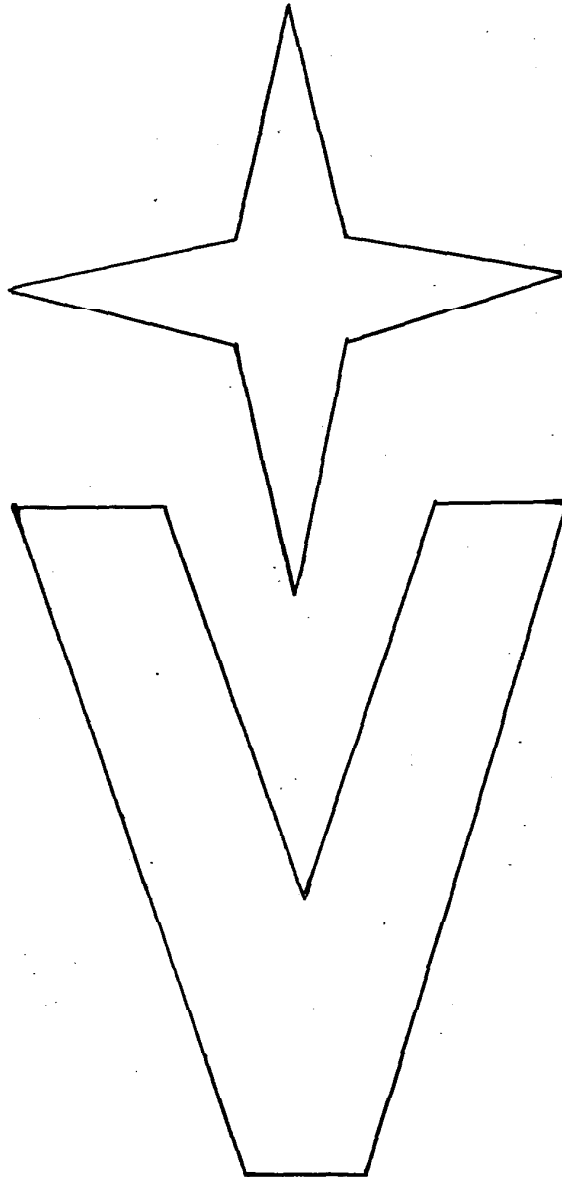


VEGA

Sidney A. Rosen
10615 Whitman Circle
Orlando FL 32821

Owner's Repair & Maintenance Manual



Vega One Design Chesapeake Association, Inc. (VODCA)

- Notice -

The members of VODCA provide the information in this manual with the explicit understanding that none of the procedures and techniques included herein have been engineered as to their applicability or conformance to any codes or standards of the boating industry. The use of any information herein is at the user's risk and VODCA accepts no responsibility for the results or consequences of the use of same.



V O D C A

Vega One Design Chesapeake Association, Inc.

VEGA OWNER'S REPAIR AND MAINTENANCE MANUAL

All rights reserved. May not be copied
or duplicated. Available to VODCA mem-
bers only.

Issued April 1978
Revised June 1980
Revised May 1982
Revised Feb 1984
Revised Sep 1987

Project Coordinator
Art Levin

CONTENTS

Alternator Relay (or Voltage Regulator)	1
Care of Hull, Topsides, and Sails	2
Cockpit Hatch Covers & COCKPIT GRATING	4
Engine - Diesel	6
Engine - Gasoline	16
Galvanic Action - Electrolysis	20
Head - Marine Sanitation Device (MSD)	22
Improvements - Additions and Changes	25
Navigation Equipment	38
Propeller Shaft - Reversing Mechanism (Combi Unit)	42
Rudder Repair	57
Standing Rigging	60
Starter - Generator	63
Stuffing Box	65
Water Pump - Impeller	68
Winterizing	70
Miscellany	72


FOREWORD

This manual represents the combined reported experience, mistakes, and wisdom of past and present VODCA members. It is meant to supplement, not supplant, the Vega owner's manual. The opinions expressed in this manual are advisory only, to be implemented at personal risk, and no guarantee is implied or intended, nor does VODCA, Inc., its officers, or members assume or accept any responsibility for these contents.

Since we are sailors, not mechanics or engineers, many of the descriptions and instructions are incomplete and sometimes confusing. Names of the commenting members are identified so readers may know whom to call for further information. Many other useful tips are not included because, while simple to implement, written descriptions become impossibly complicated. The best way to learn more is to participate in scheduled rendezvous, inspect other boats, or call or write other members. Also, the VODCA NEWSLETTER often carries additional information, which should be clipped and appended to the manual to keep it up to date.

Advice, parts, and workshop manuals for the engine (both gasoline and diesel) can be obtained from the various sources listed in the respective sections of this manual, as well as from local dealers listed in your telephone book "yellow pages." Vega owners who have replaced their engines sometimes have parts of their old engines and Combi units available as replacements. Additional sources for Vega parts and engine parts are: Vegatillbehör (owned by Henry Gustafsson, a member of the Swedish VEGA Association), P.O. Box 2284, S-310 58 Vessigebro, Sweden; and Stanton Marine & Leisure, 94 Everton Road, Hordle, Lymington, Hampshire SO4 0FD, England.

IMPORTANT NOTICE



As this revision went to press, we learned that the Swedish marine supplier VEGATILLBEHÖR (referred to throughout this manual) had changed its business name to VEGA MARIN AB, same address. It is suggested that you request confirmation in writing of the availability and price of your order before sending payment.

ALTERNATOR RELAY (or Voltage Regulator)

With the combined help of VODCA members Jay Dockman and Sid Rosen I was able to locate within days a part which had not yielded to a year-long search by my Galesville boatyard and the Albin people in Cos Cob.

The part is an aluminium box the approximate size of a pack of cigarettes and is installed on many of the diesels with both a generator and an alternator. In the owners manual it is identified as "the alternator relay," although it includes other electronic components and should be requested as a "voltage regulator."

Jay's Volvo-Penta manual correctly shows it in the diagram and identifies it as "relay" Volvo part number 239964. (This is important because my boatyard told me they couldn't get the part because they had no Volvo part number.)

Armed with Jay's manual pages I went to Washington Marina, which Sid Rosen had suggested as the best Volvo parts source. He proved right.

But here is the catch. The component is not a Volvo part, it is a Bosch part (although nowhere does it so indicate). Using Washington Marina's catalogues were able to identify it as:

Bosch: 0 190 600 010 850 Regulator

Under that description, Washington Marina obtained the part in 48 hours.

A note for the future: Washington Marina said that Bosch is in the process of renumbering its parts. The new number, which was handwritten on the box is:

Bosch: 30-047

The relay, by the way, is a relatively vulnerable part. It will burn out if some crewmember forgets and turns off the ignition while the engine is still running. Mine didn't burn out but started overheating and producing erratic voltage.

Replacement is a breeze. Simply plug in the unique three-prong connector and you are in business. Screw the box itself at any handy spot behind the instrument panel.

- Tom Moore

To be on the safe side, every time the diesel engine is turned over, even by hand with the crank, the ignition key should be on so that the relay does not burn out.

I previously reported that I had substituted for the original Bosch alternator regulator on my MD6A diesel engine a solid-state 12V Motorola regulator Model 8RH 2004A. This substitution worked for about a year, but the slightly higher voltage set into the Motorola regulator finally rendered my alternator inoperative.

I had the alternator repaired, and am now back to using the original Bosch equipment, latest regulator part number 30-051 (0 190 601 006-740). In an emergency when the Bosch regulator isn't obtainable, you can use the Motorola regulator (with its own wiring harness) temporarily, but replace it with the Bosch regulator as soon as possible to protect the alternator.

Also, an easily obtainable alternator belt is the Gates belt No. 7520 (10 x 1325 mm) available at most automotive supply stores. The Volvo belt is Continental SPZ 1312 (9,5 x 1325 mm).

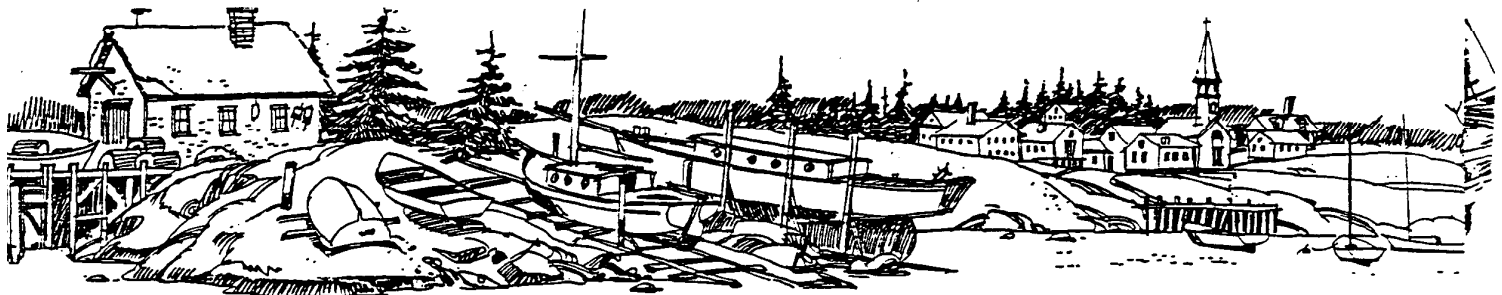
- Art Levin

The alternator regulator I had to replace had Bosch part number 0 190 600 016 stamped on it, which was the part number I ordered from Germany. While waiting for delivery, I stopped in at a Carquest Auto Parts discount store and they came up with a better part obtained from C.E. Neihoff Co., Division of TRW, Chicago, IL (part no. WA 709 Regulator). Not only was it \$10 cheaper than the Bosch part (1984), but also produces $\frac{1}{2}$ volt higher charge.

- Jim Sheldon

I took the diode pack off the alternator and connected up a battery selector switch instead. Now I can use either battery for starting, which could not be done with the original system.

- Harold Cohon



CARE OF HULL, TOPSIDES, AND SAILS

I would advise waxing the hull and tootsides at least in the beginning of the year. It prevents crazing and chipping; it is not just cosmetic. Cleaners such as oxalic acid take off a lot of stains. - Art Levin

The best product is from a Sherwin Williams car paint shop. It is a rubbing compound for acrylic finish and it is finer than regular rubbing compound and works faster.
- Mace Miyasaki

For waxing I use Classic or Starbright. - Art Levin

I use DuPont Rain Dance. - Mace Miyasaki

I use Starbright, but the Vega man said not to use it. He said later repairs might not stick to the gel coat.
- Sam Amoss

I use Starbright also and find it very good. - Russ Walker

I use teak oil on the teak and put it on three or four times a year, but I do not clean my teak first. I paint it on with a brush but you can use a rag. It will stain the gel coat but the stains can be removed with a cleaner. It is important not to let the teak dry out; it will crack. In the cabin I use furniture wax on the interior finish.
- Art Levin

I have seen several boats which had their teak done in "DEKS OLJE" number 1. It gives a rich brown color and is also a sealer. The people I have talked to all like the product. The product is also manufactured in a glossier finish (#2). The BOAT US price is \$4.70 (List \$6.21) for a quart size can. The initial application requires more than subsequent applications. - Sid Rosen

Most boats have their bottoms painted with 3 quarts of anti-fouling paint annually, and a hard, vinyl-type finish seems to be preferred. Some of us are experimenting with painting only every other year, with not too bad results. The test for your area is how soon the boat gets very sluggish in the water, even under full engine power. - Art Levin

I took my sails to Housley the first time and they seemed to get more wear by having them washed than from sailing. This year I did them myself.

- Jim Hartzler

I had my sails washed one year and I didn't see any difference. Last year I took the genoa and jib to a laundromat where they have a giant washing machine. It was a sudsy disaster and I haven't done that again. I just hose off my sails occasionally now.

- Art Levin

I had my sails cleaned one year by Thurston and another year by Murphy and Nye in Annapolis, but I didn't see any difference. I haven't had it done again. But I do hose them down occasionally to get the salt off.

- Russ Walker

One of my happier sailmates managed to step thru the cover of one of my vents over the lazarette. A thoro search of U. S. suppliers convinced me that nothing in this country was made to fit the hole. Thru Albin Marine in Sweden I located a Swedish chandlery with parts for the Vega:

Peter Andre'N AB
Hamnvagen 6
S-18363, Taby
Sweden

In 1984, the cost of two covers plus shipping was 120 kronars, or \$15.

- Robert Brillhart

I had sunken areas near the stern cleats over the lazarette. I filled them successfully with car-body filler and gel coat.

- John Sprague

A hull problem now receiving major and increasing attention is "boat pox" or blistering of fiberglass boats. As described in a Cruising World article by Jim Gilbert (Dec., 1986), blistering is caused by water penetrating the gel coat and getting trapped in the underlying laminate. As more water accumulates in the hull, the internal pressure results in blisters on the underwater portion of the hull.

All resins used in fiberglass hull construction are permeable to some extent. Theoretically, isophthalic resins are less permeable than orthophthalic resins, and epoxies are less permeable than isos. Some manufacturers are now using, or will use on special order, reinforcing fibers laid down with a chopper gun in place of the first layer of laminate, and an epoxy gel coat, to prevent blistering. One major manufacturer has been using vinylester resin in the laminate and for blister repair, with good results so far. The Gilbert article, "A Pox On Your Boat," describes in detail the causes, prevention, and cure of blistering, for further reference.

The good news for Vega owners is that isophthalic resin was used for the gel coat, and the lamination was made partly by spraying chopped fiberglass mixed with polyester resin and partly by laying up by hand two layers of woven fiberglass rovings. No fillers were used. While this does not guarantee against blistering, it should be of comfort to know that Vega hulls were properly constructed long before blistering was recognized as a major problem, now affecting as many as one of three fiberglass boats.

Blisters can be detected by careful examination of the underwater portion of the hull when drydocked for bottom painting. The old paint may hide small blisters, which, however, can be felt by touch. In the terminal stages, blisters grow like mushrooms, the hull laminate becomes waterlogged, and the boat leaks like a sieve. The condition is reparable, by pouring money into the fiberglass holes.

- Art Levin

During the original survey of "Double Fantasy," we were informed that all six of our stanchion bases were surrounded by hairline cracks. Fortunately, these cracks were only on the underside of the deck and did not extend through to the topside. I decided it was wise to repair these before any significant weakness developed.

My first step was to remove the trim boards inside the cabin in order to provide easy access to the bases. I then applied fiberglass mat and cloth to the cracks. Seran wrap and tape were used to hold the cloth in position. The plastic wrap was peeled off after the fiberglass had dried.

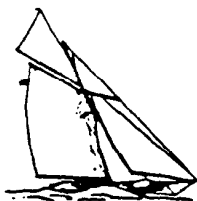
I replaced the existing small aluminum backing plates with larger ones made from stainless steel. It cost about \$20 to have the six new plates made. Each stanchion base was removed, rebbed on both sides, then repositioned. It's a good idea to purchase extra nuts and bolts; inevitably one or two of these get broken. Also, care should be taken to avoid plugging the drain holes at the base of the stanchions.

Next, the screws holding the stanchions in their bases were removed. My stanchions were constantly wobbling inside their bases, so I decided to tighten them up. By removing the screws, they moved $\frac{1}{2}$ inch deeper into their bases. I used a prick punch and hammer to mark the stanchions. I drilled and tapped two new holes; one through the original hole and a second, totally new hole. I put in two new screws which reduced the wobble significantly.

Finally, I installed a few "gate stops" (they look like doughnuts with set screws). They fit over the lifelines up against the backside of the aftermost stanchion posts. They keep the lifelines from drooping down when the pelican hook for the boarding gate is released.

I spent under \$50 and about 20 hours in repairing the system. Now I feel much more confident that I'll stay on board.

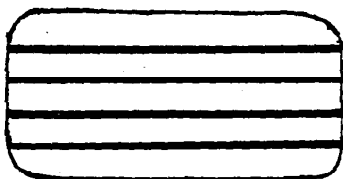
- Paul Halvachs



COCKPIT HATCH COVERS & COCKPIT GRATING

I would like to describe how I replaced my aging hatch-covers simply and cheaply. I obtained a 3'x5' piece of high-grade sheet mahogany marine plywood (3/4") from Johnson's Lumber in Annapolis, Md. I used the old hatchcovers for patterns and sawed, planed, sanded and oiled for just a few hours with the resulting covers just a beautiful sight and of furniture quality - all for \$26.00. - Mike Johnson

My teak veneer plywood cockpit seats started to come apart. I covered them with white Formica and then added teak wood strips. It makes the boat look quite different.



- Jim Ranti

On the locker (cockpit) lids. Teak arrived, planed and nicely milled as specified, 5/8" x 8" width. Two boards 70", one board 60". Some one inch thick by 1 1/2" wide pieces for cleats. The port and starboard lids were then made by carefully joining two pieces, using cut nails as dowels, using epoxy for the joint, and then using epoxy to glue three cleats across joints after setting carefully screwing using 4 screws per cleat, 1/2 inch into the seat. Using the old seats as templates, and duplicating very carefully the measurements for piano hinges, catches, installed them, with a few minor adjustments, they fit nicely. Used a thin filler, two coats, and will now varnish. The joint of the two boards, as expected, have separated slightly, which will be no problem to work a filler into when they are varnished. Having paid \$112 to Condon Lumber of White Plains for the wood, it was sent freight collect \$19.50 to Cambridge. However, the old plywood covers were shot, never were right from the start, and I would not go to sea in a VEGA with this installation, not near strong enough for the ocean. I did not bother about the inlayed gasket. I'll take some appropriate thin cushion tape and run it around at some point. Any questions please call. It took quite careful carpentry to make them up, but they came out fine. Big trick, joining the 8" boards for a smooth fit, and careful measurements to duplicate originals. - Robert Shepard

On my locker lids, the edge where the hinge is, the screws have split the wood and the hinges are loose. I chopped off the split part and built it up with Marinetex. Also the gaskets have not been fitting too well. I bought cellular vinyl tape that is 1/2 inch by 7/16ths and cut it in half. - Sid Rosen

When we bought our boat, the starboard cockpit hatch cover had started to delaminate. The previous owner had used duct tape on the underside which served to keep out water but did not provide any support, so very shortly we had two delaminations and a fracture. Our first attempt with the problem was to fiberglass the cover, but eventually the fiberglass started to delaminate and we had to remove it and sand down to the wood. For a proper fix:

1. Remove hardware and bracing boards.
2. Finish delaminating all seams, clean off old gunk with a chisel, and sand the seams down to the bare wood.
3. Assemble two large C-clamps, borrow or rent a set of "bar" clamps, buy several tubes of epoxy (not quick setting), and, most important of all, something called "resin thick" (a fine crystalline powder).
4. For one seam at a time, mix epoxy with resin thick until it is the consistency of peanut butter, spread on each side of the seam, clamp together, and scrape off excess epoxy.
5. When cover is completely glued and dry, sand like heck and then oil the wood. Reinstall bracing boards. We put some extra reinforcing braces on the underside.

- Hank and Sheila Dowst

I followed Jack Berle's lead in covering my cockpit hatch covers with formica (sheet obtainable from lumber yard, cemented down with waterproof contact glue according to directions on the can; patterns and colors available to suit every taste). So far, so good after about seven years.

- Art Levin

We replaced the teak cockpit hatch covers with new ones from Vegetill-behor -- better than the original. We were very pleased with price and quality.

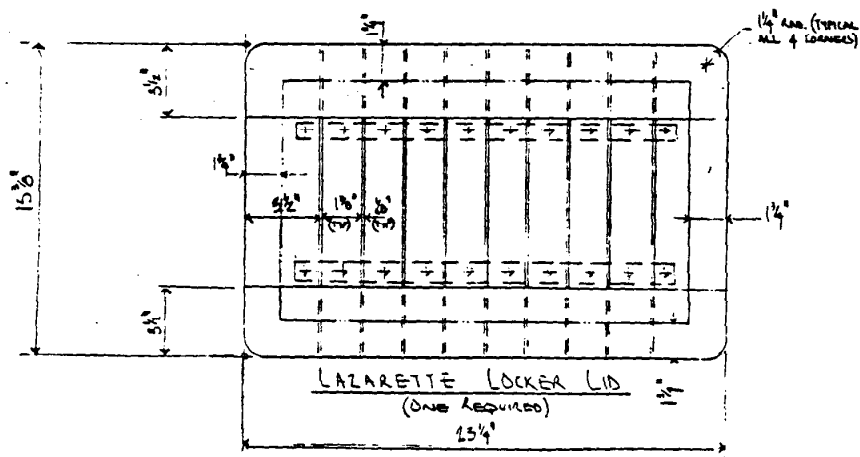
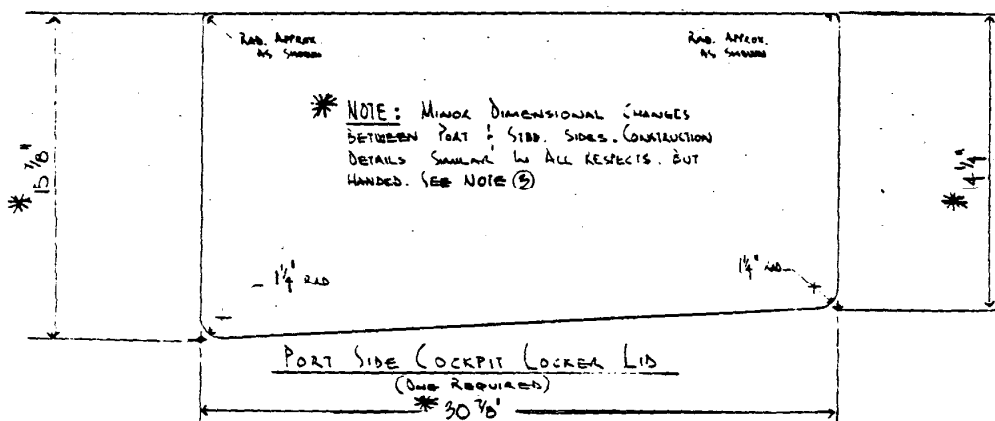
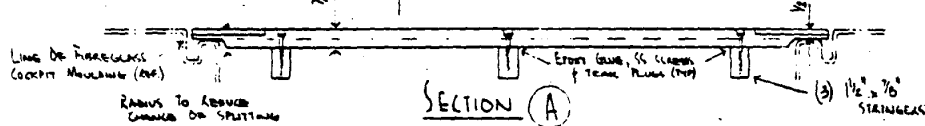
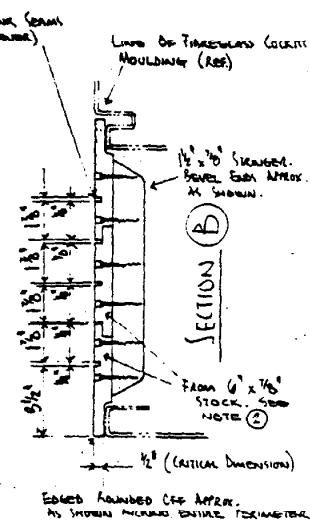
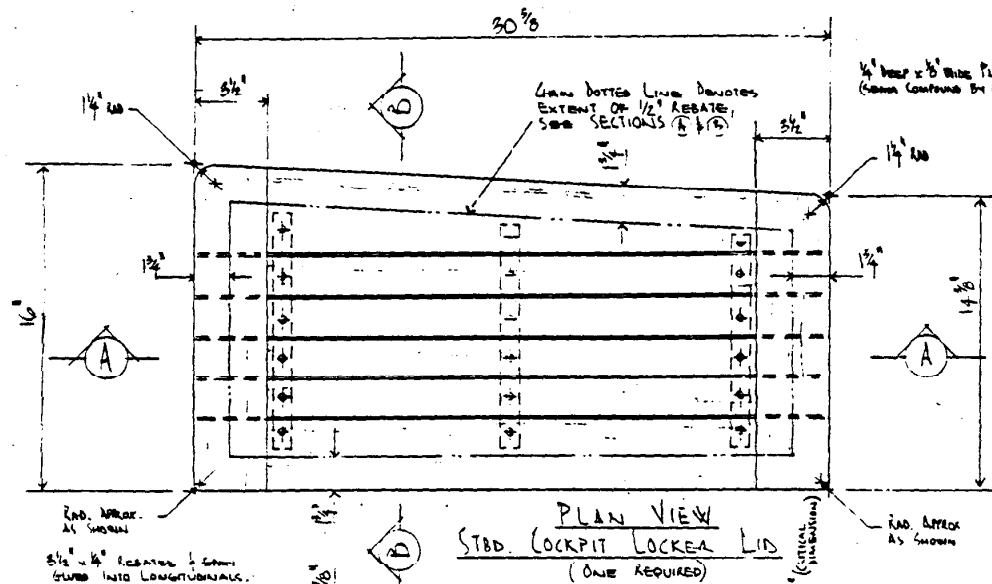
- Noel & Maureen Bearce

I manufactured new cockpit hatch covers out of 3/4" teak, using the old covers as patterns. I lap-jointed two 9" widths together and attached cross braces underneath with screws and epoxy. It really spruced up the appearance of Funseeker.

- Willis Alexander

The cockpit sole cracked and I replaced it with 3/4" marine plywood with teak veneer. With the 3/4," I needed longer screws. Rather than try to find metric screws, I retapped the existing threads (directly with no drilling) to $\frac{1}{4}$ - 20 and was able to use stock screws (flat-head, with cup washers) from the supply house. It really looks nice.

- Harold Cohon



NOTES:

1. ALL TRUCK CONSTRUCTION WITH RESORCINOL OR EPOXY GIVE JOINTS.
2. 3 1/2" WIDE PERIMETER, 1 7/8" PLANK EFFECT 1/8" PLANK SEAMS MAY BE DIMENSIONALLY MODIFIED TO SUIT AVAILABLE STOCK.
3. PORT SIDE COCKPIT LOCKER LID IS "MIRROR IMAGE" OF STD SIDE LID.
4. CONSTRUCTION OF LAZARETTE LOCKER LID IS SIMILAR IN EVERY WAY TO COCKPIT LOCKER LIDS.
5. FINISH REQUIRED - Sanded & READY FOR SEAM COMPOUND & OIL.

"LORNA DOONE"
27' Aux. M.H. SLOOF
COCKPIT HATCH LIDS

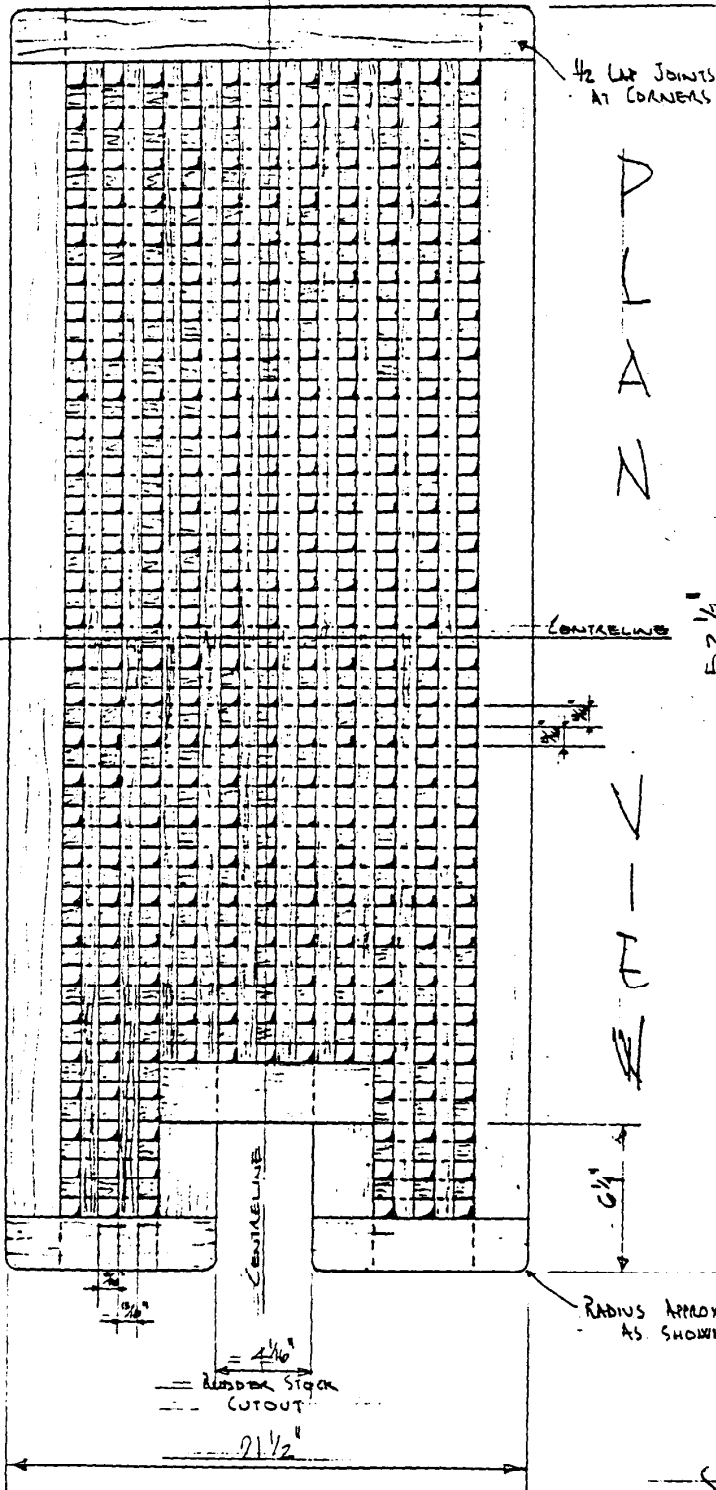
SCALE: 3" TO 1'-0"

A.G. SKIDMORE
610 LIBRA PLAZA
RR #2, VICTORIA, B.C.

TEL. 386-5833 (OFFICE)
478-5071 (RES.)

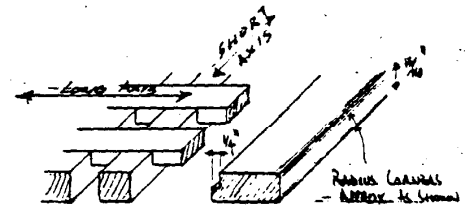
10th Nov. 83

'LORNA DOONE' 27' AUX WOOD LOCKER GRATING

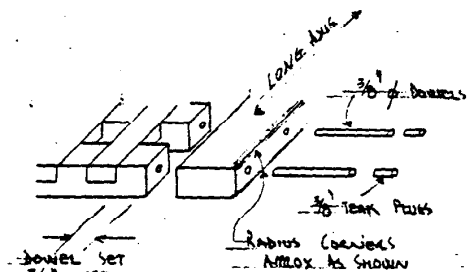


P
L
A
N

16 SKIDMORE
610 LIBRA PLACE
RR #2, VICTORIA, B.C.
V8X 5X2
TELEPHONE 478-3871 (HOM)
386-3833 (OFFICE)



SHORT AXIS (21 1/2")
EDGE DETAIL



LONG AXIS (52 1/2")
EDGE DETAIL

NOTES:

- ① MATERIAL — TEAK; EDGE
— GRAYN IF POSSIBLE.
- ② ALL JOINTS GLUED, EPOXY OR
— RESORCINOL.
- ③ FINISH — SANDED & READY
— FOR OILING.

SCALE: 3" = 1'-0"

ENGINE - DIESEL

After 20 hours service I had a mechanic torque the head and adjust the valves. The reason was to keep the engine under warranty. The boat is a 1976 with a 6-B diesel. The Volvo manual provides that every diesel engine should have the head torqued after 20 hours. - Sam Amoss

I spoke with the Volvo representative at the New York Boat Show last year (1977). His advice was: Keep the oil changed and change the filter at regular intervals. Put in a new fuel filter as needed. Never clean it; always replace it. Keep the fuel tank reasonably full to decrease condensation. But don't fool with it. Don't keep taking out the injectors. - Phil Rogers

I operate on the assumption that if it ain't broke, don't fix it! I religiously change the oil and oil filter each year, but otherwise I have not done any routine maintenance on the engine since I got the boat in 1972. - Art Levin

Had to replace the electric fuel pump (fall 1978). A replacement pump was secured from Cos Cob at a cost of \$125. Subsequent pumps will cost \$175. An American pump can be obtained for less, but the present pipe fittings are metric. In an emergency, the electric fuel pump can be by-passed and the engine fuel pump will do the job. - John Romary

There was general agreement that black smoke and soot is a common occurrence; that it is most likely to occur with the engine at full throttle.

If you have to hand crank the engine, get a little oil or grease on your fingers. If you have to use any force to get the handle in, don't use it, because it has to come off easily. - Sam Amoss

The engine acted like it was trying to run away with itself so bad that I had to shut it down and take a tow into Cat Cay. I found a bad connection on the electric fuel pump and also had to re-adjust the entire shifting positioning. Apparently the wild engine gyrations had moved the sleeve somehow so that I had no pitch in max throttle position. I was able to get about 3/4 power by changing the position of the throttle cam and the control lever.

Without going into great detail the problem was bad injectors leaking fuel, a fuel injection pump leaking fuel, a bad electric fuel pump, and also a burned out generating side

of the dynastart. The two internal fuel leaks were pumping diesel into the lube oil which in turn caused the engine to get more fuel to burn than normal. I have heard of big diesels running on the lube oil when they became super hot, but never heard of anything like my problem. The only way I know of catching it is to keep a sharp eye on the oil level and if it starts to increase you have problems. The leak in the fuel injection pump was due to the seal between the engine casing and the pump going out. The shaft bearings had worn producing shaft wobble which in turn started the seal turning in place.

A new pump was mucho bucks (\$1000) and you had to have at least a new casing since the bearings are an intergal part of the casing. That would have come to about \$350. The final solution for \$60 was to epoxy the new seal in place. The outfit that did this is one of the best in the country and although they would prefer at least a new casing, they said that their luck had been good with the epoxy. I've eliminated the electric fuel pump and the lift pump seems to do the job just fine. In the process of working out all the problems I found out that if the electric fuel pump is in line before the lift pump and if the lift pump mechanism goes out you can pump diesel into the engine oil and have the same probelm I did.

- Nat Natto

I had an oil leak of considerable proportions to the extent that if not cleaned very frequently the engine drip pan would run over when heeling and did ruin the rug twice. Several mechanics looked at it and decided several things, all wrong. The most time was spent trying to prove it was coming from a loose bolt under the engine. The problem finally turned out to be a defective oil sensor unit and when replaced, no more leak. The replacement was obtained from VOLVO near here (their factory) for about \$14.00 and put on for \$5.00 labor. Previous costs were \$125.00 for trying to find the trouble!! - Herb Edwards

Parts for the Volvo Penta MD6A and MD6B marine diesel engines, and engine workshop manuals, may be obtained from the Washington Marina, 1300 Maine Avenue S.W., Washington D.C. 20024, (202) 554-0222. The manuals are \$8.05 each. THE ORDERING, PART NUMBER FOR THE MD6B MANUAL IS 773-02-30-5.

Thermostat (MD6A) - The pointer on the temperature gauge rose slowly to normal (for my engine) operating temp of between 65 and 70 degrees C (depending on Bay water temp and boat speed), where it stayed for awhile, then suddenly jumped up to 80-85, backed down to normal again for awhile, jumped up to 80-85 again, and continued fluctuating for the remainder of the engine operation. A check of the water pump impeller showed it to be okay. However, the thermostat was all cruded up with scale and I replaced it (part from Washington D.C. Marina Co., \$14.93). I could have wire-brushed clean the old (8 years) thermostat and reused it, but instead I am keeping it for an emergency spare.

Replacing the thermostat is a breeze. It is located in the manifold water jacket on the top, front, starboard side of the engine, with the cover held in place by two front bolts. Two small hoses are connected top and bottom to the cover, so their clamps have to be loosened to remove the cover. The old thermostat has a rubber "O" ring around its circumference that has to be carefully removed and put around the new thermostat, which can fit into place only one way. No sealing compound is necessary when reassembling, but don't forget to tighten the two hose clamps.

Overheating of the engine may be due to the thermostat being stuck in the closed position or malfunctioning, but more usually extreme engine temperature problems are caused by a malfunctioning water pump.

- Art Levin

The large freeze plug (2-1/4" diameter circular depressed area in the front center of the MD6A engine block) finally rusted through after 8 years. For about the last 2 years I had been controlling pinhole leaks with epoxy putty, but this time a dime-sized spot broke through. Getting the old plug out is a chore. I finally accomplished it by placing the blade of a heavy screwdriver just under the top rim of the plug and really pounding with a hammer. This drove the top into the block, and the bottom out, unseating and loosening it. Since the plug is circular, it had to be deformed by screwdriver leverage against the block before it could be removed. Getting the new plug in is even more of a chore. I used gasket sealer, the non-hardening kind (Perma-Tex is good too) as a lubricant around the rim hole. The new plug (Washington Marina, \$5.70 plus tax) has to be seated just right by hand, even all around. Place a heavy wood block, larger than the plug circumference, against the plug and pound with a hammer. If the plug is not properly seated to start with, or the wood block is hit off-center, the plug will pop out and has to be reseated again. I got it in at about the 100th try. The secret to both removing and installing the freeze plug is not to be afraid to really pound it. Don't hit the plug itself when installing, either on the rim or the center,

lest it become deformed and not seal properly.

What appears to be a water pump leak may be due to dripping from the water cooling jacket around the exhaust pipe. The rubber hose around the exhaust pipe through which the cooling water flows is sealed by a hose clamp just above the water pump location. If this clamp is not tight, water drips onto the water pump and then down, simulating a water pump leak. The fix is to tighten the hose clamp (as all clamps should be tightened annually).

- Art levin

Hal and Commie Holzer replaced their original engine with a Westerbeke W-13 diesel. They chose this engine for several reasons, not the least of which was price. "Although the frustrations of expediting our dealer and solving the daily problems will not soon be forgotten, the end result has been sheer pleasure." Contact the Holzers for details of installation if contemplating a replacement engine of this type.

Fram fuel filter #P3522 (used on the Volkswagen Diesel Rabbit automobile) will fit the fuel filter used with the Volvo MD6A engine and is a lot less expensive.

- Sam Amoss

If you've never started your MD6A engine by hand, you ought to try it. You will be surprised at how easy it is to start. It is even easier if you have a second person to work with you. As usual, put your prop in neutral and have your fuel line "on". Turn the key one stop and then hand crank your flywheel with the decompression lever off (up position). When the flywheel is spinning well, throw the lever to it's on (down) position. The engine will start every time. It's reassuring to know that you can always start the engine -- even with a dead battery. Do it now and then to keep in practice. As an added safety precaution, show your crew how to do it.

- Sid Rosen

"Celia's" MD6B engine had been idling for approximately seven minutes when the engine alarm tripped. Just before shut-down, I noticed that the "oil light" was most assuredly on. Opening the engine compartment, I observed approximately two quarts of oil sloshing in the drip pan under the engine. What I found was my oil filter at rest on a motor mount. One of the few changes between the MD6A and MD6B was the oil filter assembly. The oil filter cartridge for the MD6A has a male fitting that screws into the block. The MD6B has a female fitting that screws into a male fitting protruding from

the block. This male fitting is not a permanent part of the block, but rather screws into the block. When removing filters during previous oil changes, this male fitting was backed out little by little, until vibration made the whole mess fall out. Using a rag to apply finger tension on the male fitting screwed it all the way back in, before re-installing the oil filter.

- Sam Amoss

Volvo makes a tach kit, part No.840082, for about \$135. which includes all the wiring harness, the sender, and an illuminated tach and rheostat. You simply unscrew a hex plug on the port side of the engine, a little above and behind the oil filter, and screw in the sender unit, hitch up the wiring as per directions, and mount the tach instrument and rheostat/switch where you will. This latter is probably the toughest part. I mounted mine just to starboard of the engine gauge cluster plate, measuring carefully and cutting the hole with a hacksaw through that fantastically tough 1/2" fiberglass of the cockpit. You'll never use that holesaw for anything else, and a quarter-inch electric drill is smoking at the end of it. Now I don't have to depend on the speedometer for engine setting -- I have the little turbine wheel impeller type and it gets fouled by sea grass or any trash, and it's a comfort to know what the engine is doing.

I raised the lazarette lid and was greeted with a blast of oily exhaust fumes. The whole aft end of the boat was coated with greasy soot from a leak in the riser just at the point where the cooling water enters the exhaust. Removing the exhaust riser, we found it looked like it was made of stainless steel lace. I've since discovered there's a thing called "impingement erosion" which occurs when a stream of water is directed against the side of the exhaust. The water jets in at right angles and strikes the wall opposite and simply wears the steel away; no corrosion, simply erosion. The mechanic boggled at the term, but said he had seen several examples of it and hadn't understood why. He modified the cooling water/exhaust system to inject the water through a tube bent in an "S" to inject into the center of the exhaust along the axis instead of at right angles about three inches aft and below the manifold, ran it into a "water box" which I was told was made for the Yamaha and then back to a riser and muffler. The water box was mounted on top of the fiberglass duct in the engine compartment next to the starboard partition, and now I have a lot more room to work on the transmission. It seems quieter too.

- Jesse Adams

Additional sources for Vega and Volvo diesel engine parts are:

Vegatillbehör
P.O.Box 2284
S-310 58 Vessigebro
Sweden

(owned by Henry Gustafsson, a member of
the Swedish VEGA Association)

Telephone: 46-34620610

Stanton Marine & Leisure
94 Everton Road
Hordle, Lymington
Hampshire SO4 0FD
England

Telephone: 0425-619402

There are many local dealers in Volvo parts. However, they are "here today, gone tomorrow," so any listing would be outdated by the time it is printed. Consult your telephone book "yellow pages."

The address of VOLVO PENTA, a Division of Volvo North American Corporation, is P.O. Box 915, Rockleigh Industrial Park, Rockleigh, New Jersey 07647.

We decided to install a 13 H.P. Volvo MD7A engine in late 1981. Straight shaft with a 16" Michigan prop (2-blade) that was computer-matched to the boat and engine by Michigan. At 2500 rpm we get 6.5 knots. We cruise at 1900 rpm and get 5.5 knots. Renewed the sound-proofing and extended it further in the engine compartment, with much success.

- Herb Edwards

My trusty MD6A diesel finally gave out after 13 years of faithful service. Seawater scored the cylinders due to either (1) blown head gasket, (2) cracked block, or (3) rusted-thru manifold. Rather than repair it, I had a new engine installed: Volvo Penta Model 2002, 2 cylinder, 18 H.P., freshwater cooled, with standard transmission and 3-bladed prop. It fit onto the old engine bed with some modification and much money.

- Art Levin

Tarka II is almost 15 years old. She is in great shape since she was Awl-gripped last year and looks almost new. I have the MD6A diesel engine and had a regular reverse gear installed. What a joy! The engine has also had a conversion to fresh water cooling. I put in a Sendure heat exchanger, designed for the MD6A. The system was running a bit too hot, so I will install a Sendure oil cooler to help the heat exchanger run cooler. My mechanic said that if it were not for the fresh water cooling, the boat would most likely be needing a new engine by this time.

- Jim Ranti

We've had several inquiries for information on the installation of our new engine, on which we did all of the work ourselves and only had a mechanic doublecheck the installation after it was done.

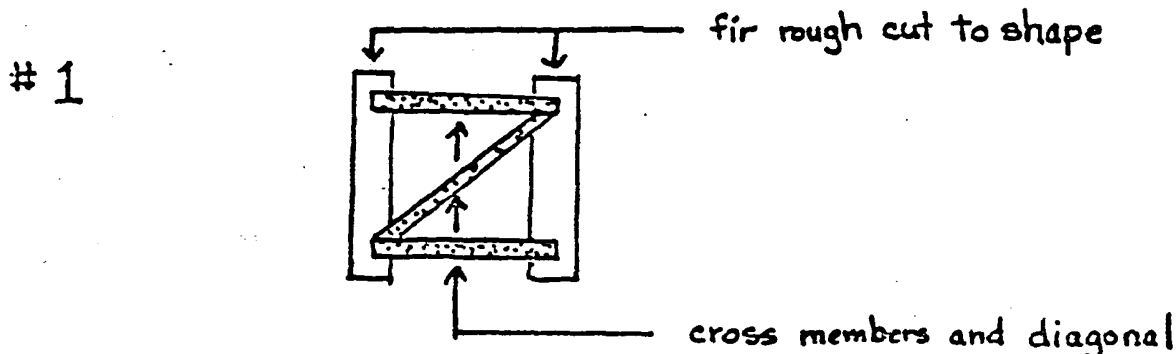
Engine Specifications: We chose the Yanmar 1GM 7.5 H.P. diesel engine primarily because it had the smallest dimensions and lightest weight of any we found. We wanted to keep within the original engine box and the 1GM had a reduction gear small enough to fit the space. We installed it over a year ago and find that with a clean bottom it will do $6\frac{1}{4}$ knots at 2900 rpm. In a moderate sea it slows down to 4 knots. The engine temperature runs at manufacturer's specifications at all speeds—a cool 125° . It does not vibrate excessively, and ours came with flexible rubber motor mounts.

Bearing Box and Shaft: We used the outside bearing box that was with the original engine. Since we replaced the original shaft with a 1" stainless steel shaft, it was necessary to enlarge the bearing box opening. To do this, we used a 1" carborundum wheel with a $\frac{3}{8}$ " drill to grind out the inside of the bearing box.

Stuffing Box: We used the original Vega stuffing box for the first six months with the new engine before changing to a 1" stuffing box made by Perko. The original stuffing box was worn enough to accommodate the new 1" shaft without modification.

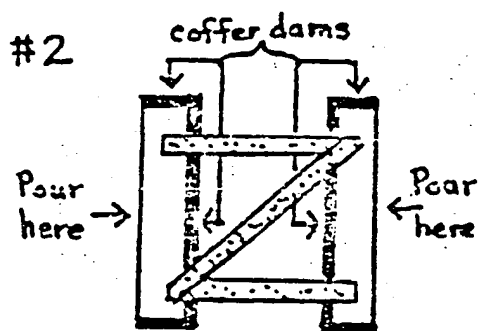
Engine Bed: We broke out the original engine bed and ground down the fiberglass mounts close to the hull (it doesn't have to be accurate, just somewhat close). With the inside stuffing box and old shaft removed, we ran a plumb line thru the middle of the outside bearing box and thru the shaft log to a batten which we had suspended on the forward ends of the galley dressers, lining it up thru the center of the shaft log. Extra care here made lining up the shaft and engine much easier later on. We could then determine the size of the new bed, using the dimensions listed in the engine brochure.

We roughcut to shape two 2x6 pieces of fir, using the plumb line and engine brochure information to determine their dimensions. We squared these up with cross members and a diagonal temporarily tacked to it. See figure #1. The base of the bed where it rests against the hull does not have to be too tight or too accurate.

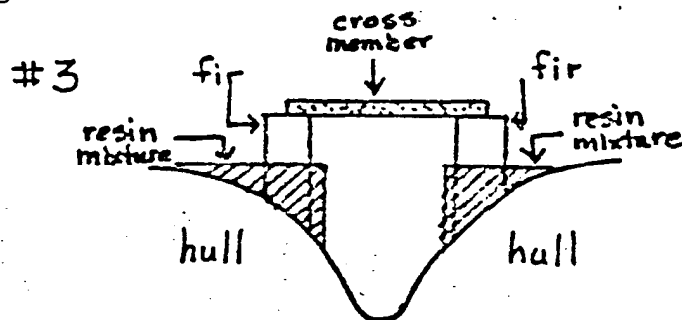


On the inside edges and ends of the bed we built a coffer dam against the hull with fiberglass and resin. Using a mixture of resin, microballoon, and Cabocil, we poured this on the outside of the bed so that it ran under the roughed-in wood form to make a seal between the roughed-in bed and the hull. The mixture must be thin enough to pour

and run under the wood. See figures #2 and #3.



TOP VIEW



SIDE VIEW

When this mixture was hard, we removed the cross members and diagonal we had temporarily tacked to the fir. Next we took fiberglass cloth and resin and covered the bed tightly all around to form a solid fiberglass bed with a wood core. We used 7 to 8 layers of cloth to complete the job.

Installing the Engine: We put the engine in place; not a hard job considering the 154 pounds the engine weighs. The dimensions were close enough so we had to do a little final fitting with the flexible rubber mounts. We lagged the mounts through the glass into the wood core. Next we put the 1" shaft, with coupling in place, thru the stuffing box. We finished lining up the engine with the couplings, using the face of the couplings to make the final alignment.

Controls and Instrument Panel: We used a Morse control as recommended by Yanmar. We found a used one which fit in the place of the Vega control. For a throttle we used a Bowden wire control and Bowden wire-type handle. A choke cable was used as a remote engine stop switch and was mounted in one of the existing instrument panel spots. We decided to install the instrument panel inside the cabin in the space above the steps for security reasons, and so it would be out of the weather.

Prop and Clutch: The engine came with a conventional clutch with a 2.62 reduction which we utilized with a conventional 2-bladed prop. The Yanmar representative recommended a prop with a 12" diameter and 8" pitch. This was unsatisfactory, so we tried a 12-10 and 12-12. We are now using the 12" diameter 12" pitch, but I believe a 12-12 three-bladed prop would not load the engine and would give more thrust.

Fuel Tank, Exhaust, and Muffler: We are using the original copper tank, although a fiberglass or iron tank is recommended for diesel. We used the existing exhaust system, but stripped the water cooling hose off the outside since the Yanmar is a wet exhaust. We hate any engine noise, so we installed a neoprene muffler (M-40, available from BOAT/US).

- Bill and Karen Sides

A problem Vega owners may experience is a low oil pressure warning. The yellow oil pressure light glowed brightly when the engine was hot and idling. The light went out at about 1000 rpm. The light was also out when the engine was cold. After many anxious moments, I was relieved to find that the trouble was a faulty oil pressure sender unit. Recommend replacing this sender first when troubleshooting for low oil pressure.

- Don Angell

My MD6A is working on its third oil pressure sender unit. Symptom in my case was an oil leak from somewhere in the vicinity of the oil filter - above which is the sender unit. Seems the unit has an integral plastic part that eventually deteriorates and leaks. Sometimes the yellow oil pressure light also indicates this problem. Replacement of the sender unit is a cinch. Remove the wire to the tip by loosening the small nut, and then unscrew the sender like a spark plug and replace. Volvo part #807078.


- Art Levin

In the hope that my experience gained in the last year getting a Bosch fuel injection pump retimed to the engine will benefit someone else, I will attempt to expand on the instructions contained in the workshop manual. My engine is an MD6B, my manual for an MD6A, but I found no difference.

"Lyra" did not react to the starter as quickly as normal, nor did she respond to the throttle until warming her bowels. As the weeks passed, the malady worsened, until she drifted into complete silence. Fault finding started with the fuel system, so out came the injectors for cleaning and adjustment; no problem there. On checking the filters, evidence of bacterial growth appeared even tho the filters had been changed within a month or two of the trouble, and I always use fuel additives to disperse water and to prevent bacterial growth. With a clean fuel tank and properly adjusted injectors, I belatedly checked the fuel pump. Clean fuel flowed from all connections on the intake side, but no fuel was coming out of the connections on the after side of the pump. What seemed obvious was the brown "goo" grown by the bacteria had entered the pump and "gooed" the works.

Dismounting the fuel injection pump from the engine after having removed all of the nuts, bolts, fuel lines, and the large 19 mm nut on the aft end of the pump shaft that drives the water pump requires some courage when one does not know by what means the pump is fastened to the shaft. The only fastener found was that created by seven years use - a few good raps on the aft end of the shaft with a rubber mallet and a piece of wood completes the dismounting procedure. This can be accomplished with fewer problems if the manifold is first removed; it will have to be removed for the final timing procedure anyway.

The installation procedure in the workshop manual is not sufficiently detailed for my mechanically novice mind. After the gear wheel on the water pump shaft has been properly positioned as shown on page 17 of the manual and the water pump has been remounted, the fuel injection pump is mounted on the two bolts on the flange at the rear of the pump.



Contrary to the manual, do not mount the manifold at this time as it restricts rotation of the pump for final timing. For the same reason, do not reconnect the fuel lines to the forward end of the pump as yet. Paragraph No. 75 on page 21 of the manual properly describes the timing procedure, but I needed additional information. After receiving bad advice from three mechanics, Volvo's district representative finally set me straight. The No. 2 cylinder of the engine is the aft cylinder and the "rock" position of its valves requires one of its valves to be fully opened and the other valve to be fully closed. Once this stage has been reached, the manual can again be followed; rotate the flywheel so that the figure "10" on the flywheel points to the mark on the block. The "mark on the block," for others who may approach my mechanical genius, is the downward pointing projection of the blowout plug housing located just above the flywheel. Actually, we found a small mark on the underside of the projection once we removed some paint and made use of a small inspection mirror. Such a mirror is very useful in the timing procedure's final step.

Final timing procedure is adequately described in the manual, but in order to line up the marks as found inside of the inspection cover, the pump must be able to rotate. By loosening the two nuts on the pump's mounting bolts, having the pump free from the restrictions of fuel lines, and uninhibited by a mounted manifold, one can freely rotate the pump to make this final adjustment.

I am still having problems starting the engine, but I am confident that timing is not the cause. Hard to believe after 500+ running hours, but I have been advised by one of the aforementioned mechanics that my engine is worn out. Compression in both cylinders is down, but I can rationalize that the fuel problems that caused all of my original trouble have left deposits on the valves that result in poor seating. Hopefully, some extensive running will verify this conclusion. By the way, once - started the engine runs with less vibration than it ever has, and once the engine is warm its starting problems disappear.

- Robert R. Brillhart

This is to let all know that the BMW 12 H.P. diesel works great in my Vega "Lightning." I recently completed the installation and I am thrilled with the engine's performance. I thoroly lined the engine compartment with lead-lined foam, which really paid off in quietness. I opted for a 3-blade prop for increased performance in reverse.

I purchased my Vega engineless and I put a 15 H.P. Johnson long-shaft outboard on a flip-down bracket on her. The outboard performed admirably, pushing me easily at hull speed, but its exposed position on the transom was not consistent with the overall seaworthiness of the Vega.

- Doug McDaniel

While reinstalling my MD6A diesel in my Vega, my mechanic suggested that it would take a lot of strain off the batteries and starter if I made a practice of cranking the engine while decompressing it. An engineer friend confirmed the value of this and suggested installing a remote decompression device.

After staring at the problem for about three hours, I eventually devised a simple device which allows me to decompress the engine from the cockpit as I turn the ignition key. It consists of a 12" long $\frac{1}{4}$ " threaded brass rod fitted with a handle at the top and a clamp and a plastic loop on the other end. The loop fits over the decompression lever, and when the handle is pushed up or down the decompression lever follows suit. I found a place about four inches to the right of the ignition key, where the rod can go straight down to the decompression lever below.

Now, when I start my engine, I just raise the handle about two inches, turn the key, and when I hear the flywheel gather momentum I slowly push the handle down and the engine starts. Works every time.

- Brendon Donegan

I chose a VETUS 10.5 H.P. diesel engine because it is a 2-cylinder, well-known engine block (Mitsubishi) and gearbox (Hirth). The engine bed was fabricated by cutting out the old mountings with a scroll saw and grinding even with the hull using a disk grinder. Glassing in 2" by 5" oak logs was done with two layers of mat on the outsides and four layers on the insides. West epoxy was used for all fiberglass work. The location for mounting the bed logs was found by mounting them to the loose engine and supporting the engine in place with chainfalls in the correct position, then marking the location of the bed logs. The installation is very strong and there is good clearance for maintenance and cleanup under the engine .

The shaft is $\frac{3}{4}$ " bronze. A 1" shaft was tried, but it was found that engine vibration at idle could cause the shaft to hit the shaft tube. A standard Perko stuffing box was used, but the dimension of the mounting rubber is greater than the shaft tube. Therefore, I wrapped the tube with fiberglass cloth and epoxy resin until the correct diameter was achieved. This makes the brass tube redundant and reduces the chances of electrolysis problems. I fabricated a new stern bearing using teflon impregnated delrin, machined to the correct clearances. I tried teflon before but it does not hold up. The propeller chosen was a 2-blade 13" diameter, 8" pitch. However, a 7" pitch came with the engine under special request, and the 8" would cause an indeterminate delay. The supplied propeller has a nonstandard 1" shaft taper, so a special shaft was made. I suggest that anyone else not use the nonstandard prop

(continued)



and order one with a 3/4" shaft hole, and use a stainless steel shaft. What I have is working well, but I would prefer American standard parts under the water in case emergency repairs need to be done someday.

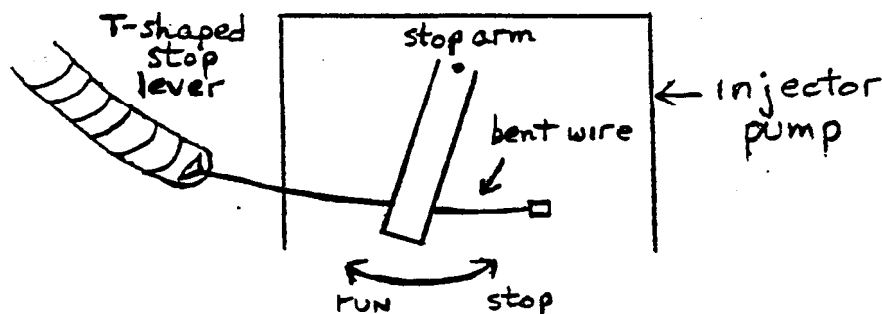
I would allow two weeks for the conversion if one is not going to spend fulltime on the project. The engine is about \$2,200, and it will require about \$500 in extras. So for about \$3,000 one can have a new engine and no leaks around the stuffing box. The boat now has a maximum speed of 6.4 knots, average cruising speed of 5 knots, and ability to motor into 20-knot winds and 4-foot chop at about 4 knots. Fuel consumption is 0.25 to 0.3 gal/hr.

- William Edelstein

The story starts when my starter would not. Upon discovering that a new one from Volvo would cost about \$900, I had it rebuilt for \$65. Lesson #1: check the "yellow pages." After reinstalling the starter, black sooty smoke poured out of the exhaust, and the engine ran very rough. A new problem had developed which turned out to be a broken thrust peg in injector # 2.

Isolating an engine problem is a step-by-step process detailed in any diesel repair manual. I will mention one that will tell you if the problem is in cylinder # 1 or # 2. While the engine is running (keep clear of moving parts!), loosen the high pressure steel pipe where it attaches to injector # 1. Note any change in the engine RPM or if it runs rougher. Retighten # 1, repeat with # 2. The problem will be in the injector or cylinder that had no change when loosened.

But I still could not get the engine to run properly. So I bled it repeatedly, ran down my batteries several times, and raised my blood pressure 20 points. Finally, I again had my injectors rechecked at a company that specializes in injector and injector pump repair. My injectors were okay, but the mechanic had several other ideas to check. Whereupon I found that my problem was in the stop arm on the fuel injector pump. I had accidentally bent the wire that runs from the stop arm on the fuel injector pump to the T-shaped stop lever (see diagram). The engine was thereby half shut off all the time. After straightening the wire, the engine started fine and has continued to run great.

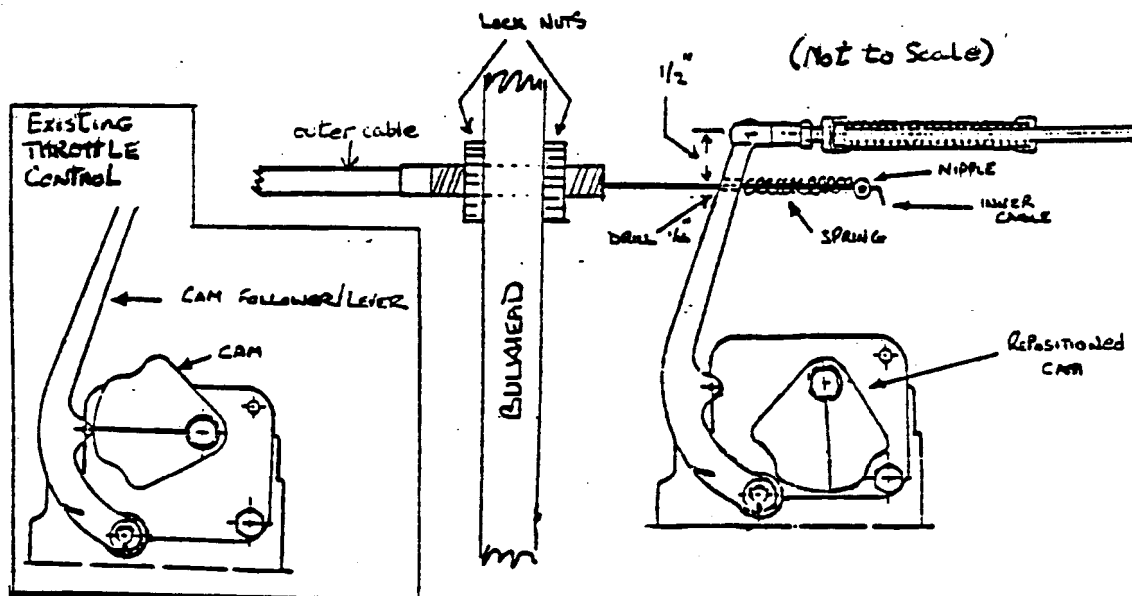


- Paul Halvachs

Having rammed my berth and got severely entangled with the davits of the motor-cruiser in the next berth, I decided to do something about the diabolical combined pitch and throttle control fitted to KRICKA. The system I devised was to use a twin-lever control as fitted to Evinrude/Johnson outboards to take over the control of the throttle, and to leave the pitch control on the normal lever.

Investigation of the linkage to the throttle showed that the throttle was closed by a cam operating from the starboard side of the engine/gearbox, and opened by a spring on the cam follower-lever. The cam, which is on a taper, was moved around on its shaft so that it no longer operated the lever, and then refixed. (Thus, it can be restored to normal operation in the event of a cable failure on the remote unit.) I then drilled a 1/16" hole, 1/2" below the clevis pin in the lever, and passed the inner of the remote cable thru this hole; the outer being fixed using the plastic threaded connector into the removable bulkhead aft of the engine. The inner cable then had a compressable spring and a brass nipple to retain it and prevent slackness.

I can now control engine revolutions and prop pitch separately. This makes KRICKA much better to handle in confined spaces, and I'm certain it is more economical now as I set the controls for optimum performance. The other lever and cable on the remote unit I have used to operate the decompression lever on the rocker cover. This entailed making several brackets and fittings -- sketches of which I will send to anyone interested. The actual control unit is screwed inside the port cockpit locker.



- Rob Peckham
(Vega Assoc. of Gt. Britain)

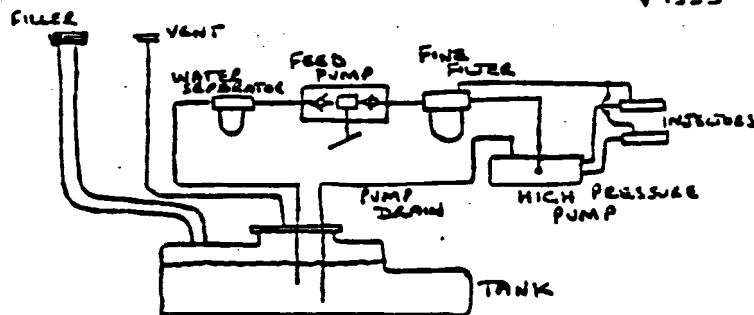
Many Vega owners have had starting problems due to air locks from joint leaks in the fuel system, because the Vega fuel tank is underneath the engine and any leak will have the effect of allowing air to be drawn into the system when the engine is stopped. The air finds its way into the body of the high pressure injection pump, where it becomes trapped behind the pistons, which have a very small displacement and they reciprocate without pumping anything.

To reduce the possibility of this happening on CHELABELLE, I have fitted a small reservoir positioned just inside the starboard cockpit locker, and piped the pump drain thru this reservoir so that when the engine is stopped the reservoir provides a positive pressure on the fuel system of at least $\frac{1}{2}$ p.s.i.

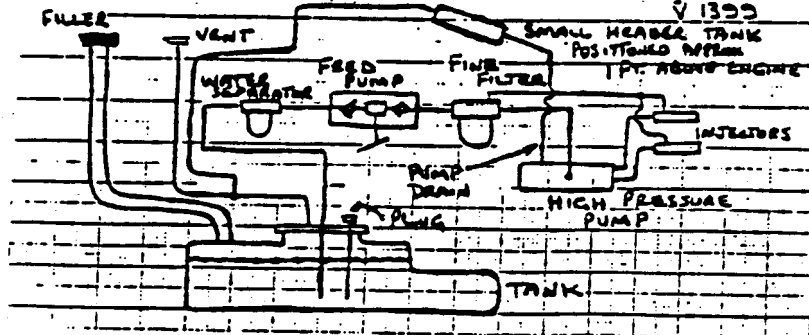
The tank return from the new reservoir is uppermost, and it drains back to the air space at the top of the tank (not under the fuel surface, which would create a syphoning effect). Access to the fuel tank is difficult, so I cut the vent hose, inserted a tee, and connected the tank return to that. The standard pump return is under the surface and therefore not reusable. Drawings of the original and modified system are shown below.

The reservoir was made from a piece of 28 mm copper tube, $\frac{1}{2}$ meter long, with reduced fittings at each end to 8 mm diameter. 8 mm bore, clear flexible hose was used to connect the reservoir to the pump and tee. This size of reservoir would replenish a leakage of 1/10 litre.

ORIGINAL VEGA/MD6A FUEL SYSTEM - CHELABELLE
V 1399



MODIFIED VEGA/MD6A FUEL SYSTEM - CHELABELLE
V 1399



- Don Seddon
(Vega Assoc. of Gt. Britain)

On Board Spare Parts Kit For



MD6A

Qty.	Parts #	Description	Short Cruise	Extended Cruise
1	834693 & 834694	Regulator & Relay	XX	XX
1 set	958362	Drive Belt MO-1234	XX	XX
1 set	960336	Drive Belt MO-1235	XX	XX
1	824823	Fuse Block	XX	XX
1	875807	Impeller Kit	XX	XX
2	804695	Pump Seal	XX	XX
1	833366	Thermostat	XX	XX
1	416033	Thermostat Gasket	XX	XX
1	243464	Fuel Filter	XX	XX
1	840043	Spare Fuel Injector		XX
	3875738	Fuel Injector Pipe		XX
	3875739	Fuel Injector Pipe		XX
1	833323	Fuel Pump		XX
1	875508	Upper Gasket Set	XX	XX
1	875509	Lower Gasket Set	XX	XX
1	3875691	Engine Oil Filter	XX	XX

SHOP MANUALS

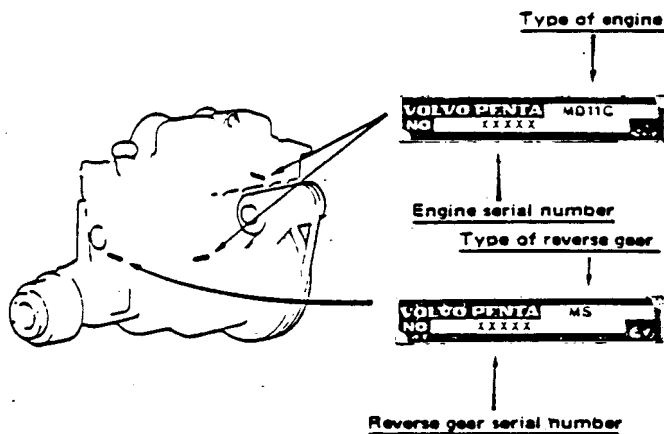
PARTS BOOKS

MD6A, 6A/110S, 6B,/ 3023 & 3258

TECHNICAL PUBLICATIONS

PARTS BOOKS

MD 6A, 6B 2600



VOLVO PENTA EASTERN DIVISION
P.O. Box 1367
Chesapeake, VA 23320
(804) 424-4500

ENGINE - GASOLINE

The way the Vega is designed right now the gas engine Vega will not pass the Coast Guard Safety inspection. The reason is that the engine compartment is not positively ventilated under existing regulations. It will require a vent to get fresh air through the compartment and exhaust it out the stern. The inspector said the easiest thing would be to put a vent on the side. - Tyke Furey

You can put a cowl vent on and extend the hose down into the bilge. - Sam Amoss

When I took the head off my engine I first saw the cooling system. The water curves. The holes are about the size of a lead pencil. There was mud in them and I dug out what I could but there was no way I could get it all out. My engine has been running hot ever since I owned the boat, but the water coming out the exhaust is not that hot. I have changed the valves with the help of a man who works with me. I was losing compression in one cylinder. I also had to change the manifold coming off the side of the engine, that goes out the back. It wore through and sprung a leak. I am now on my second one. - Jack Berle

I thought I'd share the latest in my battle with the Albin Combi gas engine with you. After struggling with this engine for two years, I think that I've found the basic problem - at last. The engine hasn't run well since I bought the boat. I was getting a lot of oil into the #2 (forward) cylinder. Some of the oil was being burned, but after running the engine for 30 minutes or so, the plug would be heavily fouled and the engine would start bogging down and eventually stop. This sequence of events would be accompanied by an oily, smoky exhaust which gradually became darker until the engine quit. After the plug was changed or cleaned, the engine would start up and the sequence would begin all over again. Needless to say, I used the engine very sparingly, afraid that I needed a major overhaul that I couldn't afford.

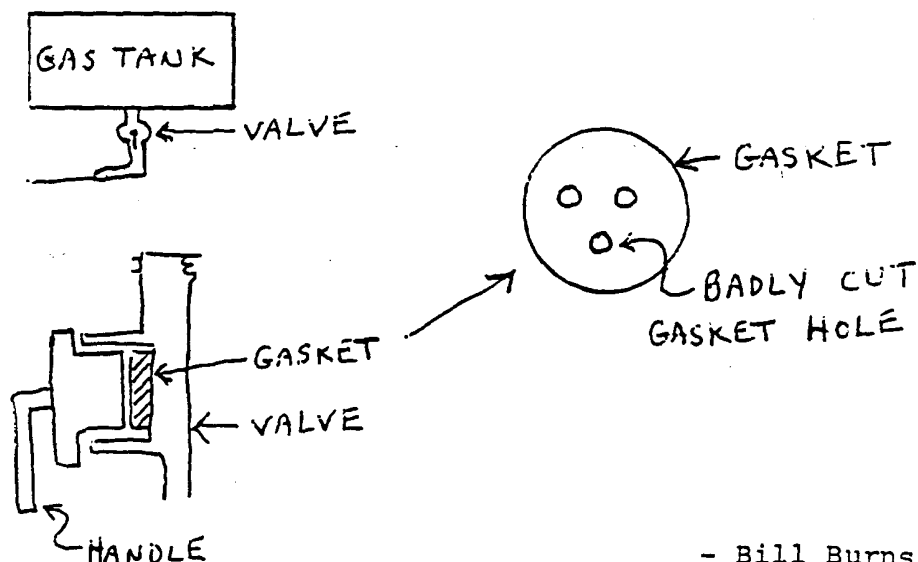
The first clue to the real cause of the problem came when the oil pressure light started staying on when I started the engine. When I put an oil pressure gauge on the engine, I found that I had very little oil pressure (3-4PSI). I then proceeded to dismantle the oil pump and associated pipes to see what the problem was. There is a small piston in the oil

pump that is spring loaded, so that all the oil doesn't drain back into the sump when the engine stops. This piston was frozen in the extended (closed) position so that oil from the sump was not getting to the engine. With the pump impellers running, oil was apparently being forced at fairly high pressure back through the #2 cylinder. I had earlier checked the compression and found that I had 95-100 psi on both cylinders, so I couldn't figure out why one cylinder should be getting so much oil past the rings. At any rate, I freed up the oil pump piston (part #10 on page 10 of the gas engine manual) and reassembled the pump. The engine started right up and the oil pressure went up to 25-30 psi. I ran the engine for an hour (the longest period of time I had ever run it) and then pulled the plugs. The #2 plug was only slightly fouled (possibly due to residual oil in the cylinder) and could tell from the exhaust that I was burning very little oil. Now I keep my fingers crossed for the rest of the season!

- Doug Smith

I have solved my engine problem! Basically, the engine - a gasoline model - ran for 30-40 minutes then backfired through the carb. I checked the gasoline, checked the filters, valves, electrical system, etc. The most puzzling event was a 10-minute shut down, and it would run for another 30 minutes; plus or minus. I also checked the compression - hot and cold.

Finally, I removed the valve on the gas line at the tank and found a gasket poorly cut; partially covering the fuel port. I checked the valve, reworked the gasket and valve, the engine ran 3 hours without a problem, and has run well since.



- Bill Burns

I have not had the trouble with the prop system experienced by most Vega owners. When the boat was relatively new, the original Albin engine and the variable-pitch prop were replaced with a Volvo MB10A gasoline engine and a conventional transmission and propeller. This 15 H.P. engine drives the boat very well -- even against strong headwinds.

- Bill Edelstein

Over the past three sailing seasons, I have had intermittent problems with the Combi-22 gas engine on my boat. Sometimes everything worked fine, and then without warning the engine would stop, apparently from lack of fuel, and usually in a critical situation. Most exasperating!

After many false attempts to fix the problem, and after great expense, the problem has been resolved. The resolution was simple and rather inexpensive when the problem finally was diagnosed. Water was getting into the cylinders, not due to a cracked engine block, cracked head, or defective head gasket, but rather by water being forced back into the engine from the exhaust system, caused by a muffler that would collapse on occasion. If the muffler had totally collapsed, the problem would have been resolved easily. The problem was the intermittent collapsing of the muffler.

A second problem developed due to all the work on the engine and fuel system trying to find the first problem. I have a 1968 vintage Vega, and on this boat a cylindrical copper gas tank was installed which has a built-in reservoir. Early on in the search for the first problem, I had removed the tank and had it professionally cleaned. What I did not know then is that algae was growing in the tank and that the cleaning did not remove the algae completely, so that it grew back again, causing the engine to die. (Adding inhibitor to the fuel on each filling will prevent this problem - Ed.)

Anyone with a Combi gasoline engine who has problems starting the engine or keeping it running might check these two areas. They are simple to correct once found.

- Dick Brauer

I'm replacing the old gas engine with a brand new Albin gas engine of the same type (O-22) purchased from Auto-Marine in Miami for \$2,000. Estimates to replace it with other engine types have run as high as \$8,000. I had the old engine stripped down and it needed so many parts that for a few bucks more I got the new engine. I hope to be able to install it using the old transmission and exhaust systems.

- Doug Smith

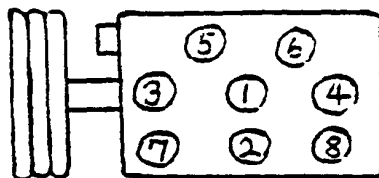
My manifold and exhaust developed a leak, so a lot of water was going into the bilge, needing immediate repairs which could not be done locally. Fortunately, I did have an exhaust system that I had purchased several years ago, but no manifold for a 1970 Albin gas engine. I finally located a manifold at Auto Marine Engineers in Miami, FL. They mailed it to me immediately, and the price was reasonable. The manifold and exhaust system are now in the boat and everything appears normal - again.

- Karl V. Larson, M.D.

We replaced our fuel (gas) line and installed a "Quicksilver" water separating fuel filter unit in the line. We had Deluxe Motorcycle Sales of St. Clair Shores, Mich., rebuild the carburetor. They are familiar with the Solex 26VBN carburetor used on the Albin gasoline engine. They preset it in their shop at a 1 to 14 mixture.

- Norman L. Stocking

According to Vosbury Marine, Annapolis, to tighten the head on the Albin O-22 gasoline engine, use 60 ft. lbs. of torque wrench pressure, with the bolts oiled, on the bolts in the following order:



★ The Vega dealer with gasoline engine parts in California (they may have more but my only interest was engine parts) is:

Tom Hall
P.O. Box 156
Sausalito, CA 94965
Telephone: (415) office 332-2788; home 982-5479

- Bill Burns

★ Another source for the Albin gasoline engine parts is:

Auto-Marine Engineers, Inc.
3464 NW North River Drive
Miami, FL 33142-4994
Telephone: (305) 635-2401

Albin Motors AB, Box 139, S-681 01, Kristinehamn, Sweden, should also be checked for gasoline engine parts.



Having just done a mechanical rebuild on my boat (#935; O-22 engine) I just thought that I would pass along some useful information which could be useful to anyone contemplating the same... First: why rebuild a gas engine? Well, though other owners might think me crazy, I wanted to retain the variable pitch mechanism (especially for motor sailing), and I liked the quiet gas engine. The savings (about \$3500.) and comparative ease of installation were also a large factor.

Tom Hall, in Sausalito, has been rebuilding these engines for years (he used to sell them). His basic cost for rebuilding the engine was \$1,000., plus \$300. for new valves and valve guides. My valves and guides had been ruined by water getting into the engine from the leaky exhaust system.

I would recommend owners with the jacketed exhaust system to be aware that if there is a hole in the coppertube, there will be water in it, only about 6" below the engine, with a direct path via the manifold to the pistons and valves. A way to check this might be to hook up a low-pressure air source to the transom exhaust outlet and listen for bubbling in the water jacket. The way I found out was by sawing the blasted thing apart after I found water in the cylinders when changing the plugs in the boatyard, after the boat had been hauled bow down by a travelift.

While Tom Hall was rebuilding the engine, I called Henry Gustafsson (thanks to the VODCA manual) and ordered the tail-end renovation kit. When the kit arrived (cost \$135. inc airmail), I installed the new operating sleeve and seals and the stuffing box - I had pulled the prop with the boat in the water. The prop and shaft came out easily just by using a mask and a wetsuit - no need to haul out! The stern tube was plugged with a tapered wood plug wired to a hose clamp on the inside of the boat.

Re-assembling the Combi mechanism was no problem - again, thanks to the VODCA Manual. I replaced the old exhaust system with a Yanmar mixing elbow and a waterlift muffler. The water injection point is about 8" above the manifold and hopefully the engine is now well protected from water damage. The cost of the new exhaust system was about \$250., including the elbow, stainless pipe, waterlift muffler, rubber hose and engine insulation.

I used the mainsheet tackle to lift the rebuilt engine from the dock and return it to it's mount, aligning the coupling to .002 using shims under the mounts. With everything hooked up, the engine ran fine, and at a much lower RPM than before. After 5 hours of running time, I torqued the head bolts to 60# per VODCA manual - unfortunately I broke two studs - they had rusted where they were in contact with the copper head gasket.

(continued)



The engine then went back to Tom Hall who replaced them all. The drilling out of the broken studs took 6 hours labor (2 additional ones broken on removal). I'm glad I didn't try it myself.

Everything is now back together and working fine! Tom says the engine should last about 1000 hours - given good care. The total cost of the job was about \$1,700. - a complete mechanical rebuild. In contrast, a friend further down the dock from me just had a 2-cyl Yanmar engine installed in his boat for about \$5,200, including \$900 labor. My labor was about four weekends at the dock instead of a boatyard.

Much thanks to the VODCA manual - I don't think I would have tried the job without it. If anyone is contemplating a similar job, they are welcome to give me a call at (408) 475- 5397.

- Ric Eiserling



GALVANIC ACTION - ELECTROLYSIS

Galvanic action again rotted the grease plug in the propeller bulb. A remedy was to bore a 11/32 hole in the old plug hole (all of the old plug could not be removed). The hole was taped for a 1/8 stainless pipe plug. I know that it is mixing metals, but it seems that Cos Cob was supplying us with a mix every time they sent a replacement plug. Time will tell. A side benefit accrues however, a standard auto inexpensive zerk fitting replaces the stainless plug for each regreasing. - Bill Carrico

Propeller problems reported by Sid Rosen in our last newsletter was due to electrolysis. Fortunately, the damage was confined to the nut holding the prop housing (bulb) in place. With the nut corroded off, the entire bulb slid back and forth with the outer tube instead of changing the pitch of the prop. The symptom was: Engine ran, but boat didn't move. Could have been more serious/costly. Check your prop system at each haul out. Both Sid and Russ Walker have added an external metal plate to the hull (over the prop). This plate is grounded to the engine. An external zinc anode was then bolted to the plate. This can be changed easily as needed. Effective? - Who knows. Only time will tell.

Bolt holding prop assembly corroded almost completely, as well as grease plug on prop assembly. Replaced grease plug twice in five years and replaced prop assembly rear bolt and washer last year (1979). Believe that bolt corroded due to my using an auto battery charger to charge boat batteries without removing boat's negative ground connection from battery post while charging. - Willis Alexander

Painting exposed underwater metal surfaces with anti-fouling paint invites galvanic action (dissimilar metals in contact in saltwater). If you must paint your propeller and shaft with anti-fouling paint, they first must be insulated with an electrolytically neutral covering such as dichromate wash. - Art Levin

Each year since we have owned the Vega we have had to replace the plug covering the propeller grease hole since corrosion had reduced it to powder each preceding year. Not this year, because I installed zinc anodes to protect it.

The usual way of installing anodes is to put a zinc collar around the propeller shaft, but there is not enough room

for this on the Vega because of the way the variable pitch propeller is made. The marina suggested putting a button-shaped anode on the rudder and making a connection to the rudder post. The rudder post would then have to be connected to the engine or propeller shaft inside the hull. I decided that it would be more straightforward to put the zinc on the hull and make all connections inside.

I found a tear-drop shaped zinc about 2 1/2" long and mounted it to the hull just above the propeller about 8" off the centerline (on the port side because the space was easier to reach because of plumbing under the cockpit.) I used two #10 brass screws through the holes in the zinc and through the hull, bedded down well with GE silicone rubber and fastened with flat washers and a nut. Under one nut I put a flat terminal soldered to a length of copper wire leading to the rudder post and to the transmission. I selected that spot because of its proximity to the propeller and because it is flat and gives a good base for the flat zinc. The zinc was about 2/3 gone by weight after 9 months.

I also bored a small hole in the end of the brass (all I could find) plug I used to stop the propeller grease hole. I filled this with melted zinc. The plug is in excellent condition after 9 months in the water.

I have no way of telling which of the zinc anodes did the job, but the fact that the hull-mounted zinc was corroded away (I have not checked the hole in the plug.) means it did something.

- Jim Hartzler

Zinc anodes shaped to fit on the aft end of the propeller hub are available at \$8.00 each from Wyman's Marine and Supply, 909 Fourth Street, Anacortes, WA 98211, Attention: Steve Ault. Telephone: (206) 293-4604. The original bolt in the end of the hub will have to be replaced with a longer one for the zinc.

I have been using a Type C-7 Clamp Zinc with 1 1/2" I.D. at a cost of approximately \$6.75. I attach it to the bronze stationary sleeve which is just in front of the prop, and replace it every other year. No corrosion has been noted since using this method for the last six years.

- Willis Alexander

HEAD - MARINE SANITATION DEVICE (MSD)

The federal law requiring a Coast Guard approved marine sanitation device is now in effect, although no one is certain of its enforcement. The Coast Guard says it will not board boats solely to inspect MSDs, but may carry out a head inspection if boarding for any other reason, such as answering distress calls. The Marine Police say this is none of their business, and they will not enforce this law. A court suit has been filed to overturn the law, and many legal questions (search warrants? for example) remain to be answered under the law.

Compliance may be achieved with a "porta-potty" type of device, available in camping and marine supply stores; various "Type I" MSDs which discharge treated wastes overboard, such as the "Lectra-San" (with high current drain) and one-piece types using chemical tablets or liquid (with much lower current drain, but much more expensive); and "Type III" holding tanks with deck pump-out fittings (and some with Y valves for either overboard discharge or deck pump-out, about which there is legal controversy). (For the record, there is also a "Type II" MSD, which is the most complicated and the most expensive.) Before purchasing any type of MSD, take careful measurements to insure that it will fit into the available space.

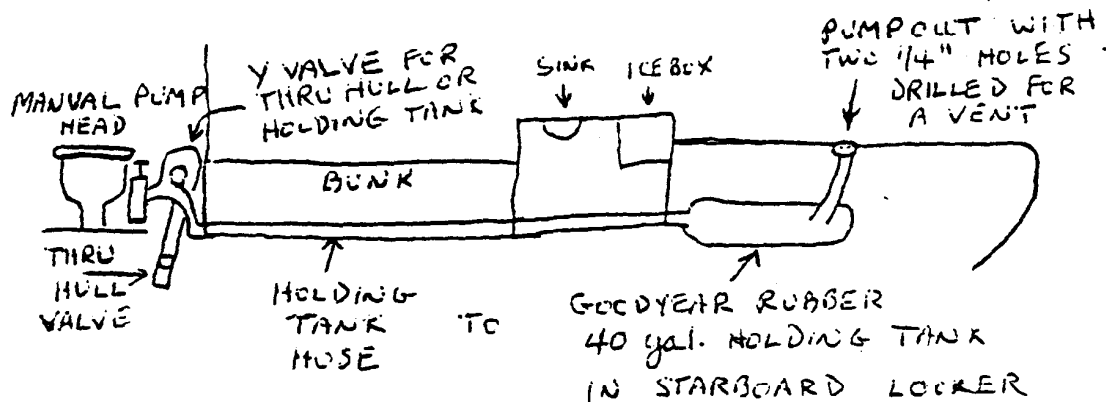
I installed an "Lectra-San" in my boat, and it is relatively easy to do. I used the same toilet bowl and hand pump, and I put the treatment tank in the V-locker just aft the water tank in the forward compartment. Hoses connect the tank to the toilet bowl and to the overboard discharge thru-hull fitting. The electric hookup is made with wires running under the cabin sole (in the drain channel to the bilge) to the battery. The control unit is mounted in the head compartment itself. It's difficult to describe, so I invite anyone interested to visit my boat.

- Art Levin

Zahniser's in Solomons, Md., will sell and install the "Lectra-San" for \$525. The last "BOAT-US" price of the "Lectra-San" was \$360.

- Sid Rosen

This is our head arrangement:



I called the CG here in Ct. and they said this system (with the Y valve) is completely legal and up to date with the new head regulations.

- Jim Ranti

A small quantity (the container cap full) of "Sealube" in the toilet bowl water once or twice a month will lubricate and soften the washer in the toilet pump. Vegetable or other oil will serve to lubricate temporarily in an emergency.

- Art Levin

We installed a Mansfield TDX-2 MSD. The tank is in the large locker under the V-berths. The panel between the berths must be moved aft about 8 inches. We were careful not to damage it, and it now slides in rails, much like the cabin access to the engine. The pump is under the head of the starboard bunk. It is necessary to reduce the depth of the medicine cabinet and basin platform in order to make room for the inboard loop. We had to rotate the head clockwise so the discharge from the hand pump would clear the overhead valve. This was a major job, but a very satisfactory one. Very little of the gear is visible, and we think that the restored areas look better than before.

- Bruce Carr

Here's how I tackled the head problem -- at least to my satisfaction, short of throwing the damn thing over the side. A six-gallon polypropelene outboard fuel tank fits very neatly into my V-berth compartment, just aft of the water tank. I've fitted the tank with an inspection port and a delrin thru-hull that connects to the discharge hose of the toilet via a Y-valve. It's neat, the fuel gauge gives you a level indicator, and the vent fitting allows for a little more class than a Jerry jug or an oak bucket. It lifts out easily, and should be adequate for most folks' needs. As far as I can tell, it meets the requirements of the law, and is basically inexpensive.

- Jim Turse

Parts for the "Brydon Boy" marine toilet (B9128) may be obtained from some marine supply stores. If not available, the home office is Brydon Division ITT Industries of Canada, Ltd., 168 Rexdale Blvd., Rexdale, Ontario, Canada M9W IP6, (416) 743-8671. The western U.S. distributor is Jabsco Products ITT, 1485 Dale Way, Costa Mesa, CA 92626, (714) 545-8251. The eastern U.S. distributor is Jabsco Products ITT, 501 West Liberty Street, Springfield, OH 45501, (513) 325-8701. The Seal and Gasket Repair Kit (internal parts) number is 59300-1002. The Fastener Repair Kit number is 59300-1001; Pump body # 591277049.

* * *

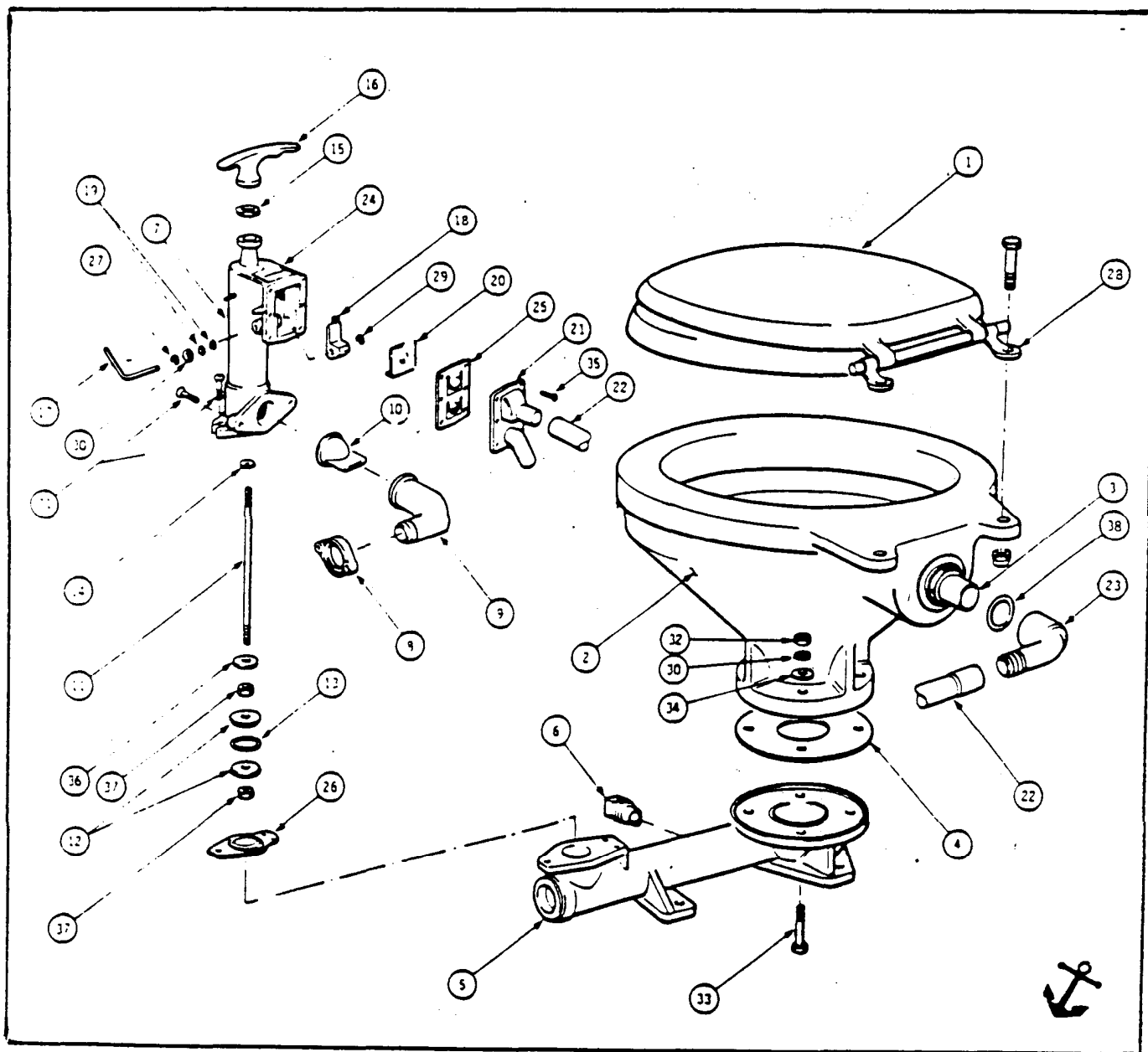
Installed a PAR electric conversion kit on the head. Draws a lot of amps, but it is sure nice to push that little button to flush.

- Herb Edwards



We installed a 14-gallon flexible holding tank, "Y" valve, and Guzzler pump in the head compartment. The holding tank went outboard of the head below the wash basin. Unfortunately, the Guzzler pump had to go into the hanging locker just forward of the head, but it all fits, and makes us legal with the USCG, et al.

- Bob & Cleo Phillips



For further information, please contact the BRYDON/PAR/JABSCO distributor in your area,
or call:

Jabco Products ITT
1485 Dale Way
Costa Mesa, California
U.S.A. 92626
Telephone: (714) 545-8251

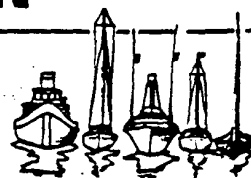
ITT Brydon
168 Rexdale Boulevard
Rexdale, Ontario
CANADA M9W 1P6
Telephone: (416) 743-8671

Jabco Products ITT
501 West Liberty Street
Springfield, Ohio Po Box 32;
U.S.A. 45501
Telephone: (513) 325-8701

PAR™
Brydon

MARINE TOILET W.C. MARIN

MODELS: 59128-0000
59128-0100
MODELES: 50745-3773



INSTALLATION INSTRUCTIONS

This manual toilet may be installed above or below the waterline. Seacocks should be used for intake and discharge hull fittings. Securely fasten all four mounting feet on flat surface.

PLUMBING CONNECTIONS. Make sure all inlet connections are airtight and free of sharp bends or restrictions. Discharge hose should be as direct as possible and free of sharp bends or restrictions. Use heavy wall non-collapsible hose or tubing.

For installations below waterline, use vented loop about 8" above waterline at all angles of heel or trim for both intake and discharge hoses.

For installations above waterline, make a loop in the discharge line about 8" above base of bowl to retain water in bowl.

OPERATING INSTRUCTIONS

Make sure inlet and discharge seacocks or valves are open. Move valve lever to "Flush" position and operate pump, return valve lever to "Dry Bowl" position and empty bowl. Leave valve lever in "Dry Bowl" position when toilet is not in use. Close seacocks when boat is unattended.

To drain for winter lay-up, remove drain plug in the base and operate pump with valve lever in "Dry Bowl" position. In salt water areas, a thorough flushing with fresh water will assure troublefree use the following season. Do not use anti-freeze, acids, harsh alkalis, javex or household bleaches in cleaning. After long period of non-use, the inside surface of the pump cylinder may be given thin coating of vaseline to assist in operation.

PARTS LIST

KEY	PART No.	DESCRIPTION	KEY	PART No.	DESCRIPTION
1.	59127-7001	Seat & Cover	18.	59127-7021	Valve Cam
	59127-7101	Seat & Cover**	19.	59127-7023	Valve Handle O-Ring Seal
2.	59127-8002	Bowl	20.	59127-7026	Intake Valve Seal
	59127-8102	Bowl**	21.	59127-7027	Valve Housing Cover
3.	59127-7057	Spud		59127-7127	Valve Housing Cover**
4.	59127-7004	Bowl Gasket B	22.	59127-7029	Hose
5.	59128-7001	Base		59127-7129	Hose**
	59128-7101	Base**	23.	59127-7030	Intake Elbow
6.	59127-7006	Base Drain Plug A		59127-7130	Intake Elbow**
7.	59127-7009	Pump Cylinder		59127-7043	Intake Elbow & Hose Assembly
	59127-7109	Pump Cylinder**		59127-7143	Intake Elbow & Hose Assembly**
	59127-7049	Cylinder C/W Seal & Label	24.	59127-7033	Instruction Decal
	59127-7149	Cylinder C/W Seal & Label**	25.	59127-7040	Double Valve Gasket B
	59127-7050	Pump Unit, Complete	26.	59127-7041	Base Flap Valve Gasket B
	59127-7150	Pump Unit, Complete**	27.	59127-7042	Control Handle Ret. Ring
8.	59127-7011	Discharge Flange	28.	59127-7047	Hinges C/W Nuts & Bolts
	59127-7111	Discharge Flange**		59127-7147	Hinges C/W Nuts & Bolts**
9.	59127-7012	Discharge Elbow	29.	59127-7052	Cam. Ret. Ring
	59127-7112	Discharge Elbow**	30.	91603-0900	1/4" St. Steel Washer A
10.	59127-7013	Joker Valve B	31.	57000-8510	1" x 14 S.S. Tap Screw A
11.	59127-7014	Piston Rod	32.	91805-0050	1/4-20 Brass Nuts, Plated A
12.	59127-7015	Piston	33.	57000-8396	1/4-20 x 1-3/4" Hex. S.S. Bolts A
13.	59127-7016	Piston O-Ring B	34.	57000-8195	11/16" Plastic Washer A
14.	59127-7017	Seal B	35.	57000-8515	3/4" x 10RH S.S. Tap Screw A
15.	59127-7018	Bumper Washer B	36.	57000-8160	3/8" Brass Washer
16.	59127-7019	Pump Handle	37.	57000-8105	3/8"-16 Hex. Brass Nut
17.	59127-7031	Valve Control Handle	38.	59127-7051	Intake O-Ring

NOTE: A. PARTS INCLUDED IN FASTENER REPAIR KIT 59300-1001
B. PARTS INCLUDED IN SEAL AND GASKET REPAIR KIT 59300-1002
**BONE COLOUR

IMPROVEMENTS - ADDITIONS AND CHANGES

1978 additions and prices:

Dodger, blue acrylic, with front plastic windshield and side triangular windows, 1" stainless steel frame, measured and installed by Almo, Glen Burnie, \$355.

Sailcover, blue acrylic, for 12' boom, from Goldbergs' \$55.66.

Whisker pole, Forespar, adjustable from 7' to 18', from Fawcett, Annapolis, \$56.68.

Dacron Awning, white, 3 battens, 8' long by 6' wide, from Almo, Glen Burnie, \$87.98.

Batteries, Deka, from Mamock's, Annapolis, large one for \$53.95, small one for \$47.95. Both will fit in battery compartment under cabin sole.

Herbert M. Edwards made the following improvements (1978):

Added Aqua-Meter engine hour clock in dash panel in cockpit. Very good for regular maintenance checks on engine.

Installed battery condition indicator for each battery. Put through face board over shelf area in galley, port side. Good units, Danforth make.

Installed Datcon Tachometer to instrument panel in cockpit. Good for checking engine performance. Engine has opening for sending unit to be installed.

Radios: Pearce-Simpson Bimini 12 + 2 model with antenna on stern of boat. Radio mounted under overhead over starboard bunk. Location of antenna limits distance so have another one which is raised to masthead by flag halyard which works fine when needed. Couldn't use masthead mount on account of local bridge heights. Added channels 26 & 22 for curiosity more than anything else. Very satisfied with set.

Unimetrics Mako-1 CB with antenna stern mounted. Works fine but will not get the two weather stations as advertised. Use this for communications with other boats in our 85 boat club fleet who do not have VHF.

Also, have WEATHER-ALERT VHF for weather reports only. Works on its own 9-volt battery or ship's battery. Medium satisfaction in that it gets foreign stations such as New York and Washington at times when you need local stations.

Vec/Trak Check-Mate mounted in main cabin on ceiling for checking radio output. This is used if you can't get a radio check from Coast Guard.

Installed Hubbel 30-amp electrical system with fuse box in port cockpit locker against bulkhead. Have two-way units (outlets) in main cabin on floor of shelf over bunk and one in bulkhead in focsle. Have Kenco Model S-972 power failure light to indicate power outage. Very satisfactory at dockside for TV or electric cooking utensils. Cable to boat is mounted up under coaming on stern of boat.

Exchanged old brass main sheet track for Merriman ball bearing car on black aluminum slide attached to main sheet block by Harken, Model 0910+008+007 parts gives 5-to-1 purchase. A most satisfactory improvement. Made it about 10" longer than old one and mounted on a teak bar much like the original.

Replaced factory sheet winches with new Lewmar #15 self-tailing type. A great boon to the crew. Couldn't use old screw holes on coaming so filled them and drilled new ones. Replaced teak cleats with black anodized aluminum ones of the jam type. Wooden ones were too easy to knock out with elbows, etc.

Added custom made teak and stainless bowsprite 36" long with opening near forward end to accommodate anchor rode and CQR 15# plow anchor. Supported by stainless pipe attached underneath on swivel (for removing) and to bow of boat about 18" above water line. Topside attached to hull by continuous stainless strip from edge of toe rail around to other side. Bowsprite made in the grating style. Most useful. Looks good on boat.

Installed Wilcraft Model B Thru-Deck Capstan aft of forestay about 18". This is the vertical model and is thru deck into forepeak locker. Put hawse pipe through foredeck near this unit and feed anchor rode down into forepeak locker which is covered with netting to retain rode. Very good unit.

Added raw water strainer to engine intake. Located in starboard cockpit locker under pop-off valve for easy cleaning. Works fine.

Installed Jabsco Model 6360-0001 bilge pump with manual or automatic switch. Mounted brass suction head on stainless steel strip to reach very bottom of bilge in keel. Fuse blows very easily while waiting for water to reach pump unit so use slo-blo fuse. Exhaust pipe feeds into exhaust pipe on afterside of Whale bilge pump as factory installed. Works fine. This is for unattended ship. Use Gusher when aboard.

Installed pressure water system throughout. Left salt water faucet in galley for dishwashing, etc. Left all pumps in place in case system should fail. Used Par Model 36970 pump with accumulator tank. No problems, works fine. Pump in small locker forward of head.

Installed Kenco 12-volt revolving electric fan in main cabin on aft bulkhead over sink area of galley. Very good performer.

Use Aladdin Blue Flame Kerosene heater for cabin when not at dockside and Electric 5100 BTU blower with thermostat and safety cut-off switch otherwise. Both will run you out of the boat with heat if not watched.

Added teak grating to cockpit sole. Much easier on feet and in making cockpit look cleaner, saltier.

Automatic Radio Model SPE 5004 FM & Stereo tape player with speakers mounted in main cabin on forward bulkhead just above reading lights. Unit mounted under overhang over shelf on port bunk. Excellent tone and all performances.

- Herb Edwards

Incidentally, I had the plastic window replaced in my dodger by Leonard Sailmakers in Annapolis for \$20 (1978).

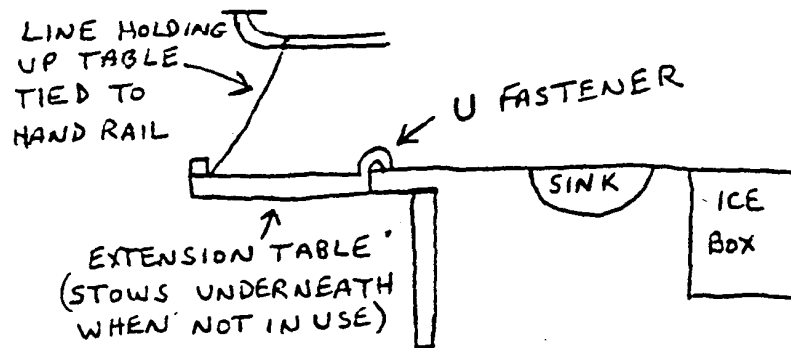
- Russ Walker

I had that done last year for \$30 (1977). Some of my stitching dried out and started to fail too so I sewed it and it should last a few more years. - Jim Hartzler

I had the plastic windows replaced in my dodger by Custom Canvas in Annapolis, and all the stitching reinforced, for \$30 in 1979. - Art Levin

I have installed a spare small Pal electric bilge pump inside the port locker. I take the 5/8" hose out and put it in the cockpit and pump, then replace the hose when I am finished. - Jim Hartzler

I added an extension table on the sink:



- Jim Ranti

I've been refurbishing "Lyra," first with a FAMET Reefurling system on both the jib and main. It's a joy to work all sails from the cockpit. Then we had the whole boat repainted with ALLGRIP in an off-white color. To protect that, we installed a rub rail (cypress capped with stainless steel) on each side at the widest curvature - where I was always bumping into docks. I am currently revarnishing all of the interior woodwork (some panels having been replaced at an earlier date). We feelas if we have a new boat.

- Bob Winans

I installed a pedestal steering unit. Being a machinist by trade, I manufactured the entire thing of stainless steel, including the rudder quadrant. I found the Edson and other units to be larger than I cared for in the small Vega cockpit. I maintained the height suggested by Edson, but scaled everything else about 3/4 size, with a 22" wheel. I cut off the rudder tube at about the waterline and machined a stainless steel packing gland for it. This enabled me to hang the quadrant (8") aft of the rudder post. As I now have throttle and clutch in the pedestal, I covered the old control location with a screw-on access cover. I plan to put a piece of PVC pipe behind it for chart storage. I cut the tiller off about 26" for emergency steering.

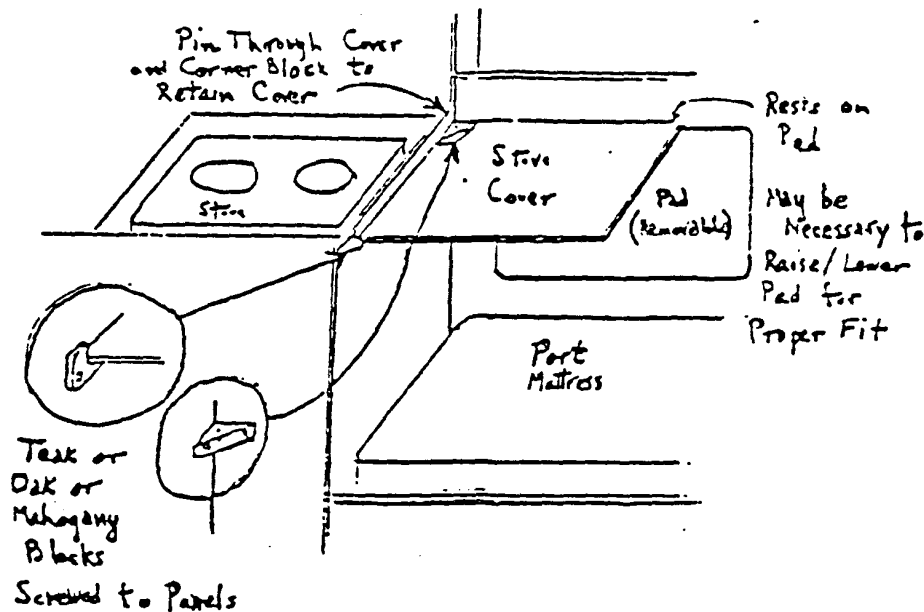
- E. W. Hancock

USE OF STOVE COVER FOR A TABLE

The accompanying figure shows the installation on our boat. It entails fitting two wood blocks on the aft partition of the port bunk near the stove. One block is essentially a triangle fitted into the corner above the bunk. The other is shaped to form a support and a catch for the aft, inner corner of the cover. It prevents the cover from sliding toward the center of the boat. A pin is fitted through the stove cover into the triangular block to retain the cover.

It may be necessary to move the supports for the padded back rest in order to have the cover sit in a level position. It was on our boat.

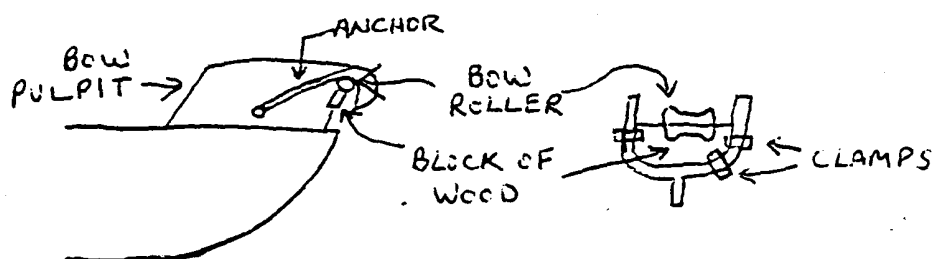
The cover is remarkably stable after the pin is inserted because its aft side slides under the wood trim at the top of the panel at the forward side of the stove. Even so, I would not recommend keeping it in this position while underway, because it is not strong enough to serve as a hand hold.



- Jim Hartzler

I installed back-to-back (inside and outside) teak grabrails on either side of the main companionway, mounted through the teak slide rails for the companionway boards. To attach, I used six 1/4 x 6" stainless steel carriage bolts, with stainless steel cap nuts on the inside. Installed by drilling three holes - top, middle, bottom - in one grabrail, then holding it against the outside companionway slide rail while an assistant lined up another grabrail inside the cabin, then drilling thru the companionway slide rail and the inside grabrail, using the pre-drilled holes as guides. Trick is to drill at the slight downward angle of the bulkhead and straight thru rather than side to side (and not to drill thru the assistant's hand). I sunk the carriage bolt heads into the grabrail on the outside and covered the holes with plastic wood. - Art Levin

I've found that the anchor roller Vega provides to be too small for my 25-lb. plow. I installed an anchor roller on the step through the bow pulpit:

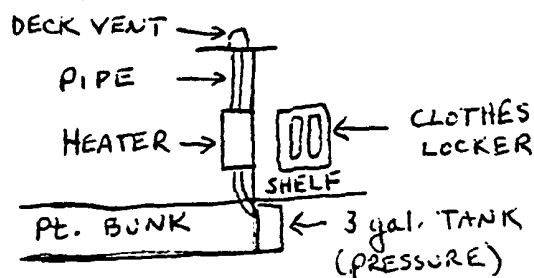


- Jim Ranti




Two years ago I installed a Mariner Jib-Away system and like it very much. We have reefed the jib with this system.

- Jim Ranti

I also installed a Taylor type Kerosine heater on the Pt side forward bulkhead. This has extended our sailing season.



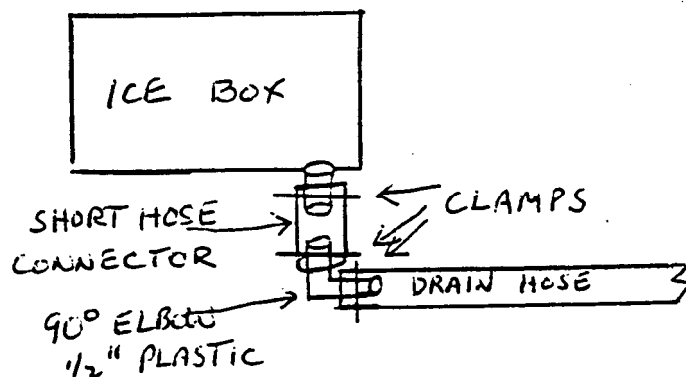
- Jim Ranti

I store my Vega table suspended from the cabin top in the forepeak, with the leg bases up. The front of the table rests on the shelf on the foreward bulkhead, above the anchor rode opening. To hold up the back end, I made the following contraption. I held the rear of the table up against the center line of the cabin top (where there is supposed to be a wooden brace embedded in the fiberglass core), and marked a spot where one edge of the rear leg base touched the cabin top. At this spot I held a stainless steel eye  up against the cabin top and marked the two screw holes for careful drilling later (not to go thru the deck). Then from the eye, I hung a s/s shackle with a screw-type pin , putting the open end of the fork of the shackle over the edge of the table leg base  while still holding up the back of the table. As you can see, in order to get the removed screw pin back in the shackle, a hole at the appropriate place has to be drilled in the table leg base, which, when all is assembled, holds up the back of the table. The size of the hardware has to be small enough not to let the back of the table hang too low, but large enough to be able to get your hand between the table and the cabin top to turn the screw pin of the shackle to remove and replace. This contraption will hold the table firmly in place even in the roughest weather, especially if you epoxy in the screws of the eye into the cabin top. - Art Levin.

Never caring for alcohol stoves, I have removed the Swedish one, installed a two burner Coleman LP using disposable cylinders, made a safe mount for a cylinder in the corner, outboard, over the berth, this puts the bottle about two feet from the stove. Security is in the individual burner valves, the main regulator valve at the cylinder, detaching the cylinder when not in use, and the smell of the gas.

- Robert Shepard

Have you had trouble with your ice chest not draining? Don Angell found the drain hose pinched together where it made a sharp bend immediately below the ice box, cutting off the flow of water. He solved this by inserting a 90 degree elbow (1/2" plastic) in the drain tubing, where it fastens to the ice box drain. The elbow can be purchased from a hardware store for about \$.40. Add a short piece of connecting hose with a couple of clamps and you're in business.



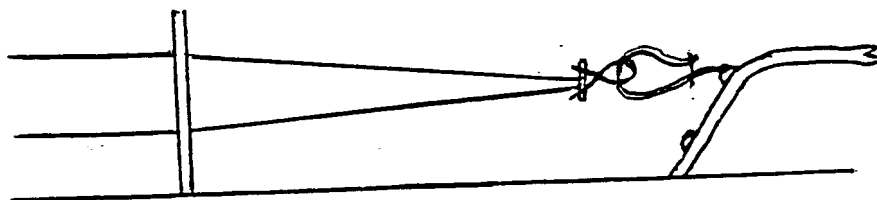
The drain is in a very inaccessible location. To provide working room for this modification, remove the seawater pump and the front engine cover.

How to make a life line gate:

If you berth your Vega bow first in your slip, here is a method of making a simple gate so you won't have to step (or fall) over the lifelines.

Equipment needed: 1 Pelican hook (\$5.95 from E&B)
1 90 degree twist shackle about 1 1/4" deep (\$4.29 from E&B)

1. Detach the two lifelines from the bow pulpit.
2. Attach the shackle to the lifelines by putting the shackle pin through the ends of both lifelines.
3. Attach the Pelican hook to the bow pulpit by pinning it to the top lifeline fitting.
4. Fasten the shackle in the Pelican hook.
5. Tighten the lifelines by adjusting them at the stern.



Don Angell will be glad to answer any questions regarding this installation.

I have ready access to the electrical panel by discarding the screws that held on the cover and replacing them with fasteners used to hold windshields in power boats. The fuse block has already been changed to U.S. standards so it holds standard 1/4 x 1-1/4 glass fuses. Sometime later this year I hope to install a battery selector switch so the engine can be started from either battery. Had to use jumper cable in the past; easier than using the crank. Also intend to add gauges to replace the idiot lights.

- Harold Cohon

The depth sounder, wind gauge, and VHF radio are all mounted on a panel which is attached to the starboard inside of the guides for the drop boards by a piano hinge, and the whole mess swings out across the companionway to be held by shock cord while underway and back inside to be latched out of the way while not underway. The dodger keeps the rain off nicely and I can reach the mike, shift channels, and see the depth sounder from the helm.

Becoming disenchanted with the idea of having to disassemble the boat to get at the fuse panel, which, by the way, I discovered by trial and error (there being no description of it in the owner's manual), I made an aluminum panel on which I mounted an ammeter for the alternator and a series of circuit breakers from aircraft surplus. So now most of the stuff goes through circuit breakers instead of those little VW fuses. I'm able to monitor charging current and if a breaker pops, it's easily reset and which one is immediately apparent. I used alodine solution to color the aluminum and centered the panel just under the companionway and it blends nicely.

I thought I'd fancy the boat up a little and got about 10 strips of birch and red oak (5 each) 3/16" thick, drew a curve on a piece of plywood, and after trying it out for shape and size with the plywood model, then put blocks on a plywood sheet, wet the strips to soften them, and laid up a new tiller. After the strips dried, they retained most of the curve and they were then glued up with waterproof glue and clamped tightly with every C-clamp and handscrew I owned. Then it was a case of hand shaping with plane or spokeshave, lots and lots of sanding and varnishing, finishing off with a 7" or 8" length of coachwhipping with a turk's head at each end, and I've got the fastest tiller in the west. I can send some Polaroid pictures if you've any further interest.

- Jesse Adams

I extended the stern for several reasons: to clean up the exit and gain a foot of waterline at speed; and safety, since a person falling overboard can regain the deck easily by pulling up onto the swim step's deck, which is only a few inches above the water's surface. The original transom remains the only transom; the new stern being "hollow."

Other ways in which the stern adds to life aboard the VEGA: a dinghy landing, dive platform (no ladder is needed and gear is put on and taken off "the aft-most deck"), all fish are conveniently cleaned here, dishes are washed here with sea water, and, finally, the Poop Deck (as it is affectionately called by all who have used and appreciate it) is also the shower.

We've also added two black PYHI rectangular portholes, 7" x 16-1/2", to the break in the cabin top. These opening ports, facing forward, admit a great breeze through the main cabin. Other changes planned: bowsprit for more fore-triangle and to stow the two 35# "Barnicle" anchors.

- Don McGregor

I have recently installed a cassette AM/FM stereo under the starboard deck over the sink area. There was plenty of room and working was real easy under the cabinets. The speakers are small bookshelf units with wooden cabinets and mount on the surface of the aft salon bulkhead. These units are supplied by Radio Shack Corp. Since the units are surface mounted, they require very little mounting holes. The sound of the system is very good. I believe this is attributed to the wooden speaker cabinets and all the wood in the cabin.

- Bill Edelstein

The removable cover over the stove can easily be made into a handy chart storage area. Either on the topside or underside of the cover, along one short side and the two long sides, attach 3 wooden strips (10 x 10 mm), and glue onto the strips a piece of plywood or teak the size of the cover (less the supporting rim if on the underside). The increased thickness of the cover is hardly noticeable.

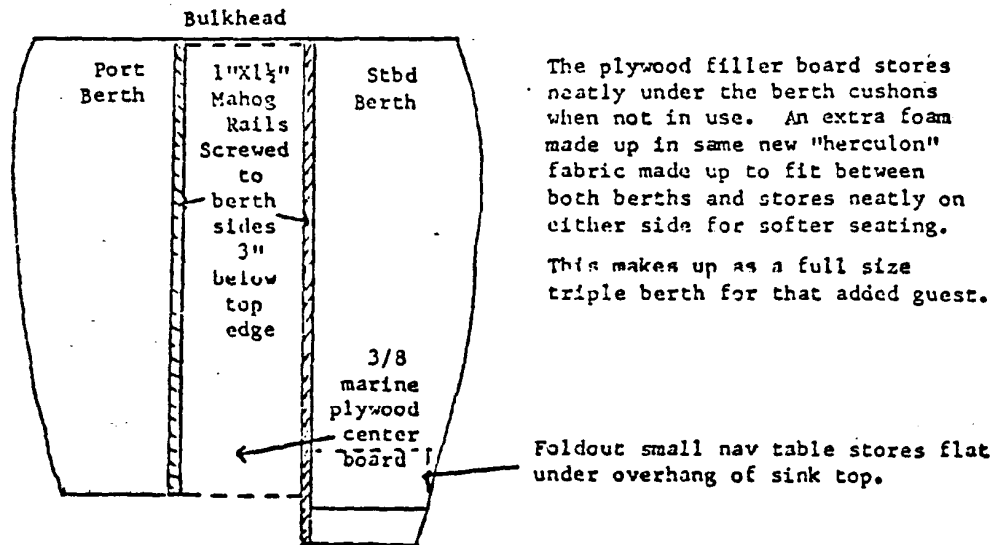
* * *

I recently replaced my 3-panel washboards with two pieces of 3/4" teak plywood. The cockpit sides had to be rabbited down to 1/2" thickness to fit the bulkhead grooves. Just use the old boards as a pattern, adjusting as necessary for a tighter or looser fit. Note that the cockpit side of the boards get rabbited, otherwise the lock will not work without further modification.

- John Cleveland

The following modifications were made to "Estelle;"

1. The standard toilet was removed from the enclosed head, and a fold-up seat was installed with a footpump connected to a hand-held shower. The floor pan was reglassed at all seams to the enclosure, and an electric bilge pump installed to remove shower drain water. A portable marine sani-head now resides in the "V" of the forward berth.
2. The port hanging locker was remodeled to provide a full wet locker. The table top now pivots on gudgeon hinges as the locker door (perfect fit - no cutting needed).
3. The galley stove was replaced with a new Coleman unit, mirror-mounted on sliding panels.
4. The stock ice chest is being converted to a 12V/110V refrigeration unit, using a small compressor mounted under the berth area.
5. All switches and fuses were replaced with U.S. items. An electric bilge pump with auto switch was installed. A 110V shore power system was installed and hooked into the boat via a DYTEK transfer switch. A panel voltmeter was installed, and a 60 amp-hour heavy duty battery. A 10 amp trickle charger also was built into the system with a separate switch to charge the battery when shore power is on.
6. A 1982 model MERCURY 9.8 H.P. electric start outboard was mounted on a swing-down mount on the transom. The unit with its built-in alternator provides excellent back-up power and electricity when I need it - which is frequently when the old Albin sputters dead. A six-gallon auxiliary tank was mounted in the lazarette with fuel crossover valve and line to the main engine.
7. Triple convertible berth was installed in the main cabin;



- Irv Furman

Another midship berth:

The distance between the port and starboard berths on my Vega (most Vegas) is 22 inches for a running length of six feet. I cut a sheet of 3/8" plywood to a size of 6' x 22" and stained it to match the interior. Then I took two 6' pieces of 1" x 1" moulding and mounted these to act as rails on each side to hold the plywood leaf. The rails were installed with seven (one foot apart) 1½ x 8 brass wood screws and then stained. The last part is to buy a piece of foam the size of the leaf and cover it. When not in use, the new cushion fits upright along the hull in the "V" berth, and the leaf fits under the starboard cushion.

- Jim Nardielli

To power our two electrical "liabilities" - an electric head and an automatic bilge pump - we had installed two batteries on a shelf against the bulkhead in the port cockpit locker, and a two-bank PRO MITE 15 battery charger on the bulkhead in the starboard cockpit locker. To feed the battery charger, we had a dockside power connector installed in the starboard forward part of the cockpit, and three plugs inside the boat: on the bulkheads by the icebox and the stove, and on the front of the hanging locker. Also located on the bulkhead by the stove is an electrical system monitor, which is worth its weight in gold. Next to the monitor is a battery switch with #1, #2, ALL, NONE. Everything was grounded, and the original "snakepit" of wires behind the engine step was replaced with neatly labeled, individually fused circuits. It cost quite a bit, but was worth every dollar in peace of mind.

- Hank and Sheila Dowst

We purchased a boom tent and a new spray shield cover from Vegetillbehor. The boom tent creates a second standing-headroom cabin in the cockpit while on a mooring or in a slip. It is very handy in bad weather. We were very pleased with price and quality.

- Noel & Maureen Bearee

I went to double backstays to use the backstays as the antenna for the SSB radio. With the short mast, the antenna needs all the length it can get. Besides, it is a comfort to know that a backstay breakage or turnbuckle failure will be little more than an inconvenience. The linkage at the top is a simple thimble and nicropress fitting, such as done for the connection of the original backstay.

- William Edelstein

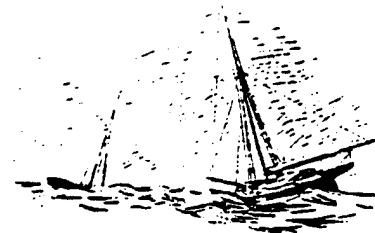
I found at the last BOAT/US warehouse sale a NORCOLD icebox conversion refrigeration system that I have installed in the existing icebox. The system draws 5 amps and runs about 50 percent of the time, for an electrical draw of 50-60 amp/hrs per day. This sounds hefty, but in two weeks of cruising the engine alternator (35 amps) was able to keep up with the load if carefully looked after. Better results can be had if the icebox insulation is increased, but that will require ripout of the icebox liner. The small size of the icebox becomes less of a problem when one does not have to carry ice. If left full on, the system can freeze the contents of the box solid, better done when tied to dockside power.

The radio installation and cabin heater share the same spot on the bulkhead to port of the doorway to the forward cabin. I used heavy mirror hangers which are made of steel and take up very little space. The SHIPMATE kerosine heater mounts on a $\frac{3}{4}$ " plywood about 12" wide and 18" high. The stack uses a $1\frac{1}{4}$ " fairing block directly above the heater. The pipe must be sealed off with a cork when not in use. This location for the stack causes very little interference. The radio box is 7" deep, 12" wide, and 18" high. The front pivots down to form a shelf for the radio (KENWOOD 430s), which is mounted to the shelf and swings with it. Inside there is a small storage shelf above the radio cavity for various cables, microphone, etc. The front shelf covers this area when in the up position, and when down this empty area of the cover forms a work area for notes, etc.

- William Edelstein

We have sailed with our Bimini under all conditions for the past two years and find it a very beneficial addition. The Bimini has a 3-way stainless bow; two parts aft of the backstay and one part forward. It extends (fore and aft) from two inches aft of the boom to the stern rail. Two vertical straps tie it down to the stern rail and two sloping straps angle down to the base of the aft stanchions. The forward section is split around the backstay, at the level where it divides, and is held by a velcro closing. It was measured and made by Leonard Sails at Zahniser's Marine in Solomons, MD, for \$500, which is expensive but well worth it in this area.

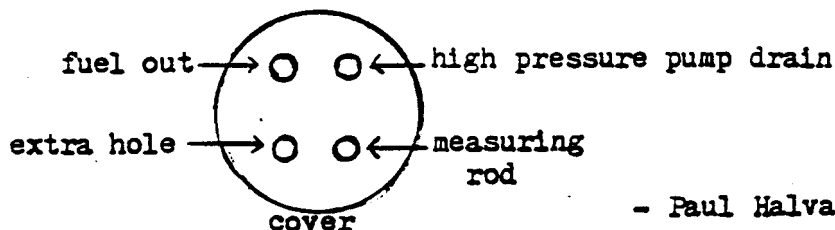
- Pierce Reed



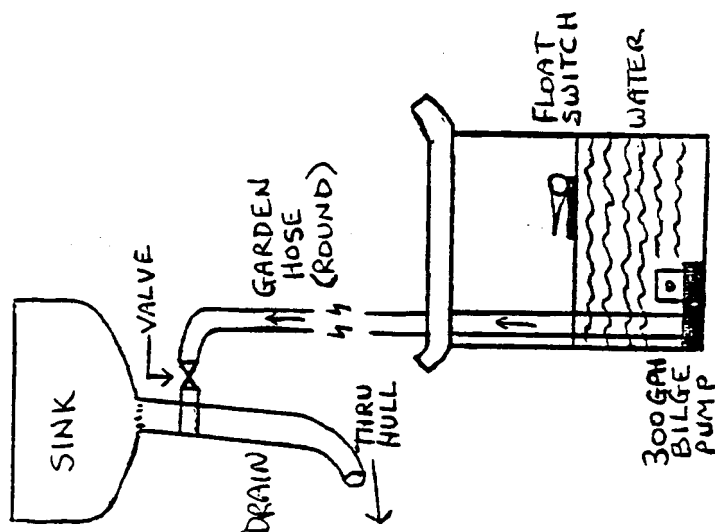
I installed the WALTHAM MARINER two-burner propane stove with broiler. The gimbals from the Origo worked just fine. However, I had to recut my cabinetry, but it was easy with just a coping saw. The stove was purchased from Thomas Folkes in England for about \$160, including shipping. The aluminum propane tank was \$140(!) and miscellaneous hoses, etc., ran about \$20. Regulator and automatic shutoff were about \$80. So the entire rig set me back about \$400. However, I filled the tank before Memorial Day for \$3.25 and it's still going strong in September! My alcohol budget previously was about \$30 per month, so the propane will pay for itself in about 14 months. The propane tank is mounted horizontally on the "fan-tail" over the bilge blower vents.

- John Cleveland

I bent the measuring float rod in the fuel tank cover (located above the bilge) so that it no longer rose or fell. To determine my fuel level, I removed the cap covering the extra hole in the cover (see diagram) with an 8 mm Allen wrench. Then I made a measuring stick divided into 4ths. To check the fuel, I remove the cap, insert my stick, measure, and recap. Just like any other "Model T" idea, it works just fine. It can also be used to pump out the fuel tank.

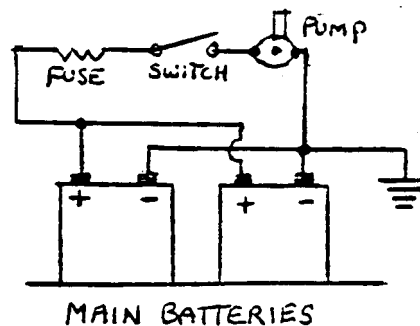


- Paul Halvachs



AUTOMATIC BILGE PUMP ARRANGEMENT

- Gunnar Asker



The most useful modification I've made is a "roll-bar" at the rear of the sprayhood (dodger). The standard sprayhood is convenient to grab when going on deck or returning, but it is certainly not very strong. The added bar provides a reassuring solid hand-hold and is also in the right place when steering in bumpy water.

The bar is aluminum pipe (not tubing) one inch O.D. and 13/16 I.D. It fits under the top edge of sprayhood and I put it inside the fabric at the bottom.

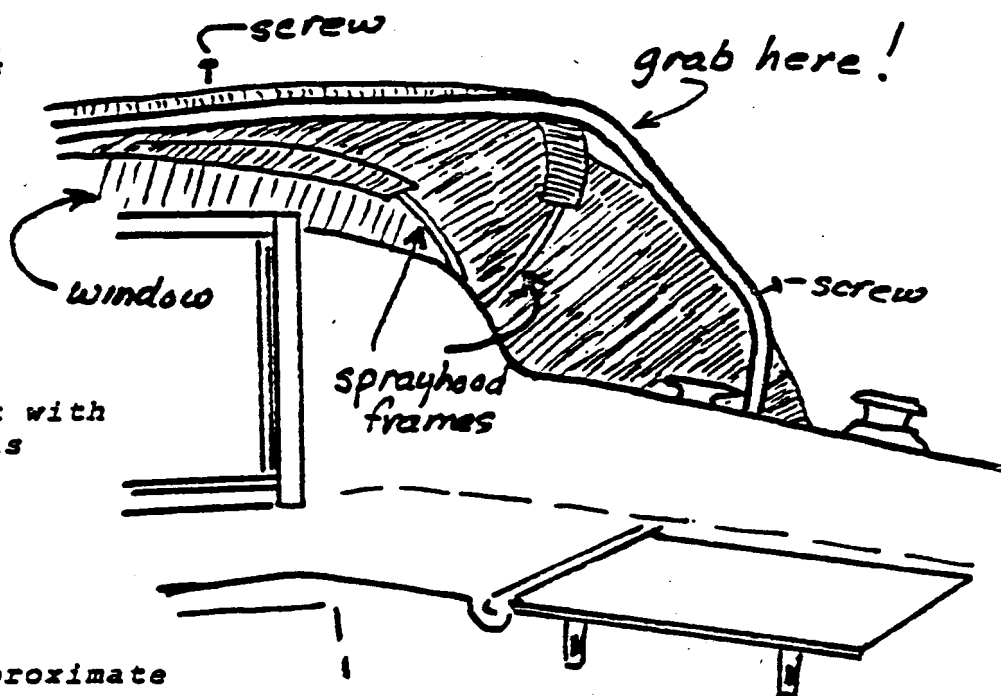
With a standard Vega sprayhood, this leaves about 18 in. of bar which sticks out astern of the upper corners of hood, with a maximum gap of about 1 in. Just right for grabbing!

The bar ends up about 115 in. long but start with an extra foot. There is no way to list exact dimensions and angles. I made a full-size cardboard template of the back of sprayhood and got an electrical contractor to make approximate bends. Then by trial and error I made it fit exactly, levering against strong points on a workbench.

The bar goes down the outside of cockpit coaming at the rear end of forward cleat. Two bolts with giant washers on inside are put out through the coaming then through the bar. Since one has to lie in the locker to get inside of coaming, put the heads inside and leave bolts in place even if bar is removed. A decent-sized s.s. screw goes down through top centre of sprayhood frame and secures in the bar. This is enough to make the whole affair rigid. A couple more screws hold the fabric to the bar near the bottom. The bar was painted to match the sprayhood.

Stainless steel would be better than aluminum if you can figure out how to bend it. The only problem is putting the fabric outside the bar at the bottom. Although this holds the hood out nicely so you can get at the forward cleat, it guarantees that your shoes will scuff the fabric as you go by. If it gets too dirty or worn, I'll put on rub-patches.

— John Sprague

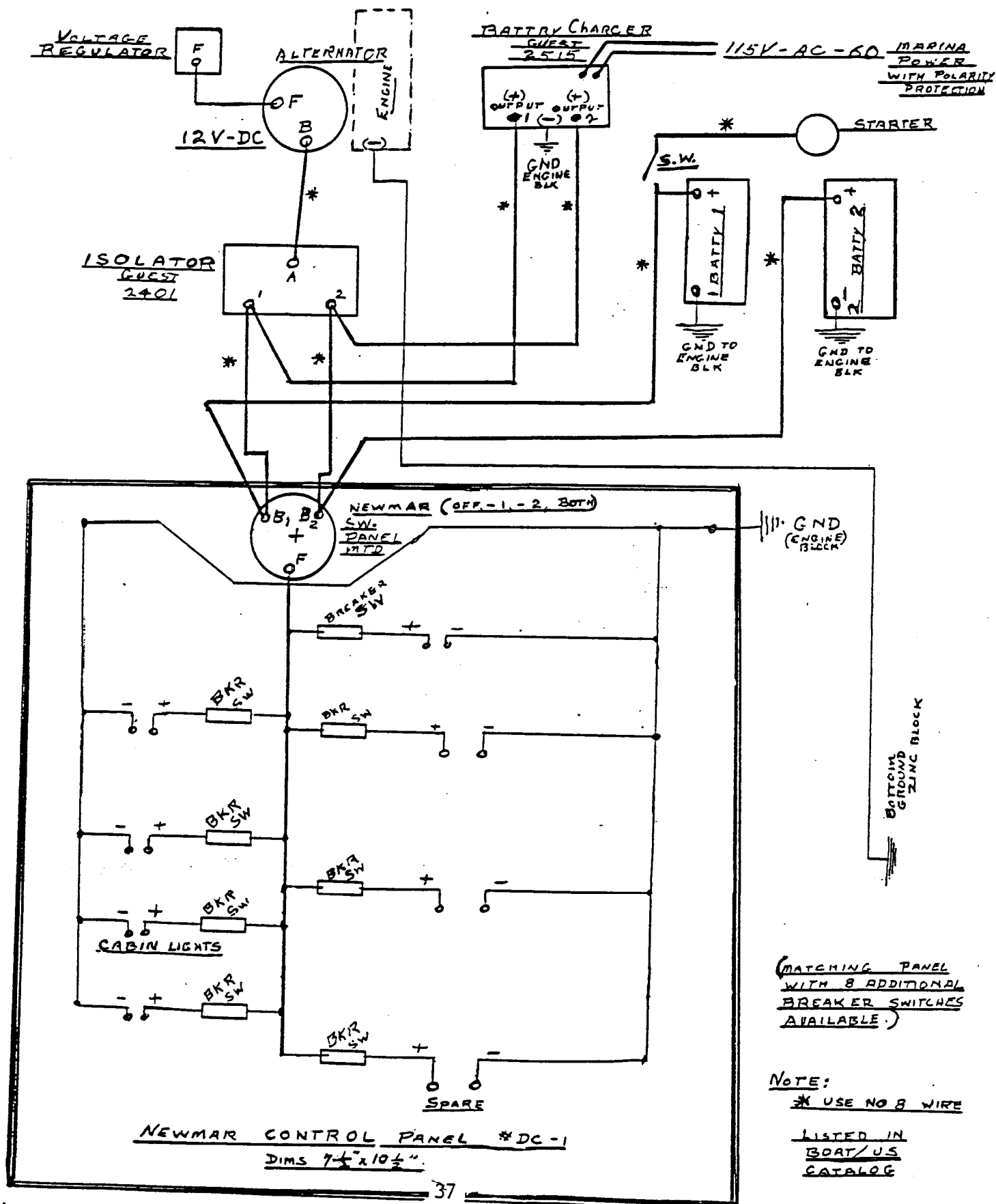


ELECTRICAL SYSTEM

REF: GUEST BUL* 1-21681 (REV B) *12

YACHT "PRIVATEER CHANCE"

ALBIN VEGA Sloop #1879 - Jim Sheldon



NOTE: BATTERY CONDITION INDICATOR, OMITTED FROM PANEL FOR CLARITY

NOTE:
* USE NO 8 WIRE
LISTED IN
BOAT/US
CATALOG

J.R.S. 1-21-84
REV

NAVIGATION EQUIPMENT

I installed a Seafarer depthsounder and a Speedolog which I purchased from Thomas Folkes in England. (Dept. YM/76, Lansdowne Road, Leytonstone, London, E11 3 HB.) The purchase price at that time (1978) was 114 pounds for the Speedolog and 32 pounds for the depthsounder, or \$232 total. The instruments are portable and there are brackets for mounting if you wish. I made a swinging gate on the port bulkhead so the instruments swing into the companionway and then back.

The transducer is through-hull. The Speedolog is electromagnetic. During the first season I had to clean it three times but it is simple to clean. I had the Speedolog transducer installed under the starboard bunk which was a goof because on a port tack it is out of the water. I am going to move it to where the existing depthsounder is, under the stove.

- Sam Amoss

I have a Datamarine digital depthsounder, and an EMS U25 knotmeter. Each is installed in a cockpit locker, at the front inside corner about half way between the keel and the water line; about eight inches or more under water. Both work fine. I have some bottom paint which is pure copper in xylol, and a small bottle of this paint is about \$3. It is very effective in preventing fouling.

The knotmeter paddlewheel can be removed and cleaned from inside the boat, using the supplied blank to plug the through-hull hole while doing so. For the depthsounder transducer, which cannot be removed, from time to time I stick my arm under the boat and if I feel barnacles on the transducer, I pick them off. Once you get a big blob of barnacles and sea grass on the transducer, you get erratic readings.

One more thing about depthsounders. Mine has an alarm which is set at seven feet. It cannot be changed, although there are others where the alarm is adjustable and it can be set wherever you want it. The boat yard put a switch on that alarm because at seven feet it would be buzzing all the time. If you have a fixed alarm I would urge a switch so it can be turned off.

- Art Levin

I installed a Loran C, a Nelco with the microprocessor. Program all your possible waypoints at the dock, and when visibility goes to pot, the Loran will take care of you.

- E. W. Hancock

I had a knotmeter and I thought there was something wrong with it. The first year I made a run between the mile markers off Kent Island and it was very true. I concluded the problem was very soft bottom. The knotmeter was AMF. Now I have a Seafarer and it works very well. The problem had to do with high frequency. I have my knotmeter and depthsounder up forward. - Jim Hartzler

The Seafarer knotmeter has a click built into it, as it clicks off hundredths of miles. You can tell variations in speed by listening to the clicks and actually trim sails accordingly. - Sam Amoss

I have a Pearce-Simpson and the transducer is in a well under the port forward berth, up against the bulkhead. The well is a plastic fruit jar I bought in a hardware store. I cut it at an angle so the top would be level and bolted the stem from the transducer to the cap. The fluid can be water or mineral oil but I found that water works fine so I use water. The hull thickness does not seem to affect it.

- Stuart Horn

For us poor guys I have a plastic tube knotmeter and it reads accurately to within a third or a quarter of a knot.

- Tyke Furey

For those still poorer guys I go forward, drop a can off the bow, give a signal the moment it hits the water, my wife in the cockpit with a stop watch notes the number of seconds it took the can to pass the transom, and then the seconds are applied to a predetermined scale that was published sometime back in Rudder Magazine, which will give the speed of the boat.

I do have a Ray Jefferson 410 depthsounder which has a needle. It is easy to read but has been undependable. I have returned it to the factory once and also had it checked by Suitland Electronics, both of whom find nothing wrong.

- Russ Walker

A simple depthsounder is a coke bottle tied to a line, say four feet from the end. Throw the line out ahead of the bow and if the bottle floats you know you are approaching water with a depth of less than four feet; if the bottle sinks the depth is over four feet. - Jim Hartzler

Signet instruments mounted through bulkhead on starboard side of cockpit. Inside cabin parts covered with custom teak

instrument box with removable cover for adjustments.

Model 20 Log
Model MK9 Knotmeter
Model MK24 Windpoint
Model MK30 Windspeed

After calibration all instruments very good performers.

Ray Jefferson Model 5120 Alarm Depthfinder, Mounted transducer inside hull in bath of mineral oil just forward of hanging locker. By subtracting distance from it to keel bottom (3') it gives very accurate readings. Readout unit is mounted on bulkhead in main cabin, port side, up high.

- Herb Edwards

I mounted my compass on the outer edge of the companionway sliding lid on top. It is high, but I stand a lot anyway.

- Stuart Horn

My compass is mounted on a bracket on the starboard bulkhead in the cockpit, and can be removed. The compass should not be closer than three feet to the engine, nor too close to the metal dodger supports either, both of which can cause interference. Compass can be wired or plugged into cigar lighter socket over icebox. Twist lead wires around each other along full length from compass light to socket to prevent electrical field that will affect compass reading.

- Art Levin

Equipment - used by various Vega owners (1978)

Seafarer Depth Sounder	Purchased from Thomas Folks,
Seafarer Speedo-Log	England for \$232 Approx.

Pearce-Simpson Depth Sounder, transducer in plastic jar well epoxied underneath port forward berth against hanging locker.

Datamarine Depth Sounder, digital, up to 199 feet, \$259.

Raytheon #DE 737 Depth Finder, needle indicator up to 90 feet.

EMS U25K Knotmeter, \$78.21 plus \$5.95 for light, from Goldbergs'.

I have a "Tillermate" self-steerer. The Vega cockpit is a little too narrow, so I put a little outrigger on it. It steers by compass. There is not much drain on the battery. My only problem has been on glassy days. The cost is about \$300 (1978) and I am extremely pleased with it.

- Jim Hartzler.

I hope most members have learned to set up their Vegas for self-steering. All it takes is two small pulleys on top of, and on either side of the cockpit coamings. A piece of 1/4" rope is then tied to mainsheet (between the boom and the mainsheet cleat) run through the pulley and attached to the tiller. On the other side, an elastic is run from the tiller to the cockpit coaming. I've broad reached from Annapolis to the Solomons without ever touching the tiller by using this simple technique.

- Mike Johnson

A word about VHF radiotelephone channels. I have a 55 channel radio, of which about 45 channels are of little or no use. I bought it because it was the only "synthesized" radio available, and I did not want to bother getting crystals installed. In my opinion, a 12 channel radio, including two weather channels, is all that is needed for recreational boating.

- Art Levin

The Autohelm 1000 self-steerer is available at a savings of over \$100 from local prices from Capt. O.M. Watts, Ltd. (a British mail order firm), 45 Albemarle Street, Piccadilly, London W1X 4BJ, England. The price of the unit is 150 pounds, with an additional 8 pounds for surface shipping and insurance (4 weeks) or 14 pounds airmail and insurance. An optional wind vane (for off-shore cruising) is available at 35 pounds. You can mail them a bank draft in English pounds, or call a commercial bank for the current exchange rate and mail them your personal check in the required dollar amount.

As far as installation is concerned, it couldn't be simpler, and the instructions are in plain English. It needs a 12-volt power supply connection and fuse. It uses about the same average wattage as one navigation light so there is no concern of running the battery down. It is so light that merely tightening the tiller bolt supports the tiller and the Autohelm. It has one switch with four positions: Off, Calm, Rough, and Vane. I use the Autohelm even going through winding channels, just turning the compass control. It steers much better than I do, and quickly figures out the correct amount of weather helm to carry. So far I have used it in winds up to 25 knots and it has performed well.

- Gordon Hempton

We replaced our nonfunctioning running lights with AQUA-SIGNAL running lights. The conversion is very simple as the existing wiring can be used, and the existing mounts will accept the new lights after new holes are drilled for the fastening hardware. The AQUA-SIGNAL lights have much larger lenses. We also installed an AQUA-SIGNAL masthead tri-color running light to provide better visibility in any sea conditions. The lights are available thru BOAT/US at a considerable savings.

- Ron and Micki Pugh

Installed the NAVIK self-steering vane on "AQUARIUS." Cost was \$995, plus \$35 shipping from California. To complete the installation required two special brackets (\$60) and some welding to lengthen the lower struts (\$10). Once I had all the parts, installation took about two hours (with a friend holding the screwdriver). In use the NAVIK was easy to use and held a course very well.

- John Cleveland

I have purchased a WINDPILOT 2500 automatic steerer. It is twice as fast as the Autohelm, twice as strong, has a dodging option, electronic selectable feedback, and automatic weather helm correction. The latter will be helpful on gusty days to keep the boat on proper course. I ordered this from Thomas Folkes in England by phone using Mastercard. Their telephone number is 011 441 539 5627. They will take the card number over the phone and ship immediately. The cost was 207 pounds (\$296) plus \$12.80 for the telephone call and \$14.00 for customs. The unit arrived within three weeks.

- William Edelstein

This year I mounted a tri-color masthead light. It mounts on a flange directly on the masthead using machine screws. I was able to drill a $\frac{1}{4}$ " hole for the power wire and used aluminum clothesline wire for a fishwire to pull thru the new wire. These units are much more visible than the hull-mounted ones, and they use only one bulb instead of three, saving about 24 amp/hrs over a 12-hour night, or about one-half the consumption of the refrigerator.

- William Edelstein

We replaced the deck ventilator with a Micro solar ventilator and it works like a charm.

- Bob & Cleo Phillips

PROPELLER SHAFT - REVERSING MECHANISM (Combi Unit)

On the underside of the reversing mechanism, port side, there is a Swedish (metric) grease fitting which an American grease gun will not grab. I unscrew halfway the tip of the grease gun fitting, put it on the metric fitting, and then tighten it by hand until the tip holds onto the metric fitting for greasing. It is usually necessary to finally tighten down the grease gun tip with a clean rag free of grease to get it to hold.

- Art Levin

Never could get grease gun to stay on the fitting for the reversing mechanism which is underneath the gear box and out of sight. I had a rubber grease tube installed, about 18" long, screwed in the old zerk fitting hole and put a zerk fitting on the end. Now you can see what you are doing and hold the thing together with no trouble.

-Herb Edwards

I have the MD6A diesel engine and the Combi transmission unit. It is the Combi unit which has given me many problems. I've taken it completely apart 6 times. Most of the time, water was leaking through the double shaft. The O rings were breaking down. If the engine is not in perfect alignment, this happens. One time, the oil seal on the inner transmission unit broke down and oil started pouring out. To make a long story short, I've talked to many people and this is the story: Vega (Volvo) does not produce the Combi anymore because of a bad design. Everyone who knows anything has said "get rid of it". The Volvo dealer in Connecticut wants \$1,500 for a regular reverse gear. He has a rebuilt unit and wants \$1,000 for that. I'll be damned if I'm going to pay that much. I'm now looking into the possibility of installing a rebuilt grey transmission from an Atomic 4 engine - using a mechanical adapter plate. The cost will be about \$100 for the transmission, \$75 for the adapter plate, plus installation charges.

- Jim Ranti

The real problem was the late launching of SUZY-Q due to work I had to do on the engine drive mechanism. I lost the seals in the shaft log last summer and improvised a grease seal which kept SUZY-Q afloat during the season. Last winter I removed the variable pitch drive from the engine, intending to replace the operating sleeve and the seals. It was a difficult job which I would be glad to detail if anybody else in the group plans to do it. I ended up unable to break the coupling from the drive shaft, so I had to take the engine from its mounts, move it forward in the boat, and then pull the drive shaft inside.

Had a real mix-up with Volvo Penta on part numbers. Thought I had ordered an operating sleeve in March only to find, in fact, I had ordered a new drive shaft which came in mid-April. Unable to find an operating sleeve anywhere in the U.S. I modified the dimension on the shaft log so that the new seals would bear on a different part of the old operating sleeve.

Finally gathered all parts by late April; took a complete weekend to reassemble variable pitch drive mechanism and the engine. The real problem was the fact that the engine as mounted at the factory was badly misaligned with the drive shaft coupling. As nearly as I could determine the misalignment at the drive shaft coupling was at least .030". I was able to realign by shimming on the back engine supports.

SUZY-Q went into the water second weekend in May. Pleased to say that the engine performs well. I don't have any of the vibration that should have told me during the previous 5 years that I had a bad misalignment problem. I would suspect the way Vegas are mass produced that misalignment is probably a common problem among most of the boats. Aligning the drive shaft on the older MD6A engines like SUZY-Q is not an easy job and requires disassembling the variable pitch mechanism at the back of the engine to provide access to the operating coupling. As difficult a job as it is, I would certainly suggest to anyone that has excess vibration when under power to consider checking alignment of drive shaft. The type of misalignment I had was certainly evident in bearing wear, seal wear, and wearing of the stern bearing.

If anyone needs any help on the variable pitch seal mechanism, please have them contact me. Would be more than glad to consult or even help if I had the time.

- Peter Richmond

Whenever the cockpit sole is removed, but at least annually, liberally grease all the movable control linkages below decks. Don't forget to check the stuffing box for grease.

Caught fellow yachtsman's 1/2" anchor rode around prop and shaft. Engine stopped at once. Started again after rode removed but ran rough and stuffing box began to leak when engine was running.

Trouble diagnosed by VOLVO national service manager and local VOLVO distributor's mechanic as bent shaft. (Note: Volvo engine plant nearby). This turned out to be the wrong problem as will be noted later. Took these people two days to try to get the shaft out of the boat. They ended up by cutting the shaft in two pieces. Not enough room in the engine compartment even though part of the bulkhead was removed. No instructions in the factory's engine manual pertaining to this remove. When the shaft was finally removed it turned out to be straight but the key in the forward end had been bent and the key way ruptured. New shaft and prop installed. Don't know why the new prop but I'm no mechanic. Installation required special tools as set forth in manual but mechanic did not have same or Volvo. Motor ran smoothly for nine months then suddenly lost all forward power. Examination by different mechanic revealed that nut that holds shaft in engine had not been properly installed allowing shaft to gradually back out of engine. Had the special tool been available this might not have happened. The Volvo plant has manuals on this Combi engine but knows very little about it since it is made overseas. Synchronization of the shaft and prop gives trouble each time any work is done.

Cost of repair: \$1,256.00 for first time and \$305.00 for second time = \$1,561.00. I had the old shaft rebuilt and now have a spare which will probably never be needed, I hope. Insurance covered the repair. (1978)

- Herb Edwards

I have just completed replacing the prop system with a standard transmission and prop. I have only a few hours on the boat at this time, but I am delighted with the modification.

The most important part of the conversion is finding enough room fore and aft for the transmission and coupling. I was able to cut off the stern tube (glassed into the boat) about 2" and install a conventional shaft packing gland for a 1" shaft. When installing the gland, push it aft as far as you can without having metal to metal contact, and double clamp each end of the hose. After the shaft is installed and coupling fitted, you will need about 15" between coupling and rear of engine to enable the transmission to be installed and removed if required. I had a stainless steel shaft 37" long, 1" dia., machined locally. On the outboard end of the

stern tube I found that a standard 1-1/4" x 1" cutlass bearing can be installed in the fitting that held the plastic bearing. I had this machined and fitted locally. The cutlass bearings are 4" long, so push it into the fitting so the excess is inside the tube glassed into the boat. Before installing the shaft, bore two or three holes about 3/8" dia. into the tube on the port side just ahead of the cutlass bearing. This will allow water flow through the bearing. My boat has the MD6 diesel so I used the MS series Volvo transmission with 1.9 to 1 reduction. Before installing the transmission, obviously the "variable mess" must be removed from the engine. After the housing is removed, there is a gear that must be removed from the engine crank so the transmission drive can be installed in its place. Removing this gear is tough but it can be done without removing the engine from the boat. I found to achieve shaft alignment I had to only raise the engine about 7/16" upward and 3/8" aft. Getting the engine mounting bolts out was really tough because of lack of room and rusted bolts. I replaced the Allen cap screws with hex heads and found them easier to work. After alignment, the engine cover insulation on the step had to be grooved slightly because of raising the engine.

I replaced the engine control with a Morse MV single lever control with minor modification to the mounting hole in the cockpit. Morse 33c cables, one 5' and one 6', worked out nicely for transmission and throttle. I manufactured the terminations for the shield ends of the cables. Finally, a 14 x 11 LH Mich. Sailor seems to be about the right prop.

This at best is a very expensive operation, with the transmission running about \$1100.00 new. This with hauling, machine work, prop, controls, etc., etc., just keeps piling it on, but I understand replacing the variable is expensive too. I cannot offer much on what labor might run on a job like this as I did all the work myself. If anyone wishes to discuss this in more detail, please give me a call any evening between 8 and 10, (804) 481-1881.

- Gene Hancock

I would like to add a few words about the prop shaft leaking problem, which I had since I purchased the boat, and which resulted in water getting into the gear box in the engine. Removing the prop shaft assemble and repairing it did not stop the leak. However, with my assistance, the yard finally found the cause of the leak. Water had been coming in between the aft end of the keel and the flange of the shaft log (part #15, p. 51~~28~~ of this manual). It seems the factory had filled a small gap with a caulking compound and it had become brittle and partially fallen out. We bevelled the area of the keel mating up to the flange of the shaft log, applied liberal amounts of 3M 5200 Marine Sealant, and the leak has stopped. The leak had

been intermittent, but sometimes would fill the bilge over a period of two to three days.

- Bob Sutton

Albin Marine has a stock of replacement brass plugs for the Combi propeller hub (\$3.05 each). The Albin parts manager recommended covering the outside of the plug with epoxy (after installation). This will keep the plug from deteriorating due to galvanic action/electrolysis. However, once applied, the epoxy must be chipped out of the screwdriver slot on the plug to remove for maintenance of the prop. The plug (as originally installed) is a 1/8" pipe plug with standard thread. Maybe we can find a plastic replacement plug?

- Art Levin

Deciding there must be a way to set the prop on neutral by some rough means other than hauling the boat out to see the little index marks on the prop hub, I set it up in proper position while the boat was out for engine overhaul. Installed the "sleeve" (part No. 27 in the illustration of the Combi Reversing Mechanism, p. ~~42~~⁴¹), and measured from the flange of part No. 2, "interm. piece," to the forward end of the sleeve when installed over the operating sleeve. Mine measured exactly 2 inches, which I guess will be close enough for a make-do setting next time it slips. Installing the housing, the key on the pinion shaft, No. 28, should be rotated so it points roughly straight up when the housing is bolted down (trial and error), while the throttle cam, No. 35, points aft with the index mark against the roller on the lever, No. 44. The cam, incidently, is mounted on a taper shaft and held by a nut and washer, and unless you have a gear puller which works better than mine it's tough to move around for adjustment. Theoretically, you can simply adjust the operating shaft, No. 28, to the proper position with the prop in zero thrust position (index mark on the blade root aligned with the index mark or joint line on the hub) and then rotate the cam on its shaft to whatever is needed -- that's if you can get the damn thing loose to do it. The control cable, No. 65, has a left-handed adjustment by turning the fork one way or the other to make the cable length to put the shift lever-throttle where you want it. A rough test of adjustment is if you can put the throttle lever all the way aft for feathering.

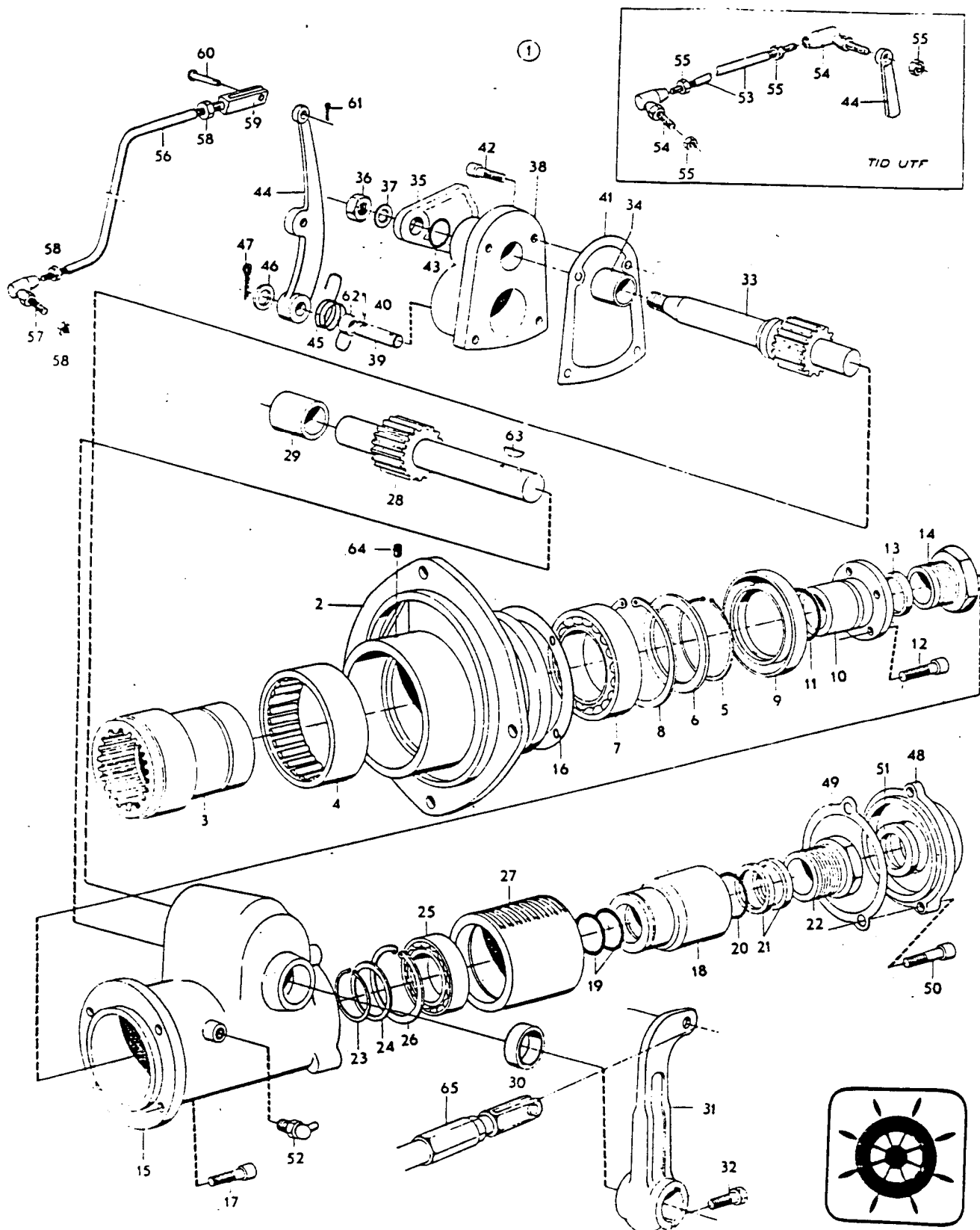
- Jesse Adams

COMBI REVERSING MECHANISM
"EXPLODED" VIEW

<u>Fig.</u>	<u>Part No.</u>	<u>Description</u>	<u>Notes</u>
1	3876394	Reversing mechanism	
2	3876297	Interm. piece	
3	3876374	Ring gear	
4	183586	Needle bearing	
5	914478	Lock ring	
6	3876410	Support ring	
7	19283	Ball bearing	
8	914548	Lock ring	
9	958897	Seal ring	
10	3876379	Sleeve	
11	925064	O-ring	
12	959219	Allen screw (4)	
13	3876421	Tensioner ring (2)	
14	3876380	Nut	
15	3876333	Housing	
16	3876418	Gasket	
17	959220	Allen screw (4)	
18	3876382	Sleeve	
19	925059	O-ring (2)	
20	925061	O-ring	
21	3849218	Tensioner ring (2)	
22	3849217	Nut	
23	914462	Circlip	
24	3876408	Support ring	
25	181549	Ball bearing	
26	914533	Lock ring	
27	3876381	Sleeve	
28	3876383	Operating shaft	
29	3876388	Spacer sleeve	
30	840222	Seal ring	
31	3877060	Lever	
32	955320	Bolt	
33	3876385	Shaft	
34	3876389	Spacer sleeve	
35	3876565	Cam	
36	955783	Nut	
37	941908	Resilient washer	
38	3876390	Bearing cover	
39	3876564	Shaft	
40	951946	Lock pin	
41	3876419	Gasket	
42	959220	Allen screw (4)	
43	955976	O-ring	
44	3876560	Lever	
45	840253	Spring	

<u>Fig.</u>	<u>Part No.</u>	<u>Description</u>	<u>Notes</u>
46	960148	Washer	
47	17276	Cotter pin	
48	3876334	Cover	
49	3876420	Gasket	
50	959219	Allen screw (3)	
51	840223	Seal ring	
52	3824387	Grease cup	
53		Control rod	MO-5159
54		Ball joint (2)	MO-5159
55	840221	Nut (4)	MO-5159
56	840024	Control rod	MO-5160
57	959079	Ball joint	MO-5160
58	955781	Nut (3)	MO-5160
59	961786	Yoke	MO-5160
60	913110	Clevis pin	MO-5160
61	907824	Cotter pin	MO-5160
62	3876993	Spacer sleeve	
63	910126	Key	
64	963050	Set screw	
65		Control cable	SE GRUPP 2D

COMBI REVERSING MECHANISM

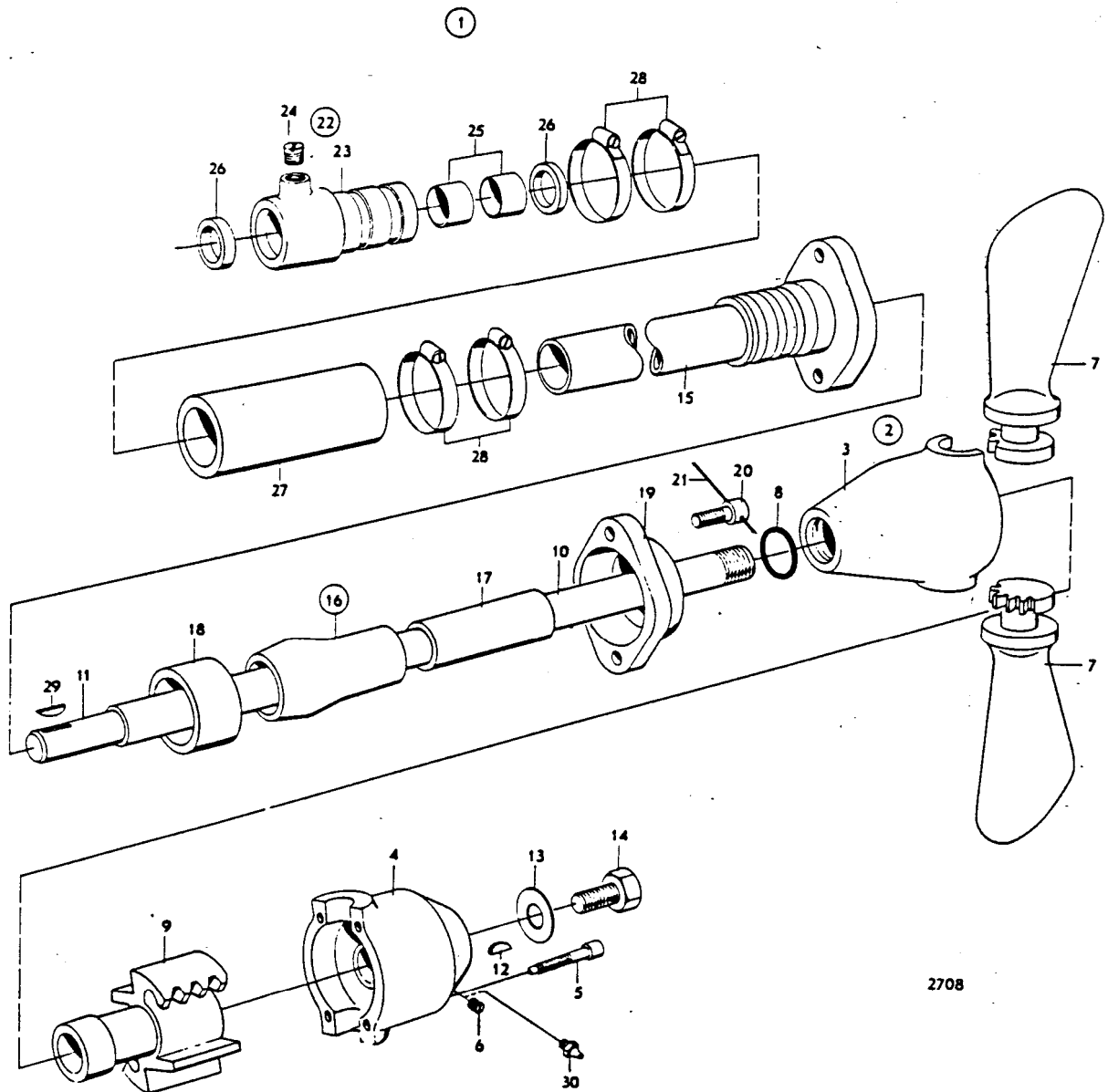


COMBI VARIABLE PITCH PROPELLER ASSEMBY
"EXPLODED" VIEW

<u>Fig.</u>	<u>Part No.</u>	<u>Description</u>	<u>Notes</u>
1		Propeller Assembly	
2	3847604	Propeller head	
3		Hub half	Lagerföres EJ
4		Hub half	"
5	959421	Screw (4)	
6	3849121	Plug	
7	3847433	Propeller blade	D=340mm STD
8	925061	O-ring	
9	3847355	Operating rack	
10	3877004	Operating sleeve	
11	3877005	Shaft	L=1643mm *
12	840250	Key	
13	840251	Washer	
14	3847627	Bolt	
15	3876057	Retainer and sleeve	
16	3875574	Stern bearing	
17	3847357	Bushing	
18	3875576	Rubber sleeve	
19	3875578	Flange	
20	3876250	Bolt (2)	
21		Lock wire	Lagerföres EJ
22	3875908	Stern bearing unit	
23		Stern bearing	Lagerföres EJ
24	3849532	Plug	
25	3875925	Bushing (2)	
26	840252	Seal ring (2)	
27	3875909	Hose	
28	3834808	Hose clamp (4)	
29	910116	Key	
30	3824381	Grease fitting	

* Other length of shaft
can be delivered on
request.

COMBI VARIABLE PITCH PROPELLER ASSEMBLY



2708

HOW TO DISASSEMBLE & ASSEMBLE YOUR COMBI PROP SYSTEM

by Don Angell

REMOVING COMBI UNIT

Loosen stuffing box clamps.

Disconnect throttle and shifting levers from shifting mechanism at rear of engine.

Remove 3 screws holding plate on rear of shifting mechanism housing. Slide plate to rear, exposing drum with teeth.

Move shifting lever on housing 180 degrees so drum moves to rear and exposes gland nut holding bronze tube to prop shaft.

Rotate drum 180 degrees to expose hole. Put pin in hole and remove gland nut on tube--twist tube at prop end to break tube loose (prop gear "rack" on end of tube is left hand thread). Note position of 2 lock rings under gland nut. These will later be reinstalled in same position.

Rotate drum back 180 degrees to original position.

Move shifting lever 180 degrees back to neutral while pressing on drum to engage teeth on drum.

Remove 4 bolts on engine end of shifting mechanism housing.

Slide housing to rear to expose gland nut on prop shaft.

Put pin in hole in cranking shaft (on front of engine) and remove gland nut.

Note position of 2 lock rings under gland nut.

Pull out tube and prop shaft from rear of boat while someone holds shifting mechanism housing (so it won't drop).

Remove stuffing box

Remove drum and shifting mechanism housing.

Remove gland nuts and lock rings (2 sets).



REPLACING COMBI UNIT

Replace 3 "O" ring seals in drum.

Replace 2 seals in stuffing box (put both seals facing to rear of boat).

Replace 1 "O" ring seal on front half of prop hub (remove hub from tube, install seal, and replace hub on tube).

Try putting prop shaft into bronze tube. If it fits hard, remove prop gear (rack) from end of tube (left hand thread) and de-bur end of tube where it screws into rack. Reinstall rack after de-buring

Replace all gaskets if torn. If not torn, may reuse with anti-sieze compound on one side of gasket.

Assemble shifting mechanism housing temporarily by inserting gland nut and 2 lock rings (previously removed from tube) and screwing on back plate--leave loose. Note--install rings in same position as when removed with flanges out and concave sides facing together (in).

(continued)

Put stuffing box and shifting mechanism in their places in boat and push in tube and shaft while someone feeds them thru the stuffing box and thru the shifting mechanism. Be sure front half of prop hub is on end of tube. Grease shaft before assembly.

Put gland nut and 2 lock rings over prop shaft and install half round key on shaft.

Line up slot with key and slide shaft into engine.

Tap end of shaft until you feel it "bottom out" in engine (Insert steel bolt in end of shaft and tap on bolt).

Put pin in hole in cranking shaft and tighten gland nut.

Bolt housing to engine.

Remove back cover of housing (which was installed temporarily) and move shifting lever 180 degrees to move drum to rear and expose teeth.

Rotate drum 180 degrees to expose hole in drum.

Screw gland nut on collar until collar turns--continue turning collar until hole in collar aligns with hole in drum. Put a pin thru both holes (pin should be snug fit). Loosen (unscrew) gland nut and move it and lock rings down tube.

From outside boat, push tube into housing until you feel it pass "O" ring and bottom out.

Tighten gland nut--remove pin holding drum.

Rotate drum back 180 degrees to expose teeth.

Move shifting lever 180 degrees to move drum back into housing into neutral position.

Replace back cover plate.

Tighten clamps on staffing box.

Install props. The blade with a small notch on base goes on side of hub with notch on hub. These notches must line up when prop is in neutral. Insert prop blade into hub by having one tooth exposed and rotate into position. If marks don't line up, blade is not installed properly--re-install until marks are aligned.

Install rear prop hub and tighten the 4 allen screws

Put washer on end of shaft and tighten bolt (this is the soft bolt that was originally removed). Note that washer has notch which must fit correctly. After tightening bolt, crimp washer. Don't tighten bolt too much as it is soft.

Grease prop with water resistant grease in grease gun, using grease fitting screwed into prop hub. Move throttle lever back and forth while greasing--until lever moves hard and grease comes out around prop blades. Remove grease fitting and replace it with plug.

Grease stuffing box with water pump grease. Remove plug and force in grease with finger until full. Do Not Use Grease Gun--It will Blow Out Seals.

Grease shifting mechanism thru grease fitting installed--about 20 pump strokes of grease gun.



Despite the scorn poured on it from many quarters, the Combi box as fitted to the Vega Diesel engine deserves much more respect.

The principle is first rate, and the design simple and robust. The main problems, and harsh words, come when the thing needs servicing. The legendary difficulty and expense of the work then cause most owners to throw up their hands and cast the whole box onto the scrap heap. Perhaps a few soothing words on our experiences recently will be of interest.

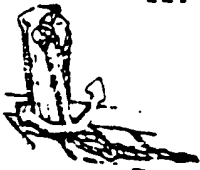
Firstly, it is not necessary to haul the boat to remove the box, nor is it necessary to dismantle the prop. In fact, it is serious mistake. Secondly, parts need not cost an arm and a leg; all the bearings, seals, O-rings and circlips are standard parts obtainable from any local dealers for a few dollars. The operating sleeve and internal sleeve are very low-stressed parts and hopefully will be OK. The total parts cost for all other replaceable parts is around \$25.

If by now your credibility is stretched slightly, read on MacDuff - it gets better:

(PLEASE NOTE THAT PARENTHETICAL NUMBERS FOLLOWING REFER TO VOLVO PARTS NUMBERS IN THEIR CATALOGUE - SEE VOCCA MANUAL p. 47.)

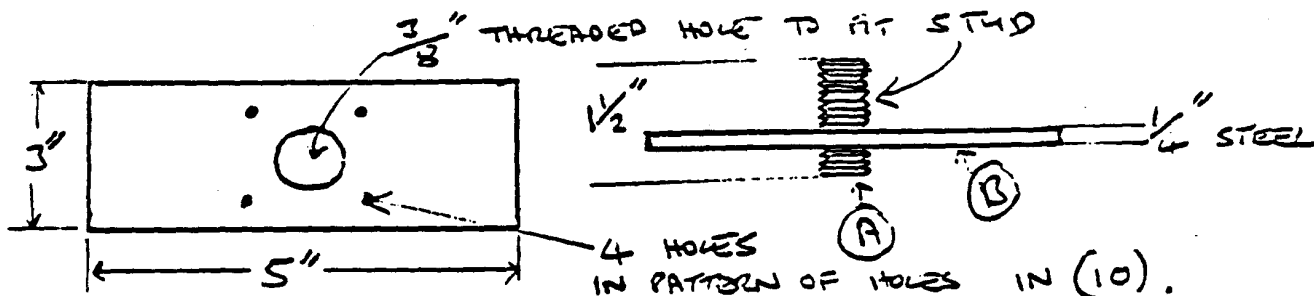
A) REMOVAL:

1. With the engine in neutral, put a piece of tape around the shaft sleeve just aft of the glass bulkhead to mark its position. Reason will become clear later in the REFIT section. IF position is not known (Broken box, etc), omit this, it isn't essential.
2. Disconnect the control rod coupling and remove the lever (31).
3. Disconnect the throttle linkage by removing the split pin (47), releasing the spring, and sliding the whole unit off. Don't lose the washer (46).
4. Unbolt the bearing cover to starboard and remove along with the cam and shaft assembly.
5. Unbolt the rear cover of the box (48) and slide to rear.
6. Using vise grips, turn the shaft (28) to expose the gland nut at the rear of the box.
7. Lock the flywheel and undo the gland nut.
8. Undo 4 Allen bolts holding the housing to engine, and slide housing to rear.
9. Undo the gland nut (14).
10. Unbolt sleeve (10) and slide entire shaft, unit, and all to rear.
11. Take a tea break and say a silent prayer for this is the moment of truth.



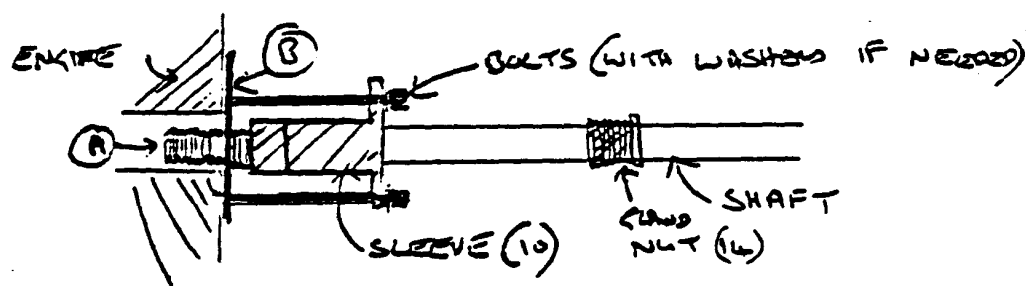
12. Getting the shaft out of the sleeve is the hardest part of it all. This is what you do:

- a) If you are very lucky, a gentle tap with a hammer will slide the sleeve forward gradually and off the shaft.
- b) By far the most likely, it won't. Make up the following special tool, or get your local hardware store to do it. Cost should be minimal.



The shaft at the forward end should protrude slightly from the forward end of the sleeve. Remember that as you refit it. Placing a solid piece of iron, or your plate of the special tool across the end of the shaft and pressed against the engine, tap the sleeve with a hammer forward, moving it along the shaft. It should move, if only very slowly. Have patience. If, after a reasonable effort, there is absolutely no movement, proceed to the next step as if successful (with all finger crossed)!

c) While at the hardware store, get 4 extra long (2") bolts to fit the same thread as the 4 Allen bolts (12), and a handful of washers. With about 1/2" of the bolt (A following) pointing aft, put the plate so that the bolt is in line with the shaft - in between it and the engine. Insert the long bolts and washers to fit, and tighten each bolt in turn to push the sleeve down the shaft.



As the sleeve bottoms on the plate, start again with more bolt exposed and more washers as needed. This will work unless you have a very serious problem in the form of a bent or broken key (29) or a totally seized shaft. Again, try a hammer, if necessary as hard as possible, because at this stage the only other alternative is cutting the shaft.

d) As the shaft comes free, don't lose any of the compression rings.

13. Right, back to business. Replace the sleeve for safe keeping, replacing the O-ring (11) if you're really feeling keen.

14. Slide shaft to rear, not too far, and remove first the housing, then the sleeve (27) and all the internals. There is just room if you remove the housing first.

B) REBUILD:

Rebuild the box as needed. We replaced the bearings (25) which had fallen to bits, all circlips, support rings and lock rings (23, 24, & 25), the O-rings (19, 20) and seal ring (51). Gaskets can be made from stout paper (49, 16, 41) - old charts, especially British Admiralty (!!) are superb. The following are the parts numbers supplied by the shop, with Volvo numbers for comparison. Total bill for everything was under \$25. (US).

<u>PART</u>	<u>VOLVO</u>	<u>US</u>
O-rings	925064	216
	925059	116
	925061	213
Bearing	181549	9U07K
Seal	840223	47697

Clean all parts thoroughly before and during rebuild. Lightly grease all parts on assembly with Molyb grease; on refitting the box, the engine is going to be run briefly without full grease packing, so every little bit helps.

C) REFIT:

1. With 360 wet and dry, clean and smooth the ends of the shaft and the operating sleeve thoroughly.
2. From the front, slide onto the shaft the cover (48) with seal, followed by the gland nut (22) and compression rings, and then the sleeve (27) and the internals. Holding the shaft firmly, push the sleeve as far aft as it will go. The operating sleeve must bottom out in the unit, so check carefully as the new O-rings will be tight.
3. Slide housing over shaft, and with teeth in (27) upright over the sleeve. Don't worry about alignment of teeth and cog yet.
4. Slide gland nut (14) and compression rings down the shaft, fit key and slide shaft into (10). Make sure it bottoms out. If this proves difficult (it should be a very tight fit), unbolt (10) from engine, hold shaft, and tap lightly with a hammer and a drift. In this direction there is almost no room. Again, have patience. It helps to heat gently with a blowtorch (as a last resort). Be very careful, and remove O-ring (11) first. Rebolt (10) to the engine.
5. Lock flywheel and tighten nut (14) hand.
6. Tighten nut (22) hand.
7. Check position of neutral mark (See REMOVAL 1.). Slide cover (15) to rear, turn the shaft (28), and refit (15) so that key in shaft is in correct position for neutral position of lever (31). This is fun (?), so its probably time for another break about now.
8. If there is no tape mark, guess & proceed (Guess not critical). Bolt (15) to block, and fasten rear cover (48). Don't kill yourself doing this, you may have to undo them all in a moment.

9. Start engine and run very briefly to check neutral. Turn shaft (28) with vice grips until neutral is found. Check position of throttle control before starting, use only tickover. Neutral should be very close to the estimated position based on the tape mark. If the tape mark is now some distance away, it is likely that the shaft is not fully bottomed out or else that the operating sleeve is not fully home in the box. Check both.

10. If needed, repeat procedure in 7 for alignment of lever (31).

11. Tighten housing bolts (17) and end cover bolts (50).

12. With cam in correct position for neutral (i.e. horizontal) refit slide cover (38) with shaft. The cam is on a tapered shaft and probably impossible to remove, so if adjustment is needed, it is easier to remove the cover (38), turn the shaft, and refit it. Correct alignment of neutral and minimum revs should be easy as the shaft and prop have not been touched.

13. Reconnect throttle linkage and arm (31) and control linkage. Adjust position of cockpit lever if necessary by using fork on engine end of control linkage.

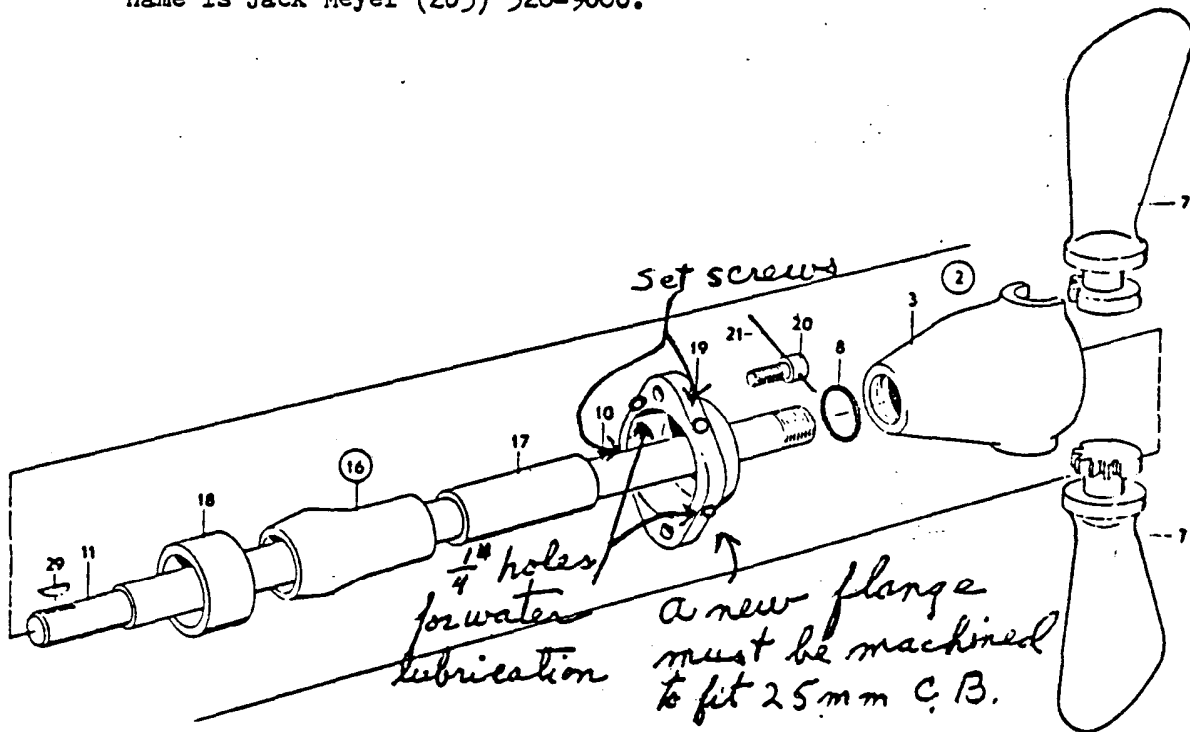
14. Grease the control linkages, and pump about 25 pumps of Molyb grease into the box with a grease gun.

15. Have a beer, you're finished.

our
VODCA Newsletter
brings people together



I put in a standard 7/8" cutlass bearing (machined out to 25 mm inside diameter), 1 1/2" outside diameter X 4" long. The bearing is pressed into place in the stern tube (retainer and sleeve) and should be snug. The 4" length must be trimmed to approximately 2 1/2" so there is 1/2" to 1" clearance between the prop and the bearing. The catch is that a new brass flange that bolts onto the outside of the stern tube must be machined to fit the new cutlass bearing. It will look similar to the standard Vega flange, but it should also have holes drilled for two set screws to hold the cutlass bearing from turning, and two 1/4" holes for water lubrication (see drawing). My mechanic in this area (Chester, CT) knows the Vega and all its idiosyncrasies inside and out - his name is Jack Meyer (203) 526-9060.



- Jim Panti

I removed the variable pitch prop and shaft and installed the Volvo gear box and fixed two-blade prop, and another stuffing box. After two years I have had no problems whatsoever.

- E. W. Hancock

Parts for the propeller assembly can be obtained from DePietro Kay Corp., 914 Cromwell Ave., Rocky Hill, CT 06067, (203) 563-2167.

Chuck Welchko was having stuffing box leak problems, as I guess we all do. I was referred as the resident expert and when I got there, his mechanic (a very capable gentleman but quite inexperienced with Combis) had been guided by an old VODCA Newsletter describing the shaft/shift surgery routine. Unfortunately, the description starts off to the effect that one should disassemble the propeller, and this he had. Mistake! Don't do it, unless you have to go into the prop for other reasons. It's hell to get back together in phase and the VODCA sailing directions are silent on that procedure. As all of us know, a change in anything about the whole Mickey Mouse, hemaphroditic abortion changes everything else.

- Jesse Adams

A member of the Swedish VEGA Association, Henry Gustafsson, P.O. Box 2284, S-310 58 Vessigebro, Sweden, has developed a stainless steel operating sleeve (part #48924) that controls the feathering prop. He also has spare parts for the Vega at very competitive prices.

* * *

To protect my propeller and shaft from barnacles and marine growth, I have tried various bottom paints, teflon grease, and bare polished metal, all without success. My research led me to the Interlux system for underwater metal (Interlux does not recommend this for steel), with very good results.

The procedure at first sounds complicated, but after the first application you will find it easy. The thinners and paint are relatively expensive, but the quantities used are so small that your initial purchase will last for five years or more. The following are required;

Interlux #216 Special Thinner; Interlux #355 Viny-Lux Solvent;
Interlux #353/354 Viny-Lux Primewash (2-part);
Interlux #267 (black) or Interlux #268 (white) Inboard/Outboard Aerosol Spray Paint.

All are available at marine supply stores (including Boat/U.S.).

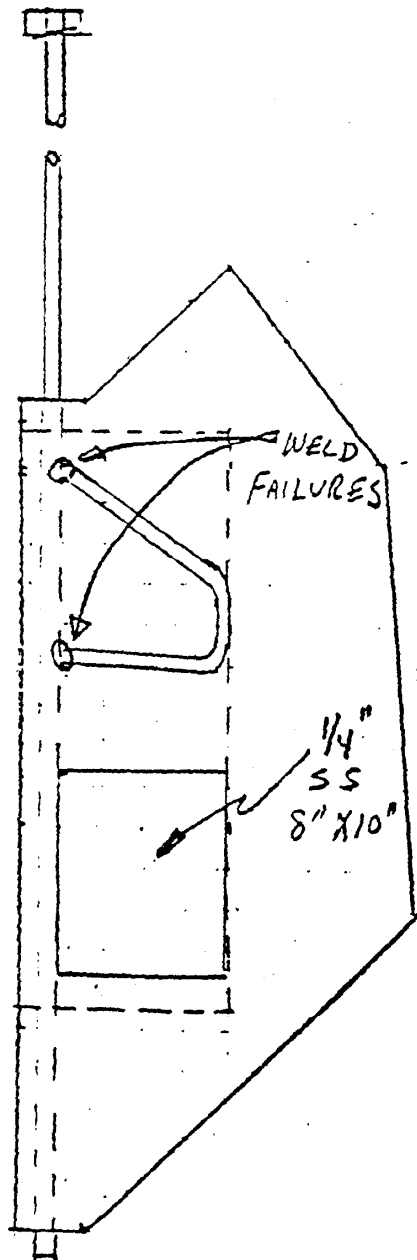
Carefully follow these steps:

1. Remove all old paint, barnacles, and corrosion (I use paint remover and a wire brush).
2. Bring bare metal to a uniform bright finish (I use a fine wire brush in my electric drill plus Emery cloth).
3. Wipe clean with a generous amount of #216 Special Thinner.
4. Apply one thin coat of the #353/354 Primewash thinned 20% with #355 Solvent.
5. Dry one hour minimum (24 hours maximum).
6. Apply two coats #267 or #268 spray with overnight dry between.

This goes very quickly as part of annual maintenance. I hope you have as much success as I and others have enjoyed with this procedure.

- Don Angell

RUDDER REPAIR



Our rudder problem was indicated by a progressing offset of the tiller with the rudder in a neutral position. We had to cut the fiberglass away (dotted line) to reveal the failed weld connections, as the drawing (to scale) shows. We had the rod re-welded to the rudder post. For good measure, we had a $\frac{1}{4}$ " stainless steel 8"x10" plate also welded to the rudder post. We then filled the void with a sand and resin mix, and fiberglassed and painted the rudder to complete the repair. The rudder is now much stronger than the original. The total cost was about \$70 for welding, fiberglass material, and the stainless steel plate.

← - Ellie and Bill Burns

* * *

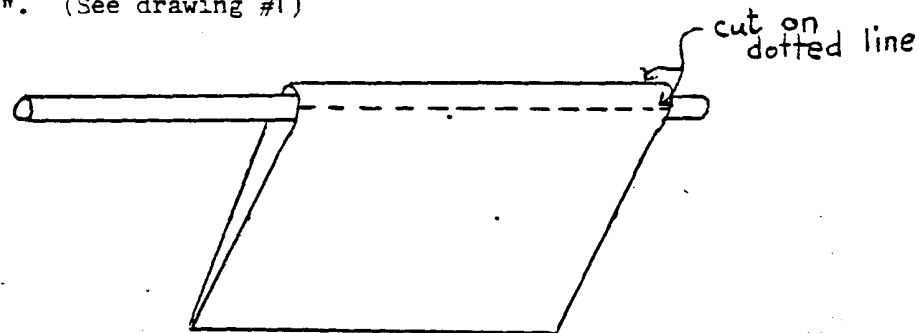
When we put "Lyra" back in the water, we noticed about 6 inches of play in the tiller before the rudder moved. From talking with several Vega owners, it seems that Albin used a variety of methods in constructing the rudder over the years. Since we could not get a clear idea of how ours was constructed, we decided to play it safe and drop the rudder and do whatever was necessary to repair it. We did this with the boat in the water. To drop the rudder, we:

1. Removed the tiller.
2. Ran a line under the rudder, tying it off on the winch on each side. We did this at the suggestion of another Vega owner who had found his rudder rather heavy when he removed it.
3. Undid the shoe on the keel. For this we needed a thin-walled 14mm socket.
4. Pulled the rudder shaft down thru the shaft tube. This can be facilitated by a light sanding of the upper end of the shaft so it slides thru more easily.

(continued)

With the rudder ashore we carefully made a cut on both sides parallel to the rudder shaft the full length of the rudder. This piece now came off as a "cap". (See drawing #1)

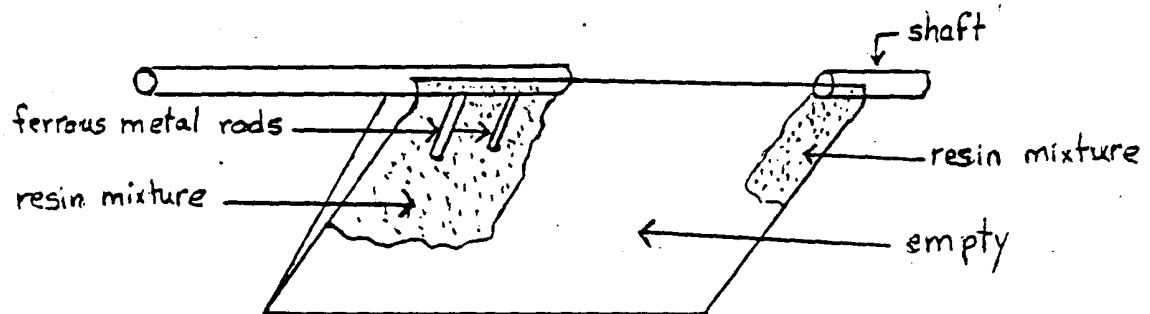
#1



With this "cap" removed we were surprised to see the construction. The shaft did not extend all the way through the rudder but was in two parts. The upper end extended approximately 18 inches into the rudder and was attached to two ferrous metal rods welded to it which were in turn embedded in a resin/fiberglass/sand mixture poured into the upper portion of the rudder. The middle of the rudder was empty. The lower end of the rudder held a 10 inch piece of shaft embedded in a resin mixture poured into the lower portion of the rudder. (See drawing #2)

#2

"X-ray" view with cap removed



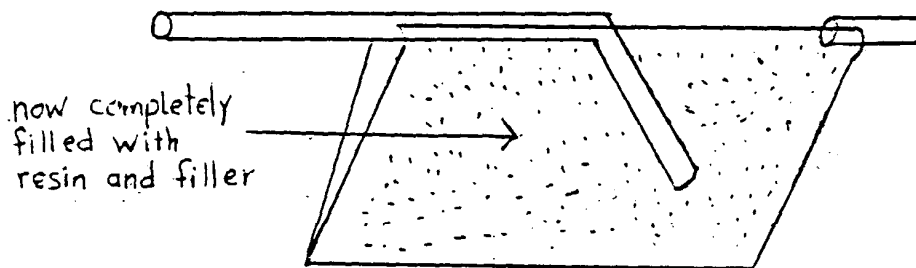
Our problem had been with the ferrous metal rods, of course. The first one had broken loose from the shaft and the lower one had begun to work in the resin mixture.

(continued)

We considered replacing the shaft with a single piece which extended all the way through the rudder but a 25 mm shaft was not available locally.

Instead, we had a 12 inch rod welded on the end of the shaft at a 45 degree angle. We put the shaft back in place and poured 2 gallons of resin and filler in to completely fill the rudder cavity. (See drawing #3)

#3



We replaced the cap and used resin to fill the gap created when it was sawed off. A little sanding and a coat of bottom paint and it was ready to put back on. Although the rudder held well for 16 years and may have continued to hold for some time we feel that in its rebuilt state it will still be around long after the rest of the boat has disintegrated into dust.

- Bill and Karen Sides

STANDING RIGGING

The mast was unstepped this spring for two reasons.
(1) The boat is 6 years old and I thought that an examination of the mast head, sheaves, shackles, pins, etc., was in order. The second reason being a leak into the cabin under the mast. All the working parts on the mast appeared in good shape and there does not seem to be any opening on the mast where water could enter. Annapolis Boat Show experts suggested that the leak could be caused by the absence of a gasket at the mast base. Cos Cob supplied one for \$2.95. The gasket sets on top of the stainless plate, the mast sets on top of the gasket. And that fellow members is the sole purpose of the gasket. The mast sets on top of it. So save your money (not much) - every little bit helps.

Removal of the mast revealed a 2" diameter pipe opening for wiring, but little else. Wood support members consume 80% of the opening. The stainless plate provides the anchor for the mast, and is held in place by two 1 1/4" screws. Stainless lips on the plate prevent the mast from forward, aft, and sideways movement. A liberal application of GE Clear Silicon Rubber Marine Seal replaced the thimble amount of compound originally applied under the plate. The Boat Show experts also suggested that the two weep holes at the mast base were clogged. They did not appear clogged, but two additional weep holes were filed on each side for insurance.

The next rain proved the leak was still operating. So, back to square one and a process of elimination was begun. All the screws for cleats and winches appeared tight, so working up the mast, a liberal amount of seal was applied to the goose neck inside the sail track. The next two heavy rains showed that there was my problem! No leak! Now some interior stained teak can be refinished that became stained over the years. By the way, Arlyne uses Liquid Gold, a furniture cleaner, on the interior cabin and it does an outstanding job.

- Bill Carrico

I am getting rid of the divided back stay, which I find a nuisance. Had a local welder make a U belt, 2", SS, and will bring the two stays together on it amidships, with a SS plate on deck and below. Checked in Sweden and they see nothing wrong with this solution.

- Robert Shepard

Sid Rosen had problem replacing a split spreader. Cos Cob doesn't carry it since incidence of replacement is low. Proctor Masts (Annapolis) ultimately provided a replacement from England; however, they were unable to identify the product as theirs for a long time. They recommended either welding or obtaining aluminum pipe locally.

a. Welding: Most shops do not wish to do a small job like this, or do not like to weld aluminum. Prices quoted ranged from \$50 to \$75.

b. Pipe: Aluminum tubing of proper size is listed in all pipe specification listings; however, it is rarely stocked. You may have to buy 20 to 25 feet of expensive pipe to get the approximate 30 inches you require.

After wasting 3 months trying to either weld or secure replacement pipe, Sid went back to Proctor Masts. After extensive research, they admitted the spreader was theirs - but not stocked in this country. Cost was \$64 which included the cast aluminum shroud fitting at the outboard end, a cable to England, and air freight (including pickup and delivery).

I had an inboard spreader fracture. It may have been like that when I got it, but last spring I was inspecting the mast and found the spreader was fractured along the shaft where the pin is alongside the bracket. The girl at Holmes got on the phone and called Cos Cob and they had it within 2 days. The cost was about \$7 (1978). It is held on by a rivet, not a screw. I couldn't find a pin to replace it so I put in a stainless bolt.

Here is the sad part. While putting on the inboard end of the spreader I dropped the outboard end in the water. I made a new one of aluminum tubing, using an old dowel. It is standard aluminum. I took a piece of wood and fabricated it to fit inside the spreader and covered it with epoxy. It worked all last summer.

- Stuart Horn

I had a case where the spreader was not seized down on the shroud. Make sure the seizing on the outer ends of the spreaders is tight.

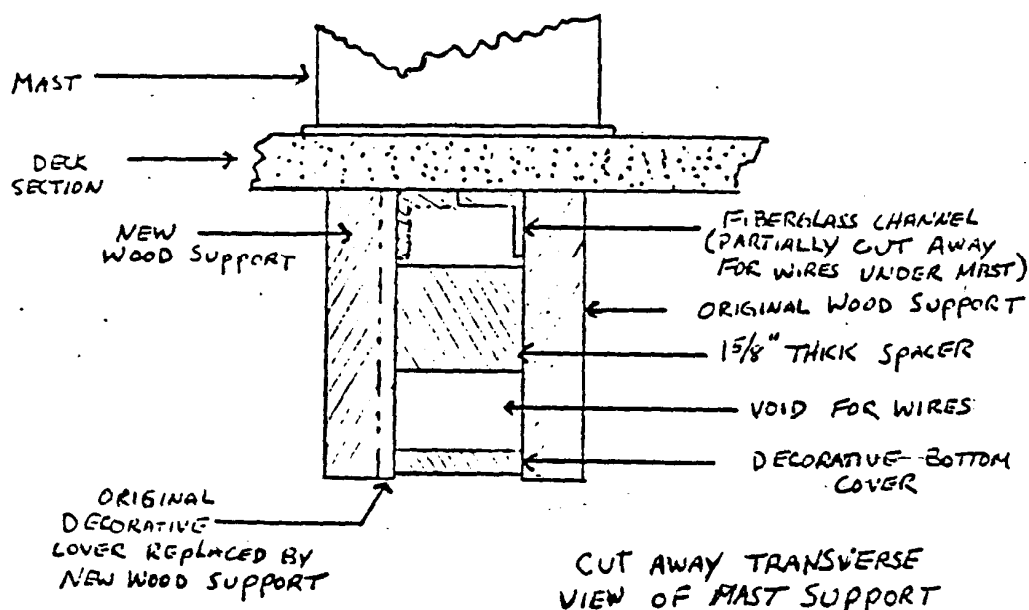
- Jim Hartzler

The lifelines should be lashed to the stern pulpit with dacron cord rather than anything metallic in order not to interfere with RDF bearings.

- Art Levin

When I purchased my Vega, I noticed that the main deck support beam under the mast was warped about $\frac{3}{8}$ th of an inch, and the head door did not close properly, probably due to too heavy halyard or standing rigging tension. To add additional mast support, I replaced the $\frac{1}{4}$ "-thick decorative wood facing forward of the mast support in the cabin with a 1"-thick piece of Honduras mahogany (1"x5"x5'), using the original facing as a template for cutting. I purposely did not add the air vent and wire access holes because I thought this would weaken the support, but I now regret the lack of easy access to the wiring terminal block.

With the aid of an automobile hydraulic jack, it was an easy job to place this support in place. The structure is fastened with $\frac{1}{4}$ "x $\frac{1}{2}$ " bolts thru the original brace, a 1- $\frac{5}{8}$ " spacer block, and the new brace. These bolts should be placed about 8 inches from the ends, with two bolts on each end about 3 inches apart. Additionally, 1 $\frac{1}{4}$ " #8 sheet metal screws should be placed every 6 inches to the fiberglass channel. I was able to raise the deck about $\frac{1}{4}$ inch, and I can now safely add a roller furling genoa this year.



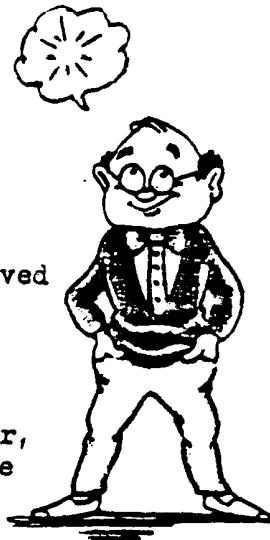
- William Edelstein

To silence the antenna wire inside the mast, I took six 4-ft. sections of $\frac{1}{2}$ " pipe insulation and fed it, one section at a time, along the antenna wire up into the mast. Tape it as you go every foot or so to close the split and where the sections join, but not too tight to prevent sliding. The insulation is cheap and available at any plumbing store.

- Dick Seed

The "final solution" to silencing the annoying clanking caused by the internal VHF antenna was "peanuts" -- the foam kind used to pack breakables for shipment. I figured I needed $3\frac{1}{2}$ cubic feet -- more than I could collect from packages received -- and I found an outfit that sold the things (15 cubic feet minimum). A number of attempts to get these into the mast by various mechanical means failed, and I finally bought a "Metro Vac 'N' Elo" which delivers air at over 100 knots. It filled the mast, which now remains silent despite choppy seas. However, can the "peanuts" be removed if necessary, and will we miss the mast's share of cabin ventilation?

- Douglas Damrosch, M.D.



STARTER - GENERATOR

My starter-generator went out, and the battery that starts the engine was not being charged. I could start the engine by cranking. After searching around, I found it had blown the fuse wire from the voltage regulator. I found there was a short in the starter-generator, and I bought a new one for \$300 (1978). I also bought a new regulator.

I tried to have the old starter-generator rewound, and ended up opening it myself. I found one end of the wire had completely grounded. That was all that was wrong with it, but it did blow the fuse wire. In the newer boats, the starter motor and the generator are not combined.

- Jim Hartzler

We did have more than our share of engine problems. The impeller went out (even tho I had replaced it in October), and we made our first anchorage under sail....A couple of days later the starter-generator started smoking, which turned out to be bad bearings. I considered running without it since the engine is so easy to start by hand, but finally felt that in an emergency Mary Lou might not be able to turn it over, and so had it repaired....The dyna-start has been nothing but a problem and this would be another \$300 plus repair bill, so I have decided that as long as it will start, to disconnect the charging side and charge both batteries with the alternator through a slitting device.

- Nat Natto

The only problem I have had with my engine is that it is equipped with a DYNASTART. First, I found the system was not charging very much. It is only supposed to deliver 6-1/4 amps which is not much; however, I was not even getting that much. Concluding that nothing major was wrong, I decided to adjust the voltage regulator by bending the spring of the bottom relay. This has worked well and I now have a fully charged battery. The next problem was failure of the starter function. I hand-started the engine, and that evening I dismantled the Dynastart. I found the main power input lead crystalized fractured just inside the case. I spliced it and the unit now functions. I will, however, replace the brushes and rework the job this winter. Please note that the present replacement cost is now \$700 for the Dynastart and voltage regulator from Volvo. This is inexcusable for such a compromise system.

- Bill Edelstein

On the last day of a cruise, the "idiot" light started glowing, indicating a generator failure. After reaching the dock, I discovered that the starter was inoperative. Arlington Armature found both the field coils and the armature were burned out, due to a bad bearing that let the armature short out on the field. Parts to repair it came to \$426 plus labor; a new one was \$562 plus tax. Remembering a Newsletter item that Ron Weiss had an MD6A for parts, I called and he sent me his starter - with the caution that it didn't always work. I had Arlington Armature give it a good cleaning, new bearings and brushes, and recoating of the field coils. Cost of repairs - \$60.95! The lesson to be learned is to have "preventative maintenance" performed on the dynastart before it dies. I highly recommend Arlington Armature, 8482 Terminal Road, Newington, VA, (703) 550-7373.

- Don Angell

The stock Bosch starter-generator failed twice and, after one complete rebuild, was replaced with a stock DELCO unit which is a perfect fit. Only slight mounting modifications were needed. The unit is primarily used on International Cub Cadet tractors. It is DELCO part #1101996, with a compatible 2-stage DELCO regulator. A much, much better and more reliable unit that puts out three times as much amperage.

- Irv Furman

I found a new Delco-Remy starter-generator with regulator attached available for about \$200 (1984). The part number is 1101863. It is easily adapted to the Volvo engine.

- Pete Richards

The starter gave up and we cranked for the end of the 1983 season. An exchange Bosch Dynastart was \$900 Can. (\$720 U.S.) so I followed Irving Furman's advice and tried Delco. After an hour with the catalogue, the Delco travelling representative decided that Irving's part no. 1101996 should be ordered as rebuilt no. R.31325 with regulator no. R.51095, total cost = \$151 U.S. Installation took some floundering around so I'll pass on the result for other amateurs. This was a 1971 Vega (1492) so details of wiring could be different for later boats.

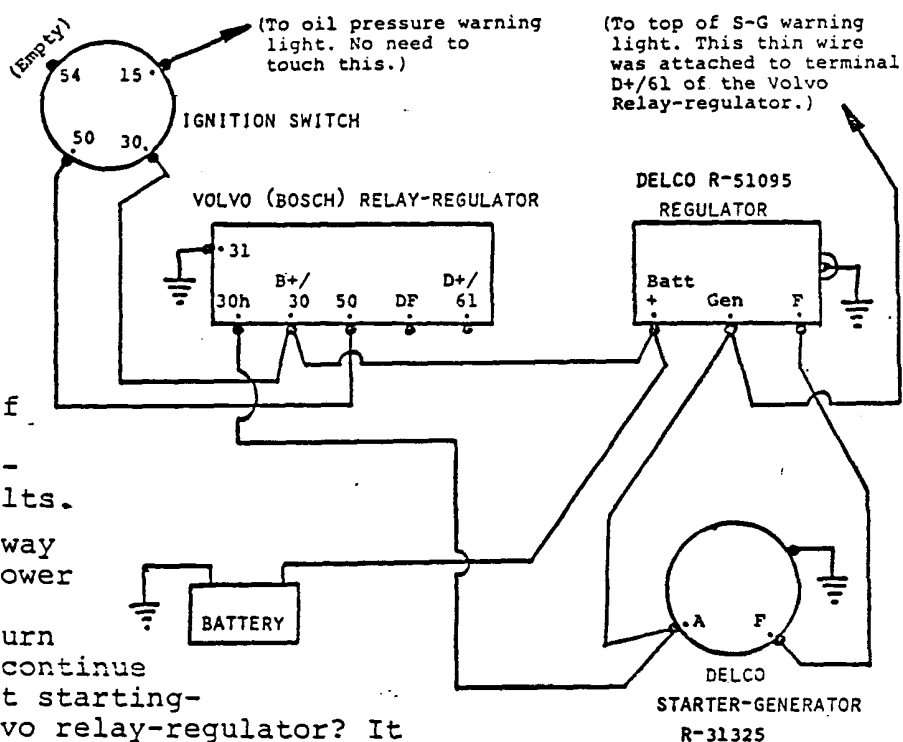
Mounting. The 2 mounting-lugs of the starter-generator (S-G) have to go on top so wiring terminals are underneath. It is best to make a new mounting-bracket to fit the lugs exactly. Figure out the holes for mounting the new bracket on the engine so that the pulley will line up with the flywheel. Also it is best if the bracket holds the top of the S-G further out from the engine to get a better angle on the arm which adjusts belt tension

(9.8 cm from engine to centre of holes for the lugs). The old tension-adjusting arm will not fit, so get a new one with 2-way curves. My advice is to get help with these 2 new parts from a country auto repair shop where they are used to rigging unusual stuff like this. Use the pulley from the Dynastart and the old belts.

Wiring. The logical way puts full starting-power through the ignition switch which might burn it out (?) Why not continue to use the well-built starting-relay in the old Volvo relay-regulator? It will mount beside the Delco regulator under the companionway. Terminal F is marked on the Delco S-G so terminal A is the other one. For a ground, add a nut to one of the little bolts coming through the S-G casing. New wire lengths will be needed in places, some of them heavy stuff. Grounds for S-G and Volvo relay can be taken to the mounting-ear of the Delco regulator, with a wire to the ground-bar. Diagram shows the rest, viewed from inside boat.

Problems? An oil-cup on the Delco S-G is now upside down and access to the engine oil filter is even worse than before. Maybe unfasten the S-G every spring, oil it and change the filter.

-John Sprague



STUFFING BOX

Our stuffing box leak situation is little different from other Vegas. Short of hauling and rebuilding, which according to past newsletters no professional knows how to do, a few treatments have been tried. After each days use the box was stuffed with a dark green grease recommended by a local marina. It did not do a complete job as each time the engine is run grease is forced out and then my process restarts. Meanwhile, Washington Marina has recommended trying a beige colored waterpump grease named "LUBRIPLATE," part #04001. I will report later how this works. I know this is only treating the problem, but I'm up the creek as to what to do. It is obvious that the shaft, seals, the box, or something is worn -- but what to do and if it is repaired, how will it work and for how long?

A remedy was discovered however, to slow the leak; that was to push the control lever to the extreme feathered position while berthed or sailing. I run the engine very little in this area and it's a good thing. A 15 minute run results in 3 minutes of pumping. At that point the bilge water is at the bottom of the batteries.

This stuffing box thing is plaguing a number of us it seems, but according to the newsletters, Nat Natto is the only one to solve it by replacing it with a US substitute. Could it be possible for Nat to write up the specs on his replacement for all members to consider? I'm tired of replacing batteries, battery clamps, carpets and a really messy cleanup.

- Bill Carrico

At this point (1978) I am sold on replacing the stuffing box with a conventional one - cost will be the same as replacing box seals with the exception of the cost of the new stuffing box.

The shaft removal is not in itself that difficult - the close quarters and tight fit make it seem that way. If you are going to the expense of removing the shaft I suggest

that you replace everything from the engine back and that you have them check the main bearings.

If you ever pull the shaft, place two or three grease seals on each side of the stuffing box so when the seals go you won't have to pull the shaft again.

- Nat Natto

For anyone having stuffing box leaking problems -- does your bilge mysteriously fill up with seawater? -- I can offer lots of experience. While replacing the seals themselves is theoretically simple, it does require removing the propeller shaft from the reversing unit, which probably is the most complicated, difficult, and expensive operation on the Vega (and so far one which no local mechanic seems to be able to handle successfully). Although Nat Natto says he replaced his stuffing box with an American type, my engineer-mechanic says this cannot be done because the Vega prop shaft is only one inch and the smallest American stuffing box is made for a one and three-quarter inch shaft. I had rigged up a fixed grease gun installation in one of the cockpit lockers, connected directly to the stuffing box through a copper tube, so that I can replace the grease that is lost every time the motor runs, without the trouble of removing the cockpit sole.

- Art Levin

Two makes of grease are recommended for the stuffing box: Drydene Water Pump grease, or "Never-Seez" grease. Both are heavy greases which do not break down under heat and wear. The stuffing box (under the cockpit sole) should be checked at least once a year if there is no excess leaking into the bilge, and repacked with grease by hand (not under pressure). If there is excess leaking into the bilge after each time the engine is run, especially after the boat stands unused for several days or a week, then you have the problem described above.

- Art Levin

I enlisted the help of Master Lubricants of Phila., PA (wonderful people!) in selecting the right grease for the stuffing box with a special additive to make the grease very sticky so it would not wash out when the engine ran. They developed M24P, a thick, highly waterproof, sticky grease. It comes in 8 oz. tubes, the tip of which fits the stuffing box hole very nicely. The cost of the tube is \$2.75. The grease can be ordered (\$30 minimum order) from Master Lubricants, Meadow and Jackson Streets, Phila., PA 19148. Check with me before ordering, since I may have a supply of tubes. I also installed a six-inch inspection plate in the cockpit sole above the stuffing box to facilitate greasing.

- Rick Woytowich
(302) 322-1730

Jim Ranti advises that a standard American stuffing box 7/8" machined out to 25mm will do the job. Essex Machine Shop in Essex, CT 06426 will sell the stuffing box for \$26.95 (1982) and bore it out to 25mm for \$30 more. The in-and-out movement of the prop feathering control sleeve will give no trouble because of the greasy packing (which must be ordered separately). The original rubber tubing over the shaft will fit perfectly around the 7/8" stuffing box. The large tension nut on the forward side of the stuffing box must be only hand tight, and the engine and shaft must be in good alignment.

Art Koenig also changed his stuffing box to a standard 7/8", machined out to 25mm. Jim Nardelli similarly installed an American stuffing box, but he advises that 25mm is 0.9843 inches and he milled his at 2/1000 over to 0.9863 inches, making installation a little easier.

Karen and Bill Sides changed their leaky stuffing box to an American 1" box made by PERKO. They found that the 1" stuffing box works fine on the 25mm shaft because the packing takes up the difference. The change-over could be done with the boat in the water, but it may leak like crazy while doing it.

* * *

A member of the Swedish VEGA Association, Henry Gustafsson, P.O. Box 2284, S-310 58 Vessigebro, Sweden, has developed a new, improved stuffing box he claims will rid Vega owners of the leaking problem. He also has spare parts for the Vega at very competitive prices. His company is called Vegetillbehor.

* * *

After rebuilding the original stuffing box in 1985 and having it fail again in two months, we installed Vegetillbehor's new stuffing box, stern bearing, and stainless steel operating sleeve in the Spring of 1986. The stuffing box is excellent (no leaks), but I will have to replace the cutlass bearing again this year. We ordered quite a few parts and accessories from Vegetillbehor last Spring and were very pleased with price and quality. The only problem was the length of time in getting delivery.

- Noel & Maureen Bearce

WATER PUMP - IMPELLER

I have had a water impeller problem. The '76 model has a new impeller that has a very minor design change. I winterized the boat last year with Prestone without diluting it, which caused the impeller to decompose and disintegrate. I got the new impeller from Vosbury. Jabsco has not come out with a changeable item. (Note: Jabsco does have a replacement impeller for pre-1976 models.)

The 76 model has an audio-visual alarm for overheating and no gauge. With the new impeller, after running the engine for half an hour there was no problem, but I didn't take the boat out right away. The morning we left for the Wye River we were motoring out the channel and the light and warning came on again. We came back and anchored. I took the impeller off and put it back on, ran the engine for half an hour and the alarm started again. We anchored overnight and the next day we went out again. There was no problem and we sailed all the way to Eastern Bay and down to Herring Bay. After 15 minutes of motoring into Herring Bay the light came on. That is the way it has been since. It will come on from time to time, but if I throttle back it goes off; and it is pumping water all right.

- Phil Rogers

Neoprene-type water pump impellers are very durable, but over time pieces of the blades will break off, thereby reducing cooling water flow. This is a gradual process that can cause engine headaches while going undetected. Remove the cover plate and check the impeller at least once a year. If the blades are brittle or incomplete, change the impeller and gasket.

The water pump on my 1972 MD6A diesel began to leak badly, filling up the drip pan underneath the engine after a couple of hours. So I removed the water pump from the engine -- see Jim Hartzler's writeup and diagram on the next page -- to replace the shaft seals. The purpose of this note is to advise that my water pump did not have an "O-ring" between the two seals. The parts manual also did not show an "O-ring." John Thorp reported that Volvo no longer makes the "O-ring," which can safely be omitted.

- Art Levin

VOLVO MD6A WATER PUMP

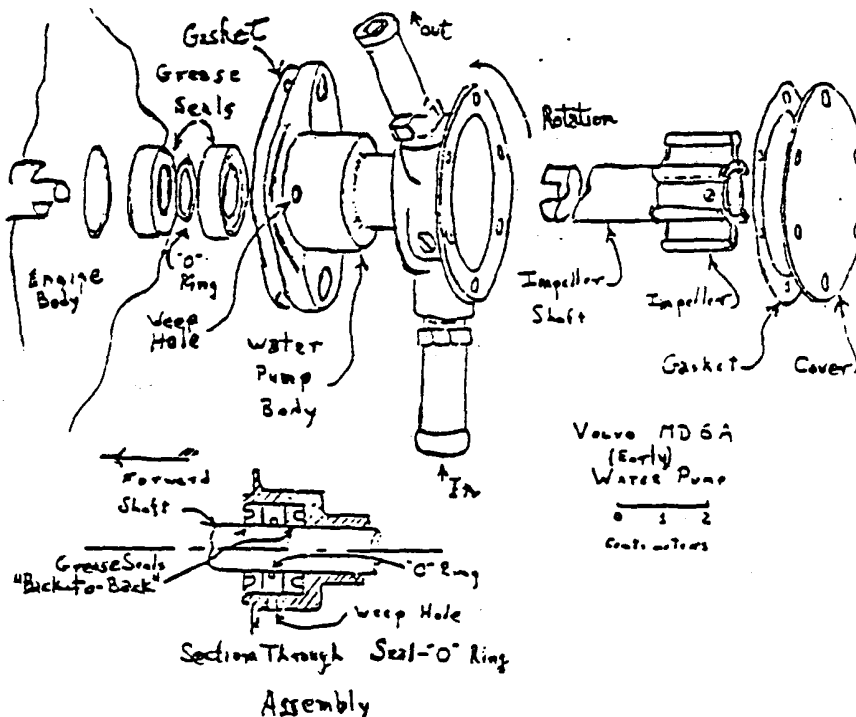
The accompanying diagram shows the construction of the water pump. The Volvo parts book makes a distinction between early and late model engines so be sure to have your engine serial number when you go for parts.

When replacing or servicing the impeller, do not withdraw the impeller and shaft further than to have the impeller emerge from the housing, otherwise the "O" ring will be pulled off the shaft and drop between the seals. Removal of the water pump from the engine will then become necessary.

For any servicing of the water pump, I recommend removing the insulation--covered boards that form the rear partition of the engine compartment. There are about 8-10 flat head brass wood screws to remove and the time needed is well worth it.

Removal of the water pump from the engine is not very difficult. First remove both water hoses from the pump by loosening the hose clamps and then twisting the hoses off. Removal of two hex-head machine bolts will then permit you to remove the pump. In my case the bolts were not at all tight, so they could be removed by hand once they had been turned about $\frac{1}{4}$ turn.

Jim Hartzler



WINTERIZING

I leave my boat in the water. I put in antifreeze, drain the fresh water tank and pump everything dry, and put antifreeze in the head. Once a month I hand crank the engine.

- Mace Mayasaki

I do the same thing, but I run my engine all through the winter.

- Stuart Horn

I kept an electric heater in my boat this year. It kept the boat dry and warm all winter.

- Phil Rogers

I do the same as the others. In addition I top off the fuel to stop the growth of fungus.

- Russ Walker

And to prevent condensation. Yes.

- Mace Mayasaki

Since my boat was out of the water all winter, the hull distorts a little from being on land. You have to be careful about the shaft being out of alignment. I am going to back off on the engine mounting bolts and the shaft will move if it is out of alignment. If it doesn't move it is all right. I am not going to disconnect the shaft.

- Sam Amoss

I keep my boat in the water all winter in the Annapolis area. I have a bubbler system which keeps my slip ice free; however, I don't think this is really necessary since ice will do little damage beyond possibly scratching the bottom paint at the water line. What is important is to make sure the dock lines are not too tight because tides are lower when the wind blows the water out of the creek or bay -- in my case, when blowing from the northwest.

Of course, I drain the water tank up forward, using a JABSCO pump attachment on my 1/4" drill, and also pumping the water out of the lines to the sinks with the foot pumps. I also drain the head by unscrewing the red drain plug below the toilet bowl (altho the head procedure will now depend on what one does about the new Coast Guard regulations; I have installed an Lectra-San.)

I used to drain the engine; mine is a diesel. I did this by removing the drain plug on the starboard side of the engine, down near the oil dip stick. However, in the last few years the inside of my engine has gotten so cruded up that the drain no longer drains, even if I run the engine with the drain plug out. I suppose I could ream it out, but I have resorted to another method because I sail all winter as long as the creek doesn't freeze.

Essentially, what I am doing now is keeping the boat interior above freezing with 4 light bulbs of 200 watts each (actually, 2 are spares). I made two boards of 1x4 lumber long enough to fit across the engine well and across the forward berth area in front of the peak area adjacent to the head. I mounted two ceramic sockets about a foot apart on each board for the light bulbs, and of course wired up the whole thing. I put one board in the forward compartment, leaving the head door propped half-way open, I remove the step above the engine, and put the other board across the engine well, with the bulbs pointing down. The light bulbs give off enough heat forward and aft to keep the boat interior well above freezing in the coldest weather; actually one 200 watt bulb fore and aft is enough, but I use two in case one should burn out from continuous night and day service. You could also use heat lamps in place of the light bulbs, but they are more expensive and burn out more quickly.

I've been doing this for five years without any trouble. When I want to go sailing, it is a cinch to disconnect the boards and remove them from the boat, since there is no permanent installation. The danger with this arrangement is any interruption in the electric current to the boat -- I'd really be in trouble if this happened for more than a few hours. My boat is visible from my apartment window, so I can keep tabs on it constantly. I don't know how I'd feel about this arrangement if I could only check the boat once a week or less. However, I am confident that if the engine is drained of water, nothing else need be done. Some have put anti-freeze in the engine by sucking it up from a pail with the water intake hose; I have never done this myself.

- Art Levin

Have you tried winterizing your bilge with some automobile windshield washer anti-freeze?



Preparing Your Vega for Extended Offshore Cruising

When we bought 'Tarka The Otter' (Vega #1639) in 1983, she had a life history not untypical for a ten-year old fiberglass boat; One owner had her for six or seven years and lavished a great deal of care and attention on her, but the next two had neglected her. On our test sail the bilge filled up with near-boiling water from a leaking exhaust and a spreader fell off - useful in reducing the price but not otherwise encouraging. 'Tarka' had over 7000 miles on the clock, including a testing 800-mile trip around Vancouver Island and a fair amount of racing.

Six years later, the boat had a great deal more weekend sailing under her keel, another circumnavigation of Vancouver Island, and a 36,000 mile circumnavigation of the world - the varnish needs work, the engine gives a few starting problems and the mainsail has lost all shape - but basically, 'Tarka' could circumnavigate again. I should stress that 'Tarka's crew have very few practical skills and I would guess that we spent considerably less time preparing the boat prior to our major voyage and working on it during the trip than most of the cruising couples we met. The message is clear: the Vega is basically a very sound boat, capable of offshore sailing, and you don't need to do a great deal to get her ready. So, what did we do (and what should you do) to 'fix her up'?

The following comments explain what we did to Tarka to get her ready for offshore, what things worked, what didn't, etc. Inevitably it is personal since there are very few 'right' or 'wrong' ways to take a boat offshore, but there might be a few points of interest to members planning such an event. Of course, Jenny and I would be happy to respond in detail to any particular question - just drop us a line. (I could write a book just about the vane.)

First, you should read a few books. We found the following to be especially useful:

Dan Spurr: Upgrading the Cruising Sailboat. In this book Spurr takes a boat not unsimilar to a Vega (a Pearson Triton) and, chapter by chapter, goes through all the ways you can 'beef up' a boat.

Eric Hiscock: Cruising Under Sail. The 'classic' work.

Lin & Larry Pardey: The Self-Sufficient Sailor. Especially relevant to people on small boats.

John Neal's Log of the Mahina is also of interest, though it is my impression that he sailed his boat rather hard, especially on the final beat back from Hawaii, when he found it necessary to insert a mast support.

Anne Miller's Out of the Blue, describing her two transatlantic voyages is well written but not very informative in practical terms.

Next, get on as many boats as possible 'that have been there' - not just Vegas but preferably boats at the smaller end of the range. You can pick up a lot of ideas and tips in this way. If at all possible, try to crew on someone else's boat on an offshore passage: this will not only allow you to see a cruising boat in action, but, more importantly, to see yourself in action offshore. You may just well decide its

not your 'cup of tea' after all and thus save yourself a lot of time, labour and money - its surprising how many people, after planning 'the great escape' for years discover after only two or three days out, that they hate offshore sailing! Most of the sailing magazines carry 'Crew wanted' ads. On the West Coast, San Francisco's 'freebie', 'Latitude 38', has a particularly large section.

Here is what we did to 'Tarka', starting, for want of a better place, at the bow:



GROUND TACKLE

The basic rule here is that you can't have too much. For months on end, possibly for years, the safety of you and your boat, possibly your life, will depend largely on your ground tackle. For peace of mind alone, go for overkill. We carried four anchors, as follows:

- 22 pound Bruce (10 kg) with 105 ft of 5/16" chain and 200 ft. braided half-inch nylon line. This was our primary anchor. Always use your heaviest ground tackle as your primary gear. The large amount of chain is necessary because many of your anchorages will be in coral. It also has the desirable side-effect of reducing swinging, as in most anchorages, you will be on all chain at a ratio of about 3 to 1. Occasionally we were in anchorages of 90 to 100 ft.; this weight of anchor and chain is about the limit that anyone other than superman can be expected to haul up without an anchor winch.

- 16 pound Bruce (7 kg) with 40 ft hi-test quarter inch chain and 250 ft laid half-inch nylon line.

- 10 pound Danforth with 15 ft quarter inch chain and 110 ft half-inch laid nylon line.

- 20 pound fisherman's anchor with 120 ft chain. Various options open on choice of line.

We have never dragged on the Bruce, so you may well ask, why so many anchors? First, it is quite often necessary to lay a substantial stern anchor in crowded anchorages. Second, it is quite possible that in the course of your travels you will lose one set of gear - through having to ditch it in a hurry, perhaps - and you can't easily get quality high-tensile replacements in the many locations you will be cruising. Third, and most important, even though you may never plan to sail anywhere in the hurricane season, hurricanes can and do occur when and where they're not supposed to and you must be prepared for this eventuality. To have a chance of surviving a hurricane, you would need to lay at least three anchors.

Remember to wire all your shackles and to periodically reverse your rodes. Though it may sound obvious, remember to tie on the bitter ends. As you'll often be on all chain, two more items are essential: a chain hook at the end of a fifteen or twenty feet of anchor line to act as a snubber, and another hook on a much shorter piece (one foot or so, attached to your bow cleat) to stop the slack chain dribbling out when the snubber has taken the major strain and also to act as a convenient temporary holding device when you're having trouble hauling all that chain in.

STOWING THE BRUCE:

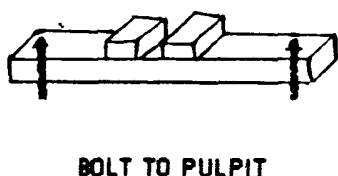
I bolted a 24" by 3" by 1" piece of teak across the top of the bow pulpit, then screwed two small



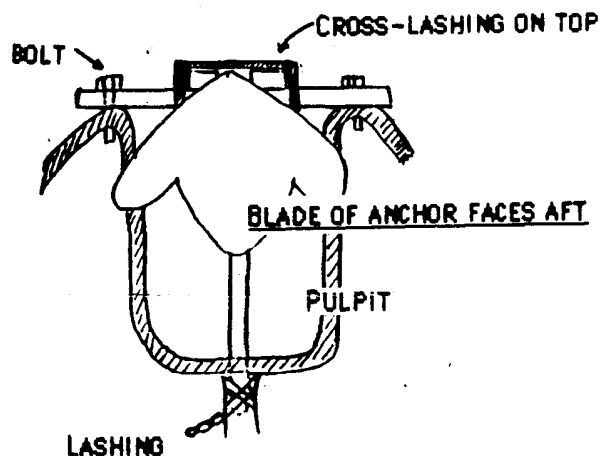
pieces of the same piece of teak to the top of the beam, leaving a half-inch wide channel between them. The Bruce sits on the beam, it's shank vertical and forward of the teak beam, it's arm running back through the retaining channel, the flukes facing astern and curving back under the beam. Do a simple cross lashing where the anchor sits on the beam and another lashing from the chain's point of attachment. to the T part at the bottom of the pulpit. The chain almost fills the chain locker, so it is necessary to feed a large part of the line out of the chain locker and into a bucket at the front end of the Vee-berth. If one is doing a large amount of beating, they won't want this much weight in the bows - on our beat to weather from Hawaii to B.C. we put it all in the locker immediately astern of the water tank. Otherwise, try to keep it up front - if you need your anchor in a hurry, you don't want to have to fetch it up from a locker.

Arrangement for Stowing a Bruce Anchor

HARD-WOOD SUPPORT FOR
BRUCE ANCHOR
(BOLT TO BOW PULPIT)



BRUCE ANCHOR
AS SEEN FROM THE MAST
(I.E. FROM AFT)



HAWSE PIPE

Not standard on the Vega, but obviously you need one. The obvious place to put it is dead centre, right up in the bow but if I were installing ours again, I'd put it to one side, so as not to weaken the reinforcing beam that runs amidships. No hawse pipe is watertight and, offshore, you need to take special care to seal yours up with plastic bags, tape, etc, etc. It takes only a few hours of heavy seas for a large amount of water to find its way into the tiny hole where the chain goes in, thence into the bilge (and over the batteries . . .)

ANCHOR ROLLER

Keep it short and stubby, with as little overhang as possible.

ANCHOR CHAIN LOCKER

We found the plywood bulkhead needed replacing due to general rotteness and from being waterlogged. Use the old one as a template for a new one; you need to take up the forward flooring section in the Vee berth to get the old one out/new one in.

NAVIGATION LIGHTS:

The pulpit-mounted nav-lights are invisible offshore. On the top of the mast we installed an Aqua-Signal Tri-light (10 watts or 25 watts, depending on which bulb you opt for), and ran the cable down inside. The light consists of a round base unit, about one inch high, into which the main assembly (about 9" high) locks. If you want, it is simple to unlock the main assembly and leave the base unit protected by a plastic cap which is supplied. This can be handy when you want to replace a bulb - unlock the upper unit, take it down, change the bulb in the safety and comfort of the cabin, then go up and replace the unit again. Feeding the cable down inside the mast was a nightmare! We eventually had to use a device called an Electricians Fish, which I believe they use when faced by similar problems with house wiring. Leave the pulpit lights mounted - they're a useful backup and when in port, are more easily comprehensible to other boats than a trilight. Though technically illegal, most offshore cruising boats do not routinely use running lights all night - your batteries simply cannot handle this for night after night, week after week. Provided you are keeping a good watch (i.e. somebody in the cockpit all night) I believe its an acceptable practice to put your lights on only when you see those of a merchant vessel or approaching land. You will find, unfortunately, that most merchant ships keep a less than adequate watch.

RIGGING

Before we left we replaced our forestay with the next one up - and this new forestay was the only rigging failure we had (which implies that the Vega was rigged with high quality material to start with). Failure took the form of one of the 19 strands breaking - only a 5 percent loss in strength, but it was impossible to haul a sail up beyond the snag. We put the old forestay back on and then when we could, got hold of some 6mm 1 by 19 and installed it with two Sta-Lock fittings. In case of rigging problems, the common wisdom is that you should carry at least one spare stay, at least as long as your longest piece of standing rigging. This will normally be the forestay. You don't have access to roller swaging, so you need some Norseman or Sta-Lock fittings (the latter are easier to fit) and wire clamps for hastier emergency repairs. A set of bolt cutters is necessary not only for fabricating your own rigging, but also for the awful scenario of having to cut loose a collapsed mast and rigging.

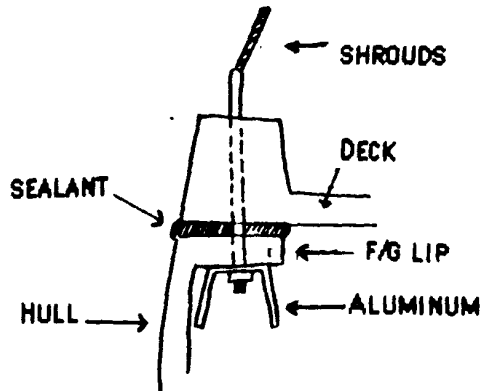
Many people wonder if they should go to double backstays, but, coldly considered, there is little point in this. In the event of a catastrophic backstay failure (and the backstay anyway takes less strain than the other stays) the sails and mainsheet would hold the mast up, and a temporary backstay could easily be improvised with the topping lift.

The best way of checking your rigging (and you should do this whenever you can) is visually and by running a hand down it. Burrs are a sign of imminent failure. You should actually pay more attention to the end fittings than the wire itself. I go up the mast before every offshore passage to check on things and pay similarly careful attention to the nine lower fittings. In particular, look for hairline cracks in the turnbuckles (bottlescrews) - I have replaced four or five in four years. It's also worth putting frequent squirts of WD-40 down the top of swage fittings - you never know what might be happening inside!

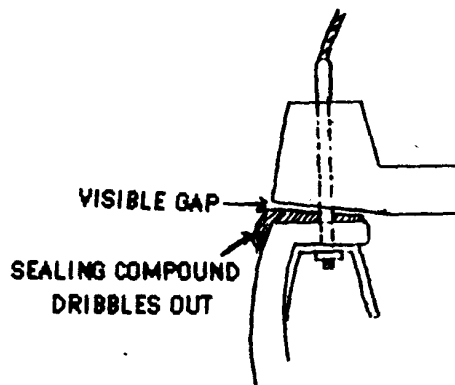
The 'chainplate' arrangement on the Vega is, of course, unusual and though I made frequent internal checks of it, I can't fault the principle of it and see no reason to go to more conventional chainplates. We did experience a slight lifting of the lip on the hull (see the following diagram (B) which had the effect of opening up the outside of the hull deck joint a little - a problem best solved with liberal supplies of silicone.

CHAINPLATE ARRANGEMENT ON AN ALBIN VEGA

WITH CONTINUOUS STRESS THE F/G LIP
ON THE HULL BEGINS TO LIFT, THUS
OPENING A GAP AT THE HULL/DECK JOINT



**"Chainplate" arrangement
as it should be**



**Result of heavy strain
on shrouds (exaggerated)**

All the stays and shrouds need periodic adjustment, but don't overtighten them - this can have the effect of forcing the mast down too heavily. For the forestay, I pull it towards me at head height with one finger - you should be able to bring it back about 2" towards you. It is vital that your fore and back stays have toggles at both ends - i.e. they can take the tension in any direction.,

Also, never tighten the turnbuckles by putting a screwdriver in the gap. Use the screwdriver to hold steady the fork that goes into the stay (so that you don't wind or unwind the stay) then use a large adjustable wrench on the turnbuckle.

CLEATS

We found an extra cleat immediately behind the bow cleat to be very useful, especially when anchored on all chain. It is vital to have two cleats here in the Panama Canal. For backing, use quarter inch aluminum, or heavier.

FORWARD HATCH

Its advisable while at sea, to always use the forward hatch when going forward to change sails, etc. It is much safer than leaving from the cockpit & making your way along the deck. With constant use, the hatch arms take a lot of wear. We went through two. Also, be sure your gasket material is of the best quality as the hatch sometimes takes green water over it. 'Ensolute' type closed cell foam is good.

CHIMNEY (if you have one)

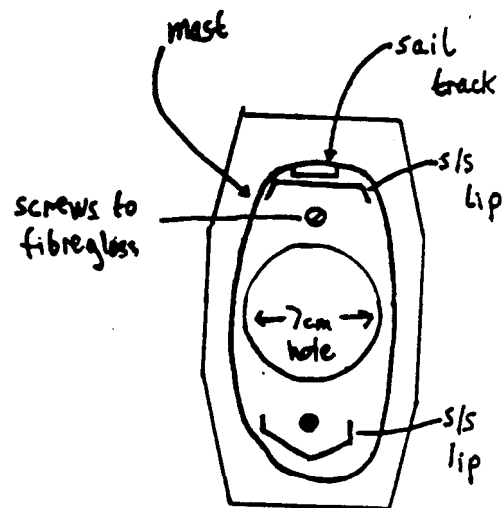
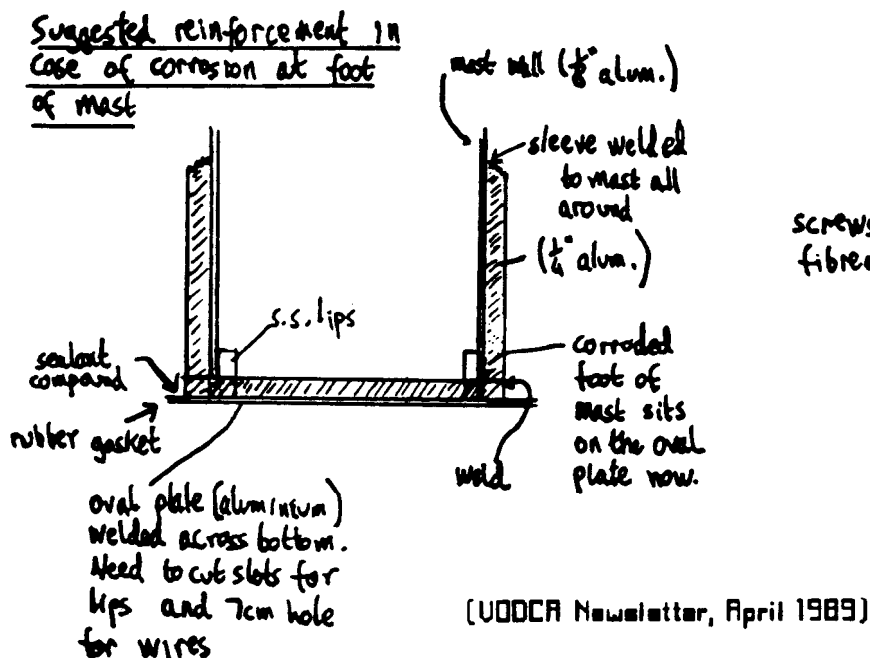
This needs careful sealing up if it is at all close to deck level.

MAST STEP (exterior)

The mast step was our main single problem. Simultaneously, we had compression and subsidence on one side of the fiberglass step and a corrosion problem at the very foot of the mast.

To solve the former problem, we lifted the mast off, filled the depression with Marine-tex and then applied several layers of alternating chopped fibre and woven fiberglass (the stainless steel base plate is held in place by two screws which are easily removed.)

The latter problem was, I think, caused by repeated dousings of seawater in heavy seas, some of which probably got in through the two small bleed holes, and which set up electrolysis between the stainless steel base and the aluminum mast; the thin rubber gasket that is supposed to insulate the two was long since cut through by the minuscule movement of the mast. The simplest solution would be to simply cut an inch off the bottom of the mast and re-step it - but only if you can take up the resultant slack in your shrouds and stays. Instead, we had a four inch high aluminum shoe built (see below) and welded onto the bottom of the mast, cutting a hole in the bottom for wires and the two necessary grooves to fit onto the stainless steel plate. This was previously detailed in a VODCA newsletter



New base plate of reinforcement needs to be cut to fit the lips and the hole

As a preventative measure, douse the foot of the mast frequently with fresh water.

MAST SUPPORTS (Interior)

We experienced a degree of flexing in the main beam, especially when beating, meaning it could become difficult to fully open the head door, but the problem is now no more serious than when we left. As a precautionary measure, we carry a precut beam ready to jam vertically under the mast, but you should note that you need to support this on another precut cross beam and not directly on the false floor molding, which will not take any great load. By inserting a cross beam, you transfer the load to the hull.

The mast load is designed to be transmitted to the hull via the two vertical posts and the bulkhead itself. Our load is indeed traveling this route, but after four years we now have a faintly visible ridge on the outside of the hull, coinciding with where the bulkhead is glassed in. I can't think of any remedy to this, for it does indicate that the stresses are going where they are supposed to be going.

RATLINES

Ratlines tied at 15" intervals between the upper and lower shrouds on either side allow the crew to climb and keep a good lookout in coral waters; they are also very useful for laundry.

LIFELINES

High lifelines, running from the pulpit up to a chest-height ratline and down again to the stern pulpit add a little extra security at sea (though you shouldn't be attaching your harnesses to the lifelines). We laced in the lifelines forward of the mast, which makes it more difficult for sails and parts of sails to disappear overboard.

JACKLINES & PAD-EYES

We ran a pair of plastic-covered stainless jacklines at deck level from either side of the coach-house at deck level. Each end was secured to a heavy s/s pad eye with aluminum backing plates. When on deck you should always clip on your tether - either around the jackline if you intend to be moving about, or straight to the pad-eye. We also installed two pad-eyes in the cockpit, one close to the normal steering position and one at the back of the cockpit, allowing access to the windvane. We made it a rule offshore, always to wear tethers at night, in rough weather, or when the other person was asleep. Your tether should be 5' long with stainless steel climbing type snap-links that can easily be undone, but which cannot accidentally undo when pulled the wrong way against a pad eye. (Climbing ones are usually made of aluminum.) It is easy to make your harness out of seat-belt or climbing tape but be sure that the arrangement is such that it can't tighten up on your ribs under load. When changing jibs at sea, always go up to the bow through the forward hatch - never around the side of the cabin trunk.

WINDOWS

There is a risk of the main windows popping out under the impact of a heavy sea (though we never actually took one that would have caused such damage. . . .) I cut one-inch wide, half inch thick strips of plywood to run above and below each window, then had two appropriately sized pieces of Lexan cut. (Lexan is virtually unbreakable, but quite expensive, and, after four years in the tropics, ours has lost its sheen and makes the interior of the cabin a little darker). We then through-bolted, through the Lexan, wood and fiberglass, leaving the front and back open. The result: permanent storm-shutters. I don't believe in temporary ones being kept in a cockpit locker, as it would usually be too late when one got around to getting them out.

SAILS



We bought new sails from J.R. Williams (The Hamble, U.K.). For headsails we carried a drifter, Genoa, No. 1 jib, No. 2 jib, and a storm jib, using the dimensions recommended in the Vega-owner's handbook. In addition, after 10,000 miles, we had what we call a 'cyclone jib' made, *about half the size of the recommended storm jib* - in addition we have found the recommended sail areas for given wind conditions to be rather too large. Of the headsails, we never used the drifter, and only rarely the genoa. The No. 1 and 2 jibs were our workhorses, with the two storm jibs as vital standbys. The larger storm jib was in day-glow orange - hideous, but probably a good idea.

For each sail you need a wire strop of a different length - in order to get the sail as high off the foredeck as possible. This has three purposes: to improve visibility, to lessen chafe on the bow pulpit, and to ensure the sail will not scoop up water in heavy seas. We flew our storm jib about 6' off the deck - just high enough to reach. You may find that closehauled you need to lead the sheets inside the upper shroud.

Because we were hoisting sails higher than they were meant to go, we were getting wire halyards on the mast winch. This can be remedied by installing a cheek-block on the mast about three feet below the winch and leading the halyards through it then back up to the winch.

For the main, we left the roller-reefing as it was, but added jiffy/slab reefing, which does not jam up and which allows you to keep a better shape in the sail. We installed three rows of reef points, then later added a fourth - it sounds like a lot, but we found that we were almost always sailing with at least one reef point in and, if we went again, I'd have the main cut smaller than the recommended size. The fourth reef point effectively serves as a storm trisail, and we used it two or three times.

General principles - do everything you can, at all times, to minimise sail chafe, especially at the points where reefs are tied in and where, running, the sail touches the aft lower shroud.

- We checked our sails before every passage and thus never had to do more than an hour or so of stitching.
- Cable-covers and/or baggywrinkles on the lower aft shrouds help minimise chafing.
- Using a windvane means you must make every effort to balance the boat, which usually means reducing the area of the main and increasing that of the jib.
- In the tropics you should always cover the main as soon as you get in. Ditto with the jib. As a safety precaution, we always kept the No. 2 jib hanked onto the forestay ready for a hasty exit, under sail, in strong winds) but bagged.

ARRANGEMENTS FOR RUNNING DOWNWIND

Our usual running-rig in Trade winds of 15-20 knots was a poled out No. 2 jib, and guyed out main with two reefs. A whisker pole is vital; we stowed ours on deck, with the 'hook' end through a rope loop at the aft base of the bow pulpit, the spring-loaded end clipped into one of the shroud attachments. A short piece of lanyard running from the pole's inboard end to one of the forward grabrails is a useful precaution against losing the pole overboard when wrestling with it in rough weather. Depending on the length of your pole, you may be able to gybe, with certain sails, just by dipping it and pulling it across to the other side; otherwise you will probably need to drop the sail

two or three feet.

For safer, long-term running, you may want a mainsheet longer than the standard one. This would allow you to let the main out to the point at which the upper half of the sail is touching the aft lower shroud. You will certainly want a preventer guy: we ran ours from the end of the boom (attached with a snap-link) forward to permanently installed blocks lashed to the foot of the first stanchion back from the bow, then back to the aft-most of the two winch cleats. When gybing you still need to go forward and rethread the preventer through the block on the appropriate side.

Provided you have reefed down enough, we have found a run in the Tradewinds is the Vega's best point of sail. By easing the pole and sheeting in the main, you can actually 'run' as far upwind as about 135 degrees of apparent wind before you need to put the jib over and go into a broad reach (best with the No. 2 jib).

Boat speed? I have heard of Vegas doing 7 or 8 knots consistently, but we rarely allow Tarka over five knots, and consider four and a half as our ideal speed. If you start doing six or seven knots, you begin to strain things and, in particular, make your vane do a lot of work. Offshore, we feel conservatism must be your watchword. Its amazing how, in the end, the vast majority of boats all end up doing approximately the same daily runs (close to 100 miles). our longer runs were as follows:

Vancouver Island to San Francisco:	790 miles	10 days
Mexico to Marquesas:	2737 miles	25 days
Marquesas to Tahiti:	797 miles	9 days
Bora Bora to Suvarov:	701 miles	7 day
Fiji to Brisbane:	1512 miles	15 days
Gove to Xmas Island:	1937 miles	16 days
Cocos to Rodrigues:	2010 miles	18 days
Reunion to Durban:	1527 miles.	15 days
Saldanha to St. Helena:	1687 miles	20 days
St. Helena to Ascension:	713 miles	7 days
Ascension to Fernando de Noronha:	1099 miles	10 days
Fortaleza to Tobago:	1665 miles	14 days
Montserrat to Colon:	1163 miles	10 days
Panama to Acapulco:	1265 miles	25 days
Acapulco to Isla Clarion:	868 miles	15 days
Clarion to Hawaii:	2285 miles	22 days
Hawaii to British Columbia:	2598 miles	28 days.



Our longest day's run was in the South Pacific - 147 miles, the shortest, 0 (yes 0!) in the South Atlantic. Fastest sailing was inside Australia's Great Barrier Reef where, one day, with no special assistance from the current, we did 62 miles in 10 hours; slowest was off Central America where,

for several days running, we did only ten or fifteen miles (under engine).

MASTHEAD INSTRUMENTS



Apart from the trilight, all we had up the mast was a Windex (wind direction indicator) which I found quite invaluable. Hailstones necessitated a repair (with a section of an old Coke can. . .) to one of the trailing 'tails'. One must ensure that Boobies are dissuaded from landing on it.

DODGER

Vital. We got a new one from Stanton Marine Services (U.K.) which was fine but expensive. Provided you have the old one, you should be able to copy it yourself. The clear plastic deteriorates fast in the tropics (about one year if you do nothing to protect it) but Armor-All seems to extend it's life considerably. A solid frame would be most desirable.

WEATHER CLOTHS

Also very desirable, and available from John Stanton, but easy enough to make your own. These stop a great deal of slop from finding its way into the cockpit.

COMPASS COVER

Prolonