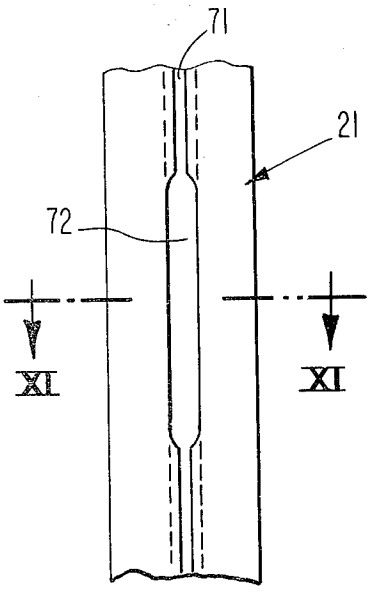


Fig. 10

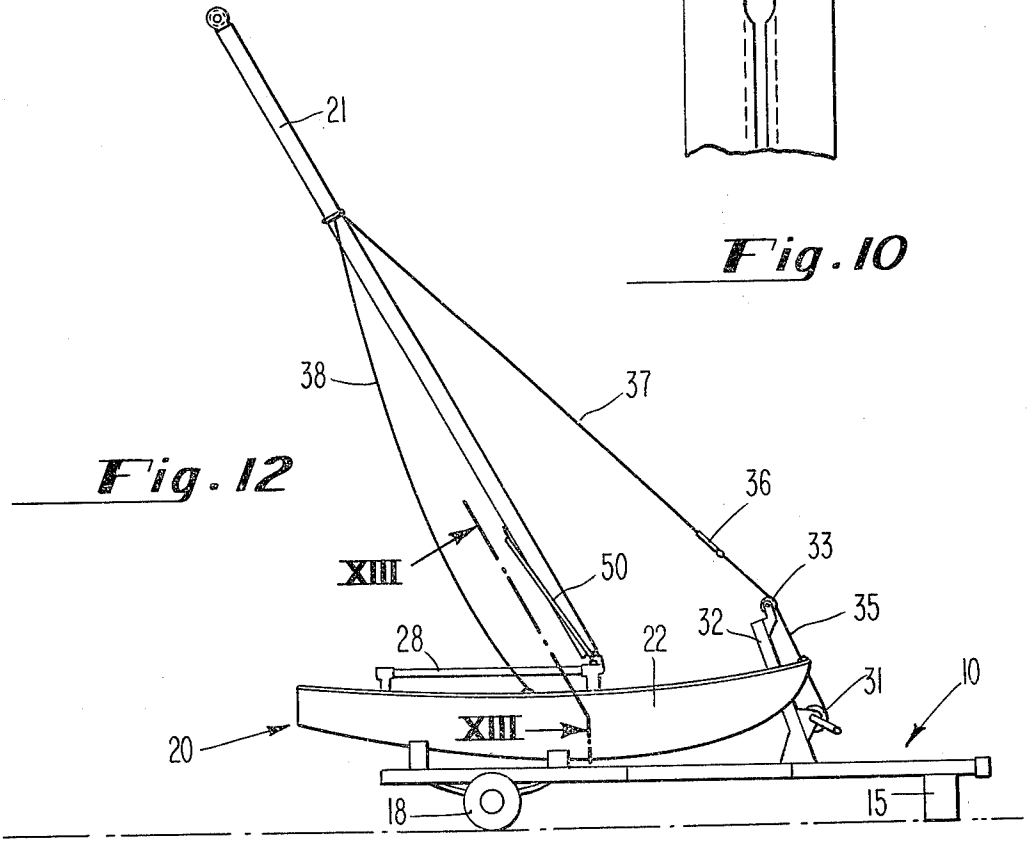


Fig. 12

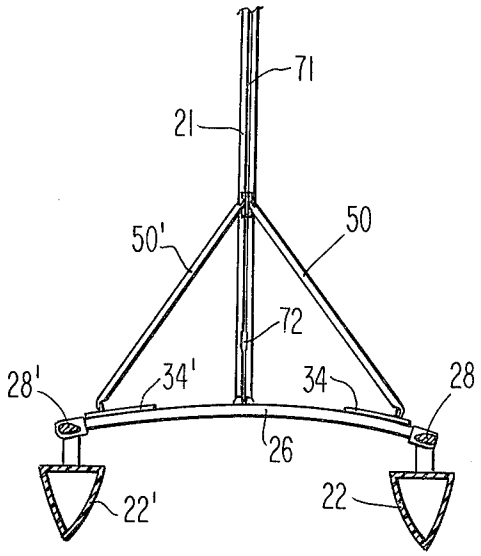


Fig. 13

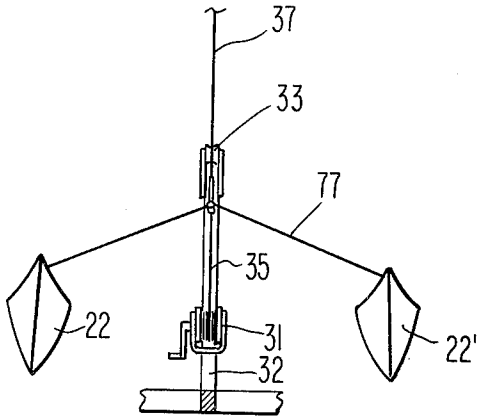


Fig. 15

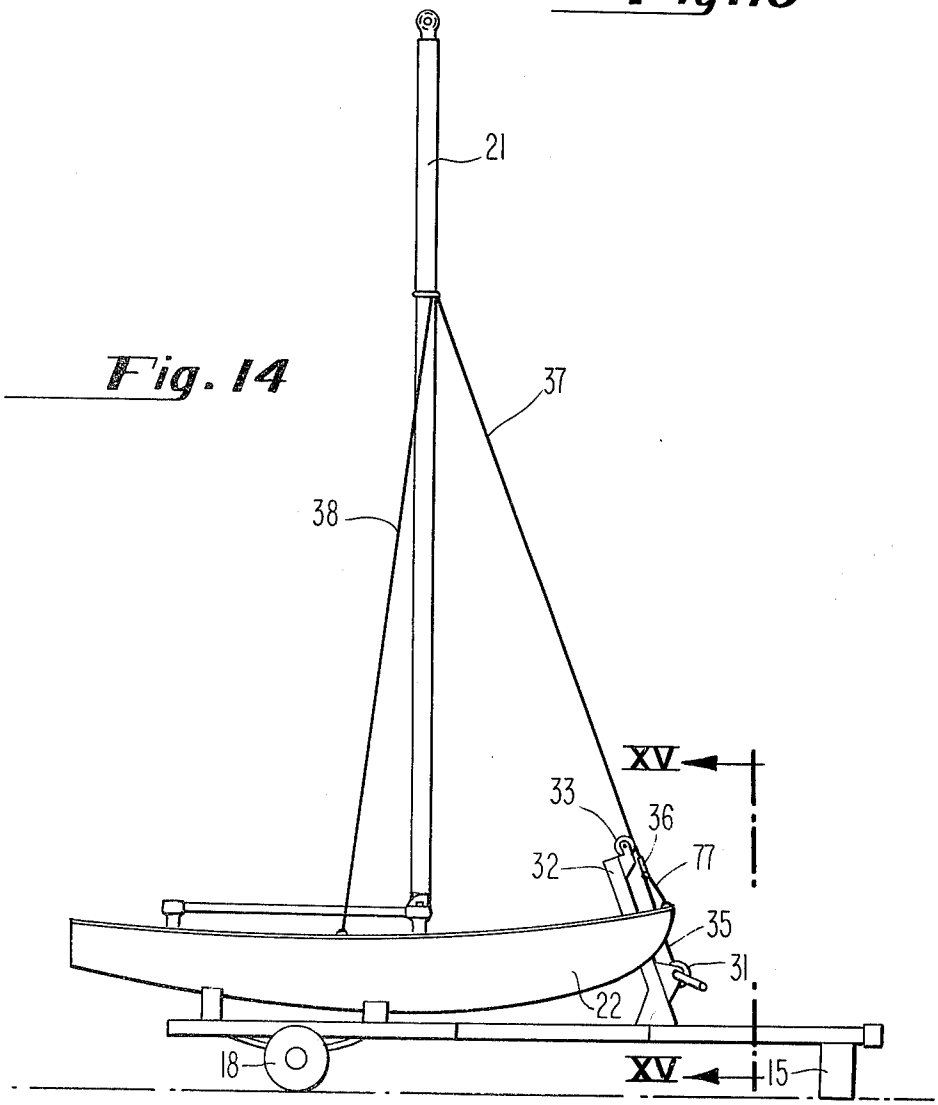


Fig. 14

MAST HANDLING

This invention relates to safe handling of a dismountable mast, such as the conventional mast of a catamaran or other sailboat while being raised from or lowered to substantially horizontal stowed position.

Even relatively light dismountable masts such as are usually provided for use on catamarans and other sailboats are difficult to handle, especially alone. Being several times the height of a person, such a mast is likely to topple sideways when only partly raised toward or lowered from erect position, with consequent hazard of personal injury and risk of damage to the craft. The step into which the foot of the mast fits accommodates swivelling of the erect mast through a limited acute angle to either side but permits stowage in an essentially aft direction only. Even when more than one person is available to assist in handling the mast there is a need for increased safety during its raising or lowering.

A primary object of the present invention is lateral steadying of the mast of a sailboat intermediate the stowed and erect positions thereof.

Another object is facilitating the raising and lowering of the mast of a trailered boat.

A further object is provision of means for accomplishing the foregoing objects.

Other objects of this invention, together with means and methods for attaining the various objects, will be apparent from the following description and the accompanying diagrams of a preferred embodiment, which is presented by way of example rather than limitation.

FIG. 1 is a side elevation of a trailered catamaran with the mast stowed, and

FIG. 2 is a plan view of the foregoing.

FIG. 3 is a side elevation, on an enlarged scale, of the mast foot and step (partly in section), taken at III—III on FIG. 2;

FIG. 4 is a sectional elevation through a jib sheet track and supporting frame member, taken at IV—IV on FIG. 2;

FIG. 5 is a view of a brace assembly of this invention including a pair of steadying braces joined to a slider at one end and with their opposite ends juxtaposed to jib sheet tracks shown in phantom;

FIG. 6 is an end elevation of the slider at the joined end of the steadying braces, taken at VI—VI on FIG. 5, with the mast and the brace bodies shown in phantom;

FIG. 7 is an end elevation of the opposite end of one of the braces, taken at VII—VII on FIG. 5; and

FIG. 8 is an elevation of the same brace end as shown in FIG. 7, taken transversely thereto at VIII—VIII thereon.

FIG. 9 is a side elevation of the trailered boat of FIG. 1 with the mast propped up somewhat from the horizontal and with the steadying braces installed;

FIG. 10 is a bottom plan of longitudinal grooving of the mast, taken at X—X on FIG. 9;

FIG. 11 is a transverse section through the mast and groove, taken at XI—XI on FIG. 10;

FIG. 12 is a side elevation of the trailered boat, with the braced mast shown more than half erected;

FIG. 13 is a rear elevation, partly oblique, of the boat with the braced mast partly erected as in FIG. 12, taken at XIII—XIII thereon;

FIG. 14 is a side elevation of the same boat with the mast erect and the steadying braces removed; and

FIG. 15 is a front elevation corresponding to FIG. 13, showing attachment of the forestay to the bridle between the bows.

In general, the objects of the present invention are accomplished, in a mast-handling arrangement for a sailboat with a dismountable mast, by means of a rigid brace assembly adapted to be pivotally secured at one end to the deck athwart the foot of the mast and adapted at the opposite end to fit in sliding engagement with the mast.

More particularly, the invention extends to erecting a dismountable mast of a sailboat, especially one having a step adapted to retain the foot thereof when the mast is in a substantially horizontal stowed position aft of the step, as well as when the mast is erect, the mast being provided with a forestay, by taking up the forestay from a forward location above the level of the step and thereby raising the mast, via a fulcrum not located on the boat, and meanwhile steadying the mast laterally by interposing from fixed locations on the deck athwart the mast to the mast itself a pair of rigid braces and pivotally connecting them to the deck and connecting them together and slidably relative to the mast. Advantageously the fulcrum for the forestay is located on an upright of a trailer upon which the boat is transported, as to and from a body of water suitable for sailing craft.

In the diagrams reference numerals are used to designate apparatus components for clarity of the description, which follows. Where such components occur in multiples, as quite a few of them do, the same numeral may be assigned to each. However, in the instance of paired components, further clarity is assured by priming the numeral referring to one of the paired members (the after member in a fore-and-aft pair, and the port-side member in a lateral pair) and leaving unprimed the same numeral for the other member in the pair.

FIGS. 1 and 2 show, in side elevation and plan, respectively, apparatus of the present invention adapted to use with a trailered catamaran. Trailer **10** is shown supporting catamaran **20** in conventional fashion, with mast **21** stowed in horizontal position extending aft from dismounted engagement with step **24**, which itself is also adapted to hold the foot of the mast when erect. It should be understood that when the boat is being transported on the trailer the mast is preferably carried completely disengaged from the step and secured, as by being tied, to the boat frame and the trailer upright so as to extend forward over the vehicle pulling the trailer and thereby minimize its projection astern.

Trailer **10** comprises supporting frame **11** of generally rectangular plan with a V-brace **12** at the forward end and drawbar **13** extending from the apex thereof and here shown resting on block **15** at its forward end. Leaf spring **17** depending from the frame carries pair of wheels **18, 18'** at opposite end of axle **19** for rolling movement over the ground. Pair of supports **16, 16'** extending laterally upon the frame cradle hulls **22, 22'** of the catamaran on the opposite end portions of the supports. Forward support **16** is located about midway of the hulls, while aft support **16'** is another quarter of the way or so toward the stern.

A deck frame having a generally rectangular plan comprises pair of laterally extending frame members **26, 26'** and pair of longitudinally extending frame members **28, 28'** joined by fittings **29** L-shaped in plan

at the corners. The frame is supported on the hulls by pairs of post portions underlying the L portions of the fittings and secured at their lower ends to the hulls. Forward lateral frame member **26** has step **24** mounted midway thereon and carries jib sheet tracks **34, 34'** on the upper surface of its opposite end portions. The mast, which is secured at its foot in the step rests upon the mid portion of after lateral member **26'** in the illustrated stowed position. Pulley **23** at the peak of the mast accommodates a mainsail halyard (not shown).

Upstanding from the apex of V-member **12** of the trailer frame is upright **32,** which carries pulley **33** at its upper end and winch **31** mounted therebelow. Winch line **35** is secured detachably by clip **36** to forestay **37,** which itself is secured at its opposite end in conventional fashion to the mast, together with sidestays **38,** 38' extending from the mast to points of attachment to respective hulls **22, 22'**. The upright is raked to place the winch forward of the pulley, whereupon the pulley is substantially aligned between the winch and the attachment of the forestay to the mast when erect, as shown subsequently.

FIG. **3** shows the foot portion of mast **21** dismounted from step **24** but with hook **42** protruding from the foot engaged with horizontal pin **44** affixed to the after part of the step, in the dismounted position of the preceding views. Exposed ball **41** of the foot is adapted to fit into socket **45** of the step when the mast is stepped. Shoulder **47** on the forward rim of the step is adapted to engage protruding part **46** of the step casting to limit the extent of swivelling of the erect mast.

FIG. **4** shows jib sheet track **34** on forward lateral frame member **26** sectioned from FIG. **2** and considerably enlarged. A threaded nut **48** is retained in channel member **49,** which has a lazy C configuration in transverse section.

FIG. **5** shows pair of steadying braces **50, 50'** oriented schematically rather than in normal use position as shown subsequently. At one end the braces have end fittings **51, 51'** pinned thereto and terminated in hollow hemispherical ends, themselves joined together by headed pin **53** and retainer ring **55** through an opening in the free end of the pin, which has washer **54** thereon. Sandwiched between the hemispherical ends of the fittings is flange **61** of slider **60,** which is shown further in the next view.

FIG. **6** shows slider **60** sectioned from FIG. **5** and further enlarged. Centered on the opposite side of crosspiece **62** from flange **61** is beaded flange **63,** the bead of which fits slidably in a complementary groove—for the luff rope of the mainsail—in the mast (shown here in phantom) as further illustrated in subsequent views.

Also in FIG. **5,** at their opposite ends the respective braces have clevis fittings **58, 58'** and pins **57, 57'** pivotally retaining L-shaped feet members **59, 59'**. Detents **68' 68'** from the respective feet fit into the corresponding jib sheet tracks **34, 34'** (shown in phantom). Not shown here are screws for securing the feet to the threaded nuts in the tracks.

FIGS. **7** and **8** show detent **68** of foot **59** of brace **50** fitting into channel member **49** (here shown in solid) of jib sheet track **34** on forward lateral frame member **26** (cf. FIG. **4**). Thumb screw **69** threaded into nut **70** retained in the channel member secures the foot to the track.

FIG. **10** shows, looking forward, part of the aft surface of mast **21,** which has luff rope groove **71** extending longitudinally thereof, erupting to the surface throughout its length. This view is indicated obliquely upward in FIG. **9,** in which the mast is raised a bit from the horizontal, as discussed further below. Over part of the illustrated length the groove eruption is enlarged to the full width of the groove, the enlarged part being designated **72,** whereas over the rest of the groove length the width of the erupted part is a minor fraction of the groove width, as shown in the sectional view in FIG. **11.**

The practice of this invention is readily understood from the foregoing description and diagrams. It is convenient to assume complete preassembly of the brace assembly (usually called simply "the braces"), here comprising slider **60,** pair of braces **50, 50'**, angled feet members **59, 59'**, pins **57, 57'** securing the lower ends of the braces to the feet members, and pin and ring **53** and **55** securing the upper ends of the pair of braces to the slider and, thus, together. Whereas the former pins have not been disclosed as detachable they may be modified in obvious fashion to be so, and while the latter pin is disclosed as detachable it need not be. When respective components are detachable from one another installation of the brace assembly may occur in no particular sequence of operations, but when preassembled a single sequence is prescribed, as follows.

With the mast in the illustrated stowed position, or optionally in completely disengaged position as for transporting, the bead flange of the slider is inserted into the luff rope groove via the enlargement and is slid somewhat toward the peak of the mast so as to remain in engagement therewith. Then the feet members are juxtaposed to the respective jib sheet tracks (with the mast foot hooked to the step or close enough thereto to do so) and, with the detents inserted therein, are secured in place by tightening the thumb screws in threaded engagement with the nuts retained in the tracks.

Alternatively, when the slider is disengageable from the upper ends of the braces, as illustrated, the feet members can be secured to the tracks at any time, and the slider be engaged with the groove in the mast at any time or at any distance of the mast foot from the step, and the brace ends and slider be pinned together when the mast is ready to be raised. However, as disassembly of the components of the brace assembly is readily avoidable, and pinning of the components together may be inconvenient when they are desirably close-fitting, complete preassembly of the brace assembly before installation is generally preferable.

Once the brace assembly is in place, the free end of the mast is raised somewhat, as may be done manually by a single person, to facilitate subsequent winching of it upward. If the entire operation is being conducted by one person it is convenient to prop the mast in such position. The upper end of the prop may be tapered to enter the groove eruption sufficiently to be retained in place, preferably resiliently as by a rubber tip. It may be permitted to fall free upon winching of the mast further upward or preferably may have a transverse bead on the tip so that a quarter turn of the prop after the tip has entered the groove will retain it therein (much as the beaded flange of the slider shown in FIG. **6** is retained) until released therefrom by another quarter turn. From the position shown in FIG. **9** the mast is readily raised by turning the handle of the winch to take up the line attached to the forestay and thereby

apply raising force to the mast, care being taken to see that the ball on the foot of the mast seats in the socket of the step. So installed, the mast is raised by further winching of the line and forestay. FIG. **12** shows the mast about two-thirds raised. Of course, the prop has been removed before reaching this position.

FIG. **9** shows prop **75** with its upper end inserted in the rope groove and its lower end on the ground, in such location as to incline the mast upward from the step at a minor acute angle, such as 20±10° to the horizontal.

It is quite obvious that, during any change in angle of inclination of the mast, the clevis-like lower ends of the braces rotate—about the interconnecting pins—relative to the feet members secured to the deck, which themselves may be non-horizontal so long as the axes of rotation are horizontal, as such axes must be perpendicular to the plane swept out by the mast as it is raised or lowered. Not so apparent perhaps is the fact that, inasmuch as the braces and the mast rotate about non-aligned centers, the locus of engagement of the brace assembly with the mast (via the slider) must move somewhat lengthwise of the mast, as can be observed during the raising and lowering thereof. The hemispherical end parts of the upper ends of the braces flanking the slider accommodate any minor misalignment, as by limited swivelling of the mast during such operation.

FIG. **13** shows the bracing of the mast in a view taken looking obliquely upward and forward as indicated on the preceding view. The hulls and lateral side members are sectioned, and the upper portion of the mast is omitted to conserve space.

FIG. **14** shows the mast in fully erect or upright position as attained by further winching. At this stage the side stays are taut, and the brace assembly removed by unfastening the feet members from the jib sheet tracks and then dropping the slider in the mast groove until it can be removed through the enlargement, which is located within a man's reach above the foot of the mast.

FIG. **15** shows the bow portion at the stage shown from the side in FIG. **14.** At this final stage the clip on the end of the forestay is detached from the winch line and attached to the bridle **77** extending upward from junction at its opposite ends to the bows of the respective hulls. Thereupon the catamaran can be removed from the trailer into the water in customary fashion. It will be understood that the catamaran is secured to the trailer by tying it or in other convenient fashion during transportation and throughout raising (or lowering) of the mast.

When it comes time to dismount the mast, the operation just described is reversed, whereupon the braces again steady the mast during the ensuing stages until the mast approaches the horizontal sufficiently that the assembly can be removed with minimal effort and risk. Installation and removal of the braces, whether for raising or lowering of the mast can be accomplished readily in a couple minutes. Once installed, the braces provide more than adequate risk against lateral toppling, thereby greatly enhancing the ease and safety of this operation. Nothing more need be added to the vessel to adapt it to such installation.

If desired, screws at the feet of the braces can be eliminated by substitution of expanding eccentric or cam fittings, but such an alteration would be apparent to persons of ordinary skill, as would substitution of universal joints for the clevis and pin interconnection of the braces and the feet members. Other modifications can be made, as by adding, combining, or subdividing parts or steps, or by substituting equivalents, while retaining principal advantages or benefits of this invention, which itself is defined in the following claims.

The claimed invention is:

1. In a mast-handling arrangement for a sailboat with a dismountable mast having a longitudinal rope groove therein erupting to the exterior therealong, a laterally steadying rigid brace assembly pivotally and detachably attachable at a first end to the deck athwart the foot of the mast and also slidably and disengageably engageable at a second end to the mast and including at the second end a slider fitting within the rope groove.

2. Mast-handling arrangement according to claim **1,** wherein the sailboat is a catamaran having a forward lateral frame member with jib-sheet tracks secured thereto and wherein the brace assembly is secured detachably at the first end in the respective jib-sheet tracks.

3. Mast-handling arrangement according to claim **1,** wherein the eruption of the rope groove is enlarged within a man's reach from the foot of the mast, and via such enlargement the slider is engageable with the rope groove before the brace assembly is secured at the first end to the deck, and is disengageable from the rope groove after the brace assembly is detached at the first end from the deck.

* * * * *