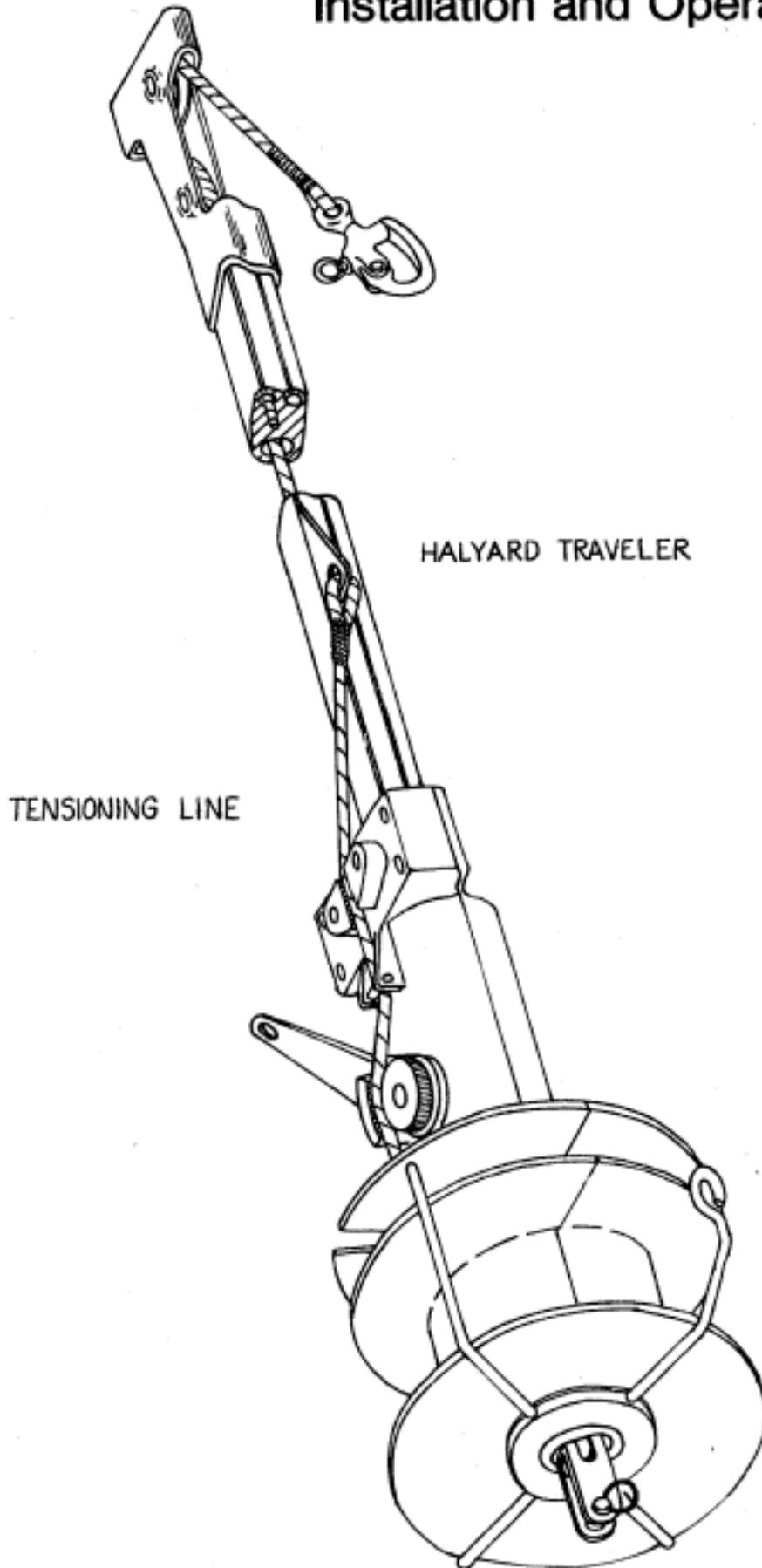


CRUISING DESIGNS, INC.

P.O. BOX 431 SALEM, MASSACHUSETTS 01970 617 745-8750

the reefer r.8&9

Installation and Operation Guide





SWAGE TOP

REEFER WILL FIT
OVER STUD

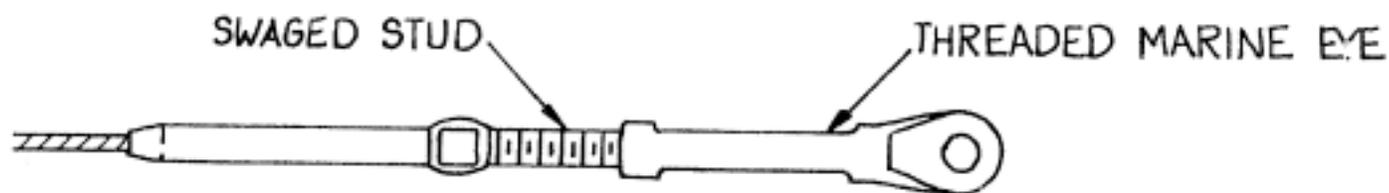


NAVTEC

MUST HAVE ADAPTOR
TO INSTALL REEFER



JAW-JAW



CRUISING DESIGN ADAPTOR

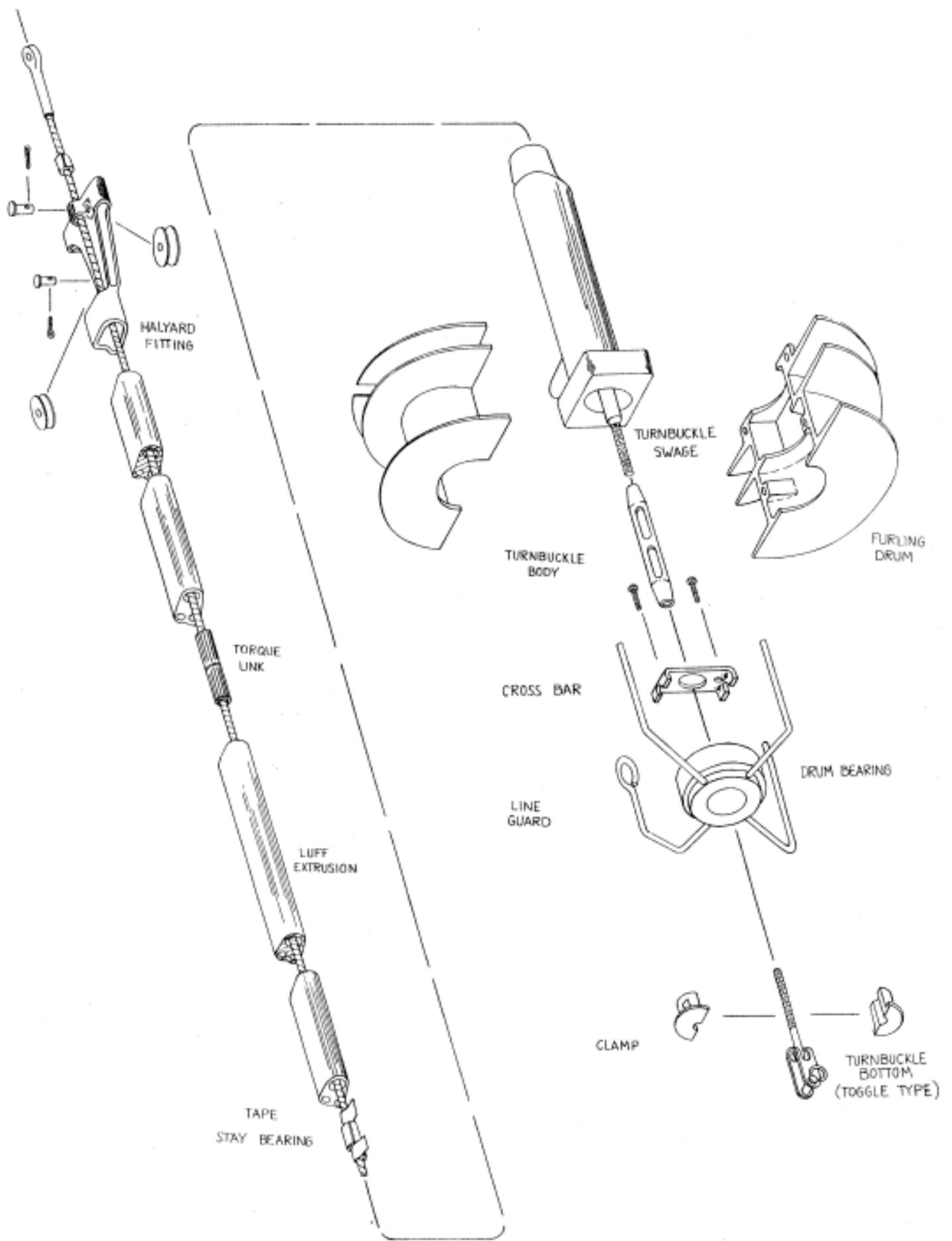
INTRODUCTION

Reefers have been designed for easy installation by the sailboat owner. If the mast has already been installed in the boat, two people will be required to remove the headstay, assemble the system and then hoist it aloft. The only tools needed are a hacksaw, screwdriver, vice grip, a hand drill or electric drill, and access to a 5/32" Micropress tool. When properly installed and maintained, the Reefer will provide many years of cruising pleasure.

The Reefer #8 is for headstay diameters of 7/32" and 1/4", and the Reefer #9 is for headstay diameters of 9/32". Reefers will fit all standard turnbuckles that have a threaded swaged terminal at the upper end. If your headstay has no turnbuckle, or has a turnbuckle which does not have a threaded stud, there are two solutions (each requiring access to a rigging shop with a swaging machine):

1. For a boat with no turnbuckle, or with a turnbuckle that is mostly screwed in, the old turnbuckle or lower fitting can be replaced with a new turnbuckle with a swage top. (recommended)
2. For other boats, a replacement upper fitting consisting of a swage stud and marine eye is available through your dealer (Cruising Design Part #207-7, 8 or 9 depending on your wire size). The old upper terminal can be replaced by this fitting. Make sure the masthead has a toggle to prevent fatigue in the threads of the stud.

All headstays must have a toggle at each end. Sail loads bend the headstay side to side with each tack and toggles eliminate the metal fatigue from this bending. The Reefer warranty is invalidated by headstays without toggles.



PARTS LIST FOR R8-R9 REEFERS

Hardware Bag Sized for Specific Wire Diameter

7/32" & 1/4" Diameter Headstay:

10 Torque Link Halves
9 Stay Bearings
1 Bearing Clamp with Crossbar

9/32" Diameter Headstay:

12 Torque Link Halves
10 Stay Bearings
1 Bearing Clamp with Crossbar

Plain Luff Extrusions:

5 for 7/32" & 1/4" Diameter Headstay

6 for 9/32" Diameter Headstay

Bottom Feed Extrusion with Slot: 1

Lubricant: 1 Tube WGL teflon marine lubricant

Assorted Stainless Steel Fasteners

Two Allen Wrenches (3/32" & 5/32")

One Halyard Fitting (Pre-Assembled)

One Drum Body (Left and Right Halves)

One Drum Throat

One Assembled Drum Bearing with Guard Arms

One Line Tensioner

One Halyard Assembly:

One Wire Halyard with Shackle and Traveler

One Tension Line

One Set Assembly Instructions

<p>IMPORTANT: DO NOT USE SILICONE SPRAYS. THESE CONTAIN ANHYDROUS HYDROCARBONS WHICH DRASTICALLY WEAKEN THE LEXAN DRUM.</p>

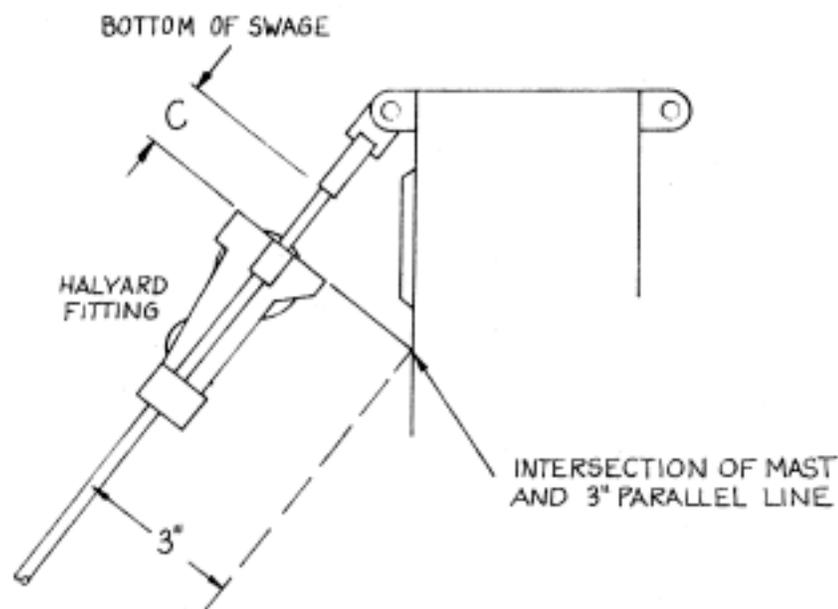
READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE ASSEMBLING THE REEFER! INSTRUCTIONS CRITICAL FOR PROPER OPERATIONS ARE ENCLOSED BY AN OUTLINE.

PRE-ASSEMBLY PROCEDURE

1. Disassemble turnbuckle, after marking where it was adjusted.
2. Remove Reefer parts from shipping carton and check against parts list. Note: If any parts are missing check with your dealer before attempting to assemble your Reefer.

MASTHEAD CLEARANCE

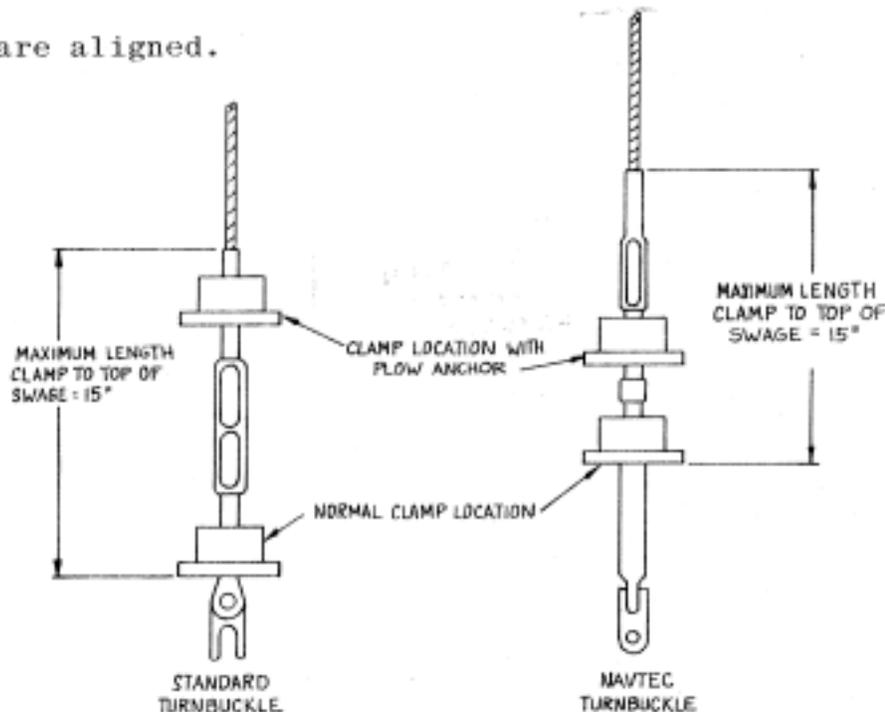
The halyard fitting must have room to rotate clear of masthead, halyards or other fittings. Some mastheads have insufficient clearance with halyard fitting as high as it will go. With headstays at angle it is in boat, check clearance as shown below and mark headstay where there is at least 3" clearance from mast or other fittings to headstay. This mark will be referred to in cutting of extrusions section.



ASSEMBLING DRUM BEARING

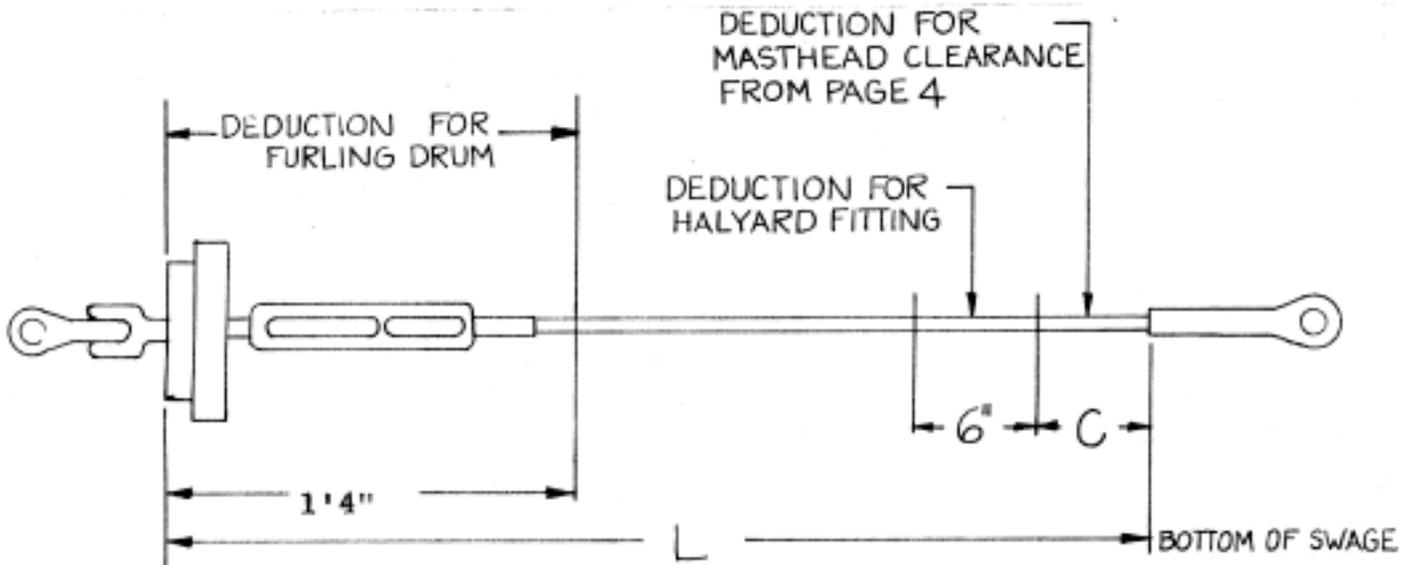
Drum bearing is preassembled with line guards installed. Stay bearings, clamp and crossbar are in a package sized for specific wire diameter. Additionally each clamp will fit only one turnbuckle thread diameter. Check package label for proper wire and turnbuckle thread diameter.

- 1) Disassemble bearing clamp and crossbar.
- 2) Place on turnbuckle threads as shown in drawing-on bottom of turnbuckle unless clearance for a plow anchor is desired, then on top. If clamp placed above turnbuckle body lock nuts should be placed on turnbuckle and securely tightened.
- 3) With turnbuckle assembled to the length it was on boat (or one half extended if not known) loosely tighten clamp so maximum length as shown in picture is less than 15".
- 4) Place drum bearing temporarily on clamp. Hold drum bearing into clamp by placing crossbar over cross ribs in drum bearing and loosely installing screws between bearing clamp and crossbar. Bearing clamp will be fully tightened after headstay is installed on boat and line guards are aligned.



CUTTING EXTRUSIONS

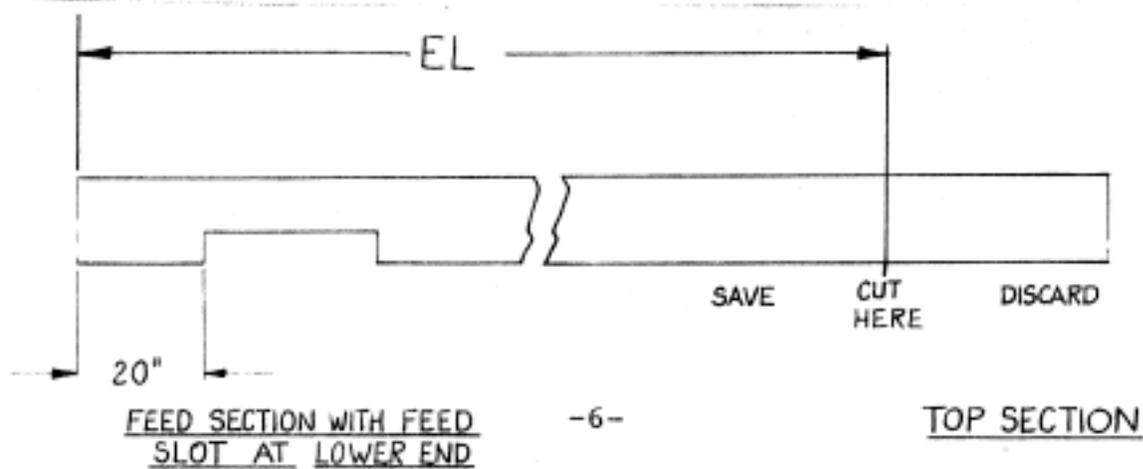
1. Lay headstay out in flat area with turnbuckle assembled to length it was on boat (or 1/2 extended length if not known). Measure length as shown below.



$$\text{Extrusion Length EL} = L - (C) - (6") - (1'-4")$$

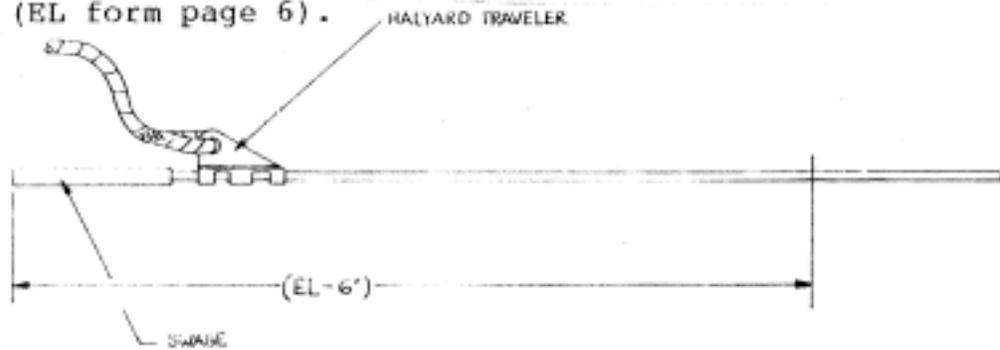
If C cannot be determined use 3" but check clearance at masthead carefully after installing. See page 4 for exact description of C.

2. Lay extrusions out and cut with a hacksaw as shown below. The sections are not reversible so be sure that no extrusions are reversed end for end.

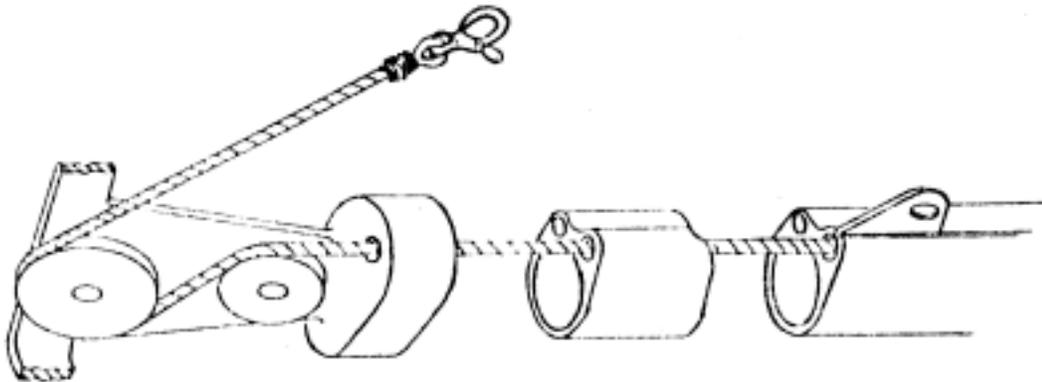


ASSEMBLY OF HALYARD

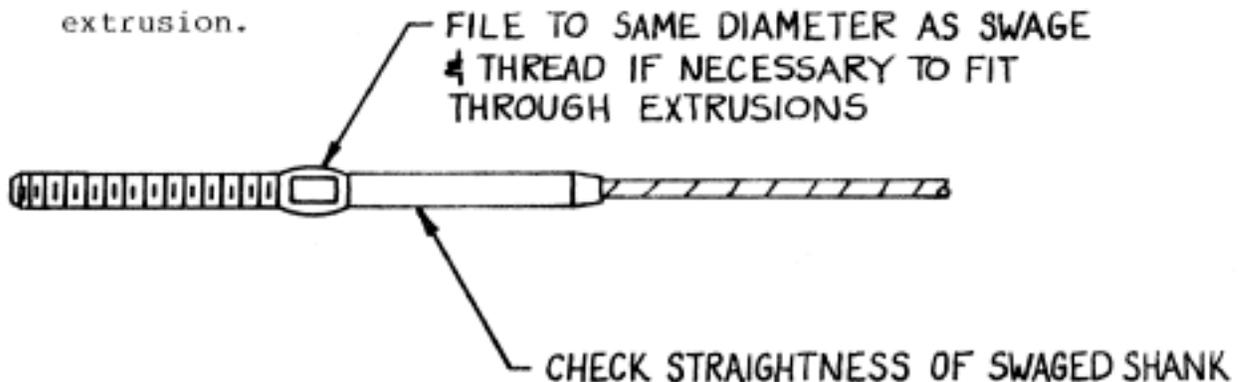
1. Cut halyard so its length is 6" less than extrusion cut length (EL form page 6).



2. Thread halyard through halyard fitting as shown below and micropress snapshackle and thimble to end of wire away from swage and halyard traveler.



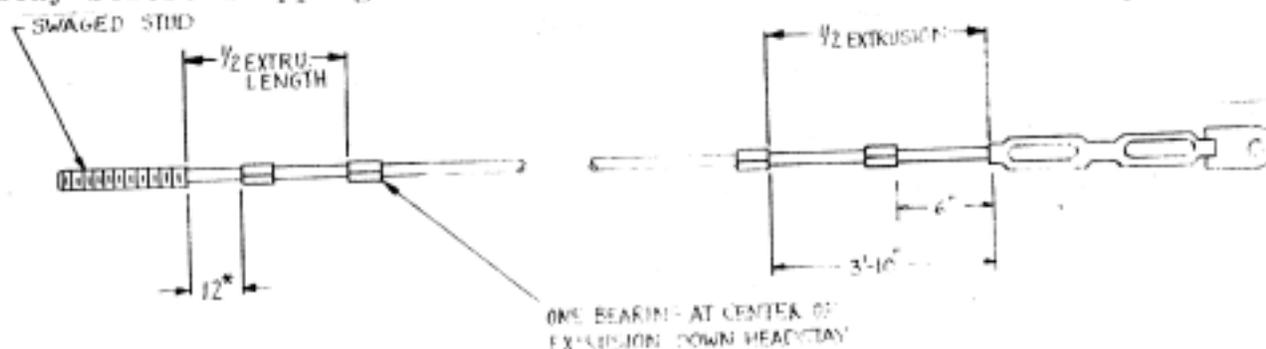
3. Check fit of swaged thread stud in halyard fitting. Some swages have hexagonal or stamped flats that may not fit and may have to be filed off. If shank was bent during swaging it may have to be straightened to fit through extrusion.



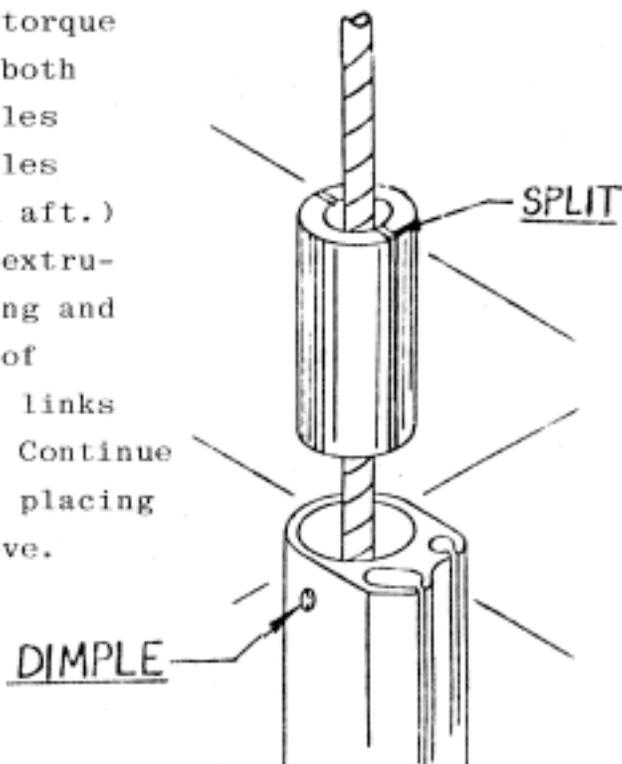
ASSEMBLING THE EXTRUSIONS

FOR HEADSTAYS WITH JAW-JAW OR NAVTEC TURNBUCKLES

1. Place two stay bearings on bottom of headstay spaced as shown below. Install bearings by slipping split in each bearing over headstay while holding open with screwdriver blade. Then wrap strapping tape (provided) around headstay on either side of each bearing. Dry headstay before wrapping and be sure to make at least seven complete wraps.



2. Slide bottom extrusion from top of headstay down over bearings, making sure feed slot is closest to bottom of headstay. Place a line of WGL lubricant down each half of the torque link where it fits against the headstay. Fit two halves of torque link together and slide in against dimple. If put in one half at a time, torque links can drop past dimple. Make sure both halves of torque link are opposite dimples inside extrusion as shown. (Since dimples are athwartship, slits must be fore and aft.)
3. Put on next bearing spaced in middle of extrusion length, slide extrusion over bearing and insert lubricated torque link into top of extrusions. Again, make sure halves of links are opposite dimples inside extrusion. Continue this same procedure to top of headstay, placing the top bearing as shown in drawing above.

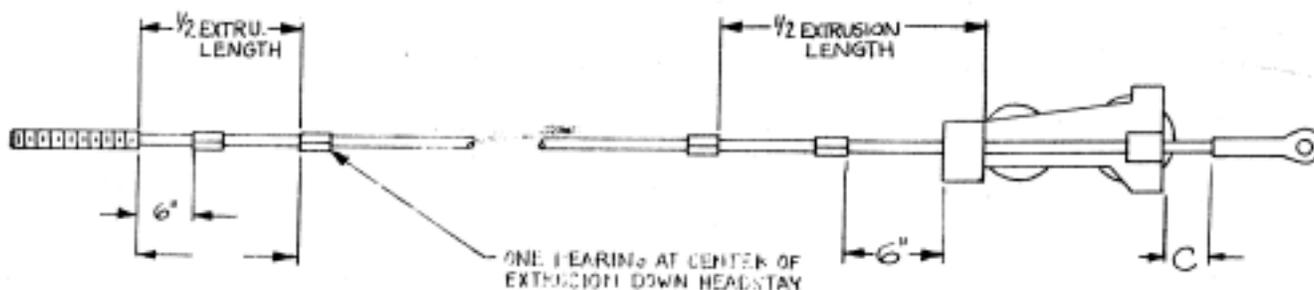


- Slide on halyard top fitting after fitting halyard traveler into larger groove in extrusion. Place teflon bearing into cup at upper end. Tighten set screw to prevent bearing from coming out. Tighten set screw to hold halyard fitting to extrusions.

- Screw threaded marine eye fitting onto upper stud and secure with cotter pin. Failure to do this will allow headstay to unscrew itself and fall down.

II. FOR TURNBUCKLES WITH SWAGED THREADED STUD

- Slide halyard top fitting over headstay from bottom, and place teflon bearing in upper end. Tighten set screw to prevent bearing from coming out.



- Place two stay bearings over headstay below halyard top fitting as shown. Install bearings by slipping split in each bearing over the headstay while holding open with screwdriver blade. Then wrap strapping tape (provided) around headstay on either side of each bearing. Dry headstay before wrapping and be sure to make at least 7 complete wraps.
- Slide first extrusion from bottom of headstay, over bearings. Slide halyard traveler into larger groove in extrusion and insert into

halyard top fitting, tighten set screw. Lubricate torque link with WGL as described on page 8 and insert into bottom of extrusion as described on page 8. Make sure dimples are opposite torque link halves.

4. Continue to install bearings, strapping tape and extrusions to bottom of headstay, making sure halves of torque links are lubricated and are perpendicular to "dimples" inside extrusions. Place final bearing as shown in drawing, then slide bottom extrusion over bearings, making sure feed slot is closest to bottom of headstay.

CONTINUE HERE FOR ALL TURNBUCKLES

Slide entire extrusion assembly, including halyard fitting, as high on headstay as possible and place a vice grip tightly against the bottom of extrusions.

Slide traveler to bottom of left slot. Check that it slides freely down entire length of extrusions. If extrusion grooves have been damaged in shipping, they may be opened with a screwdriver blade.

Slide drum throat over lower end of extrusions. Reassemble turnbuckle by first threading lock nuts back onto threaded ends (if turnbuckle provided with lock nuts). Then thread each end approximately 1/2" into the body of turnbuckle.

Tie messenger onto end of tensioning line. A messenger is required to change sails. It can be any line as long as the headstay. Pull shackle to bottom of extrusion assembly (traveler will go to top). Tape shackle and messenger to bottom of extrusions in order to control halyard and messenger during installation.

INSTALLING REEFER ON THE BOAT

WITH MAST OUT OF THE BOAT:

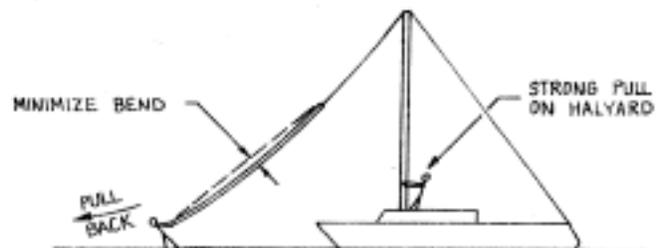
Reattach headstay upper terminal to the masthead toggle. Then restep mast in regular manner. Be careful to bend extrusion assembly as little as possible, to avoid damaging joints.

WITH MAST IN BOAT:

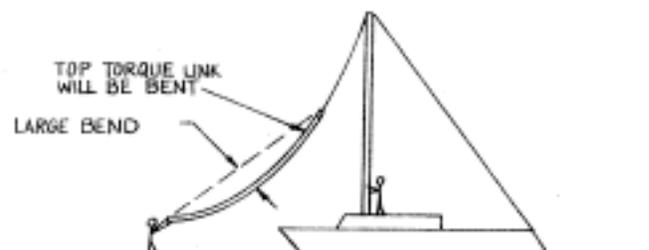
Hoist headstay and assembled extrusions, using spinnaker or spare halyard, while someone goes up on main halyard and attaches headstay upper terminal to masthead toggle (with jib halyard holding up the mast).

CAUTION: Extrusions must not be bent sharply or torque links may be damaged. Hoist assembled extrusions aloft with one person holding lower end against pull of halyard to keep extrusions as straight as possible.

If boat is in an awkward position where above cannot be accomplished, 24" wood splints can be taped at each joint and removed after headstay has been tightened.



CORRECT HOISTING OF EXTRUSIONS



INCORRECT HOISTING OF EXTRUSIONS

TIGHTENING HEADSTAY

Attach lower end of headstay to stem fitting in normal manner. Tighten headstay turnbuckle to achieve desired mast position and tension. Then tighten lock nuts or install cotter pins (depending on design of turnbuckle) to keep turnbuckle from opening. Cotter pins or nuts are important to keep furling from opening turnbuckle. If clamp is placed above turnbuckle body, lock nuts should be added to prevent the turnbuckle from turning against cotter pins during furling and unfurling.

TIGHTENING CLAMP

Stainless steel clamp prevents rotation of line guards and drum bearing by biting into turnbuckle threads. Before aligning fairlead eye, make sure ridges inside clamp are not sunk into turnbuckle threads.

- 1) Grasp line guards and rotate clamp so fairlead eye lines up with furling line.
- 2) Remove crossbar and lift drum bearing clear of clamp.
- 3) Securely tighten four socket head screws in clamp.
- 4) Reinstall drum bearing and crossbar with fairlead eye correctly aligned.

THINGS TO CHECK AFTER TUNING RIGGING

- 1) Turnbuckle lock nuts tightened securely, or cotter pins installed and bent over, to prevent turnbuckle from backing off.
- 2) Furling line fairlead eye facing aft, and screws in clamp tightened securely.

INSTALLING FURLING DRUM AND FURLING LINE

- 1) Place a generous amount of WGL teflon marine lubricant inside furling drum where bearing will rotate.
- 2) Remove vice grips and gently lower extrusions and drum throat until extrusions bottom on turnbuckle. Raise drum throat so it will fit into square cavity in top of furling drum halves. Align drum throat so tack flanges are over slot in upper flange of furling drum.
- 3) Fit left and right halves of furling drum over drum bearing and drum throat. Before installing fasteners, place end of furling line 1/2" into furling drum between jammer teeth. Install and tighten #12 nuts and bolts (2 1/2" long bolts at top of drum, 4 1 1/4" long in middle and lower) and four #6 screws to hold flanges together. Do not over tighten.

4. Raise assembled extrusions as far up headstay as possible, then back down approximately 2", rotating one turn to check halyard fitting clearance. Then slowly slide extrusions up or down until first visible set of tapped holes on each side of lower extrusion lines up with holes in either side of drum collar. Insert two flat head machine screws into holes on each side of drum collar to lock drum and extrusions together.

LEADING FURLING LINE AFT

Furling line should be 5/16" braided dacron twice the length of boat. Three or more small blocks should be used to lead furling line to cockpit. Do not use fairleads, as too much friction is generated.

TO INSTALL FURLING LINE:

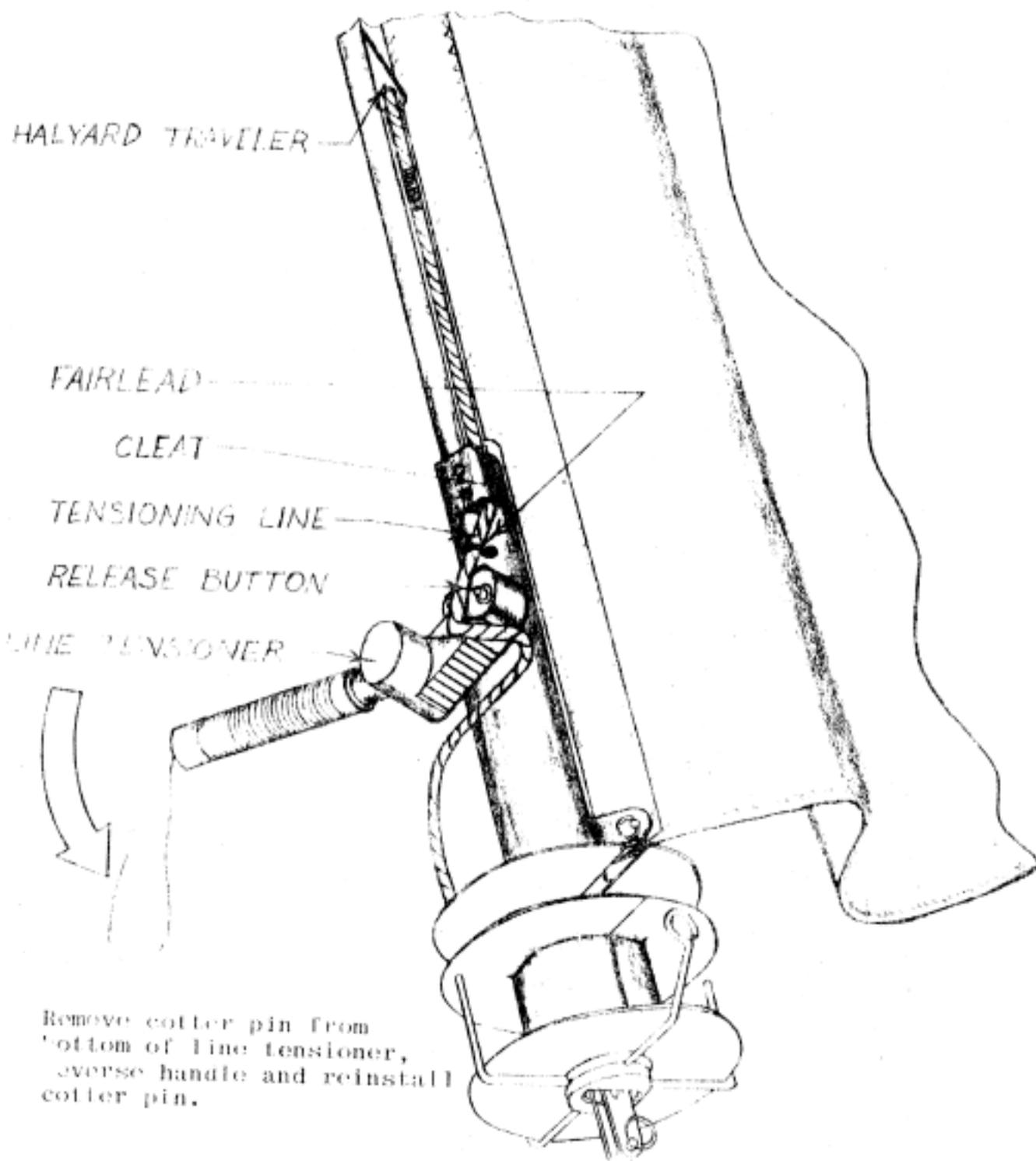
1. Place first block so furling line is parallel to drum flanges. If furling line presses hard on fairlead eye, then line guards may be forced against drum and cause binding.
2. Place other blocks to lead furling line smoothly along rail to cockpit, with a minimum number of turns. Install cleat in any convenient spot in cockpit.
3. Load line onto drum by rotating headstay. Approximately half line should be stored on the drum. When this is done, you are ready to hoist the sail.

HOISTING THE SAIL

1. Attach tack and halyard pins to sail.
2. Insert luff of sail into smaller groove in extrusion.
3. Hoist the sail aloft with messenger, place tensioning line in cleat on drum throat and untie messenger.
4. Line tensioner is inserted into drum throat by pressing release button and inserting into hole in drum throat and halyard tensioned as desired. See picture on page 15.
5. Wrap excess halyard between upper two flanges of drum. Velcro is provided to hold line between flanges. Lead halyard through slot in upper flange opposite cleat to more securely hold halyard in cleat.

ILLUSTRATION OF LINE TENSIONER USE

After placing tensioning line in cleat and removing messenger, pass end of tensioning line through fairlead and around line tensioner as shown. Rotating line tensioner will tension luff of sail for maximum luff tension. This may be repeated several times.



FURLING AND REEFING THE SAIL

HALYARDS HANGING DOWN FRONT OF MAST CAN CATCH IN ROTATING HALYARD FITTING. TO PREVENT JUST FLIP THEM BEHIND UPPER SHROURDS AND SPREADERS BEFORE CLEATING TO MAST.

FURLING

1. To furl the sail, merely pull in on furling line from cockpit. Hand power all that's needed, only special situations necessitate use of a winch.
2. To roll the jib tightly around the headstay, it is advisable to keep some tension in jib sheet. This can be done by holding the jib sheet and allowing it to slide through your fingers or by leaving two turns around a winch while furling. After jib has been completely furled, furling line should be cleated and jib sheet tensioned.
3. To unfurl, uncleat furling line, leaving one turn around the cleat for friction. This prevents snarls on drum. The jib sheet on leeward side of boat is then pulled to unfurl sail. It may be unrolled part way or all the way, depending on wind conditions.

REEFING

1. The sail should be tightly rolled to maintain optimum sail shape. Leave two turns around the sheet winch with the tail of the jib sheet held loosely in your hand. Then pull the furling line in against tension of jib sheet to achieve the tightest roll (and, therefore, the best sail shape).

2. You may reef the sail to any point. Any sail may be reefed except a Genoa specifically cut very full and having a light-weight cloth that cannot withstand the strain of reefing.

REMOVING THE REEFER FROM THE BOAT

To unrig mast or adjust headstay turnbuckle, you must first remove furling line. Then, while holding extrusions up, remove 4 screws holding extrusions to drum collar, disassemble drum, and place a vice grip below the extrusions on the lower headstay terminal just above turnbuckle.

Keep extrusions as straight as possible during removal to prevent damage to torque links.

SAILING WING AND WING

Double groove design of the Reefer enables you to sail wing and wing with 2 jibs. The second sail can be inserted in halyard groove, but first the halyard traveler must be below feed slot in bottom extrusion (which may require use of a pennant on primary jib or Genoa).

This second jib is hoisted with regular jib halyard in usual manner. If you find second sail difficult to hoist, simply ease up primary jib to allow slack in halyard wire.

NOTE: You cannot furl either jib when sailing in this configuration.

RACING WITH THE REEFER

The Reefer was designed primarily as a reefing and furling system for cruising sailors. Though it will serve adequately for racing, we do not content that your Reefer is a superior double headsail changing system.

FOR DOUBLE HEADSAIL CHANGING:

- 1) Attach a small messenger line to snapshackle and pull traveler down as far as possible. When traveler is all the way down, snapshackle will be two-blocked at halyard fitting. This will prevent extrusions from separating when hoisting sails. Be sure not to over-tension the tensioning line, or you will encounter difficulty in hoisting the sail in halyard groove.
- 2) Flip small messenger line behind spreaders and secure. This will make it possible to later retrieve snapshackle to use the Reefer for furling. The grooves are now ready for double headsail changing by using masthead halyards supplied with the boat.

MAINTENANCE OF THE REEFER

The Reefer requires minimal maintenance. If furling becomes hard, merely rinse the drum out with fresh water (for easiest furling, WGL Teflon lubricant as supplied with unit can be used). If hoisting of halyard becomes difficult, lubricate halyard traveler with WGL.

<p>IMPORTANT: DO NOT USE SILICONE SPRAYS. THESE CONTAIN ANHYDROUS HYDROCARBONS WHICH DRASTICALLY WEAKEN THE LEXAN DRUM.</p>

LIMITED WARRANTY

1) Cruising Design warrants all parts for the period of two years from date of purchase with the following exceptions:

A) Standard marine parts listed below carry their manufacturer's

warranty:	Nicrofico	Line Tensioner
		Cam Cleat
	Seco	Blocks

B) Normal wear items are listed below and warranted for 90 days: -

Halyard

Hoisting Halyard

Rope Tensioning Halyard

2) If during the above period of time any part of the system fails function properly, that part will be replaced or repaired by C. Design, Inc., free of charge. Just return the part postpaid

Cruising Design, Inc.
Customer Service Department
35 Congress Street
Salem, MA 01970

WARRANTY REGISTRATION CARD

PLEASE COMPLETE AND RETURN TO THE ABOVE ADDRESS:

DEALER NAME _____
ADDRESS _____
UNIT SIZE _____ DATE OF PURCHASE _____
CUSTOMER NAME _____
ADDRESS _____
TYPE OF BOAT _____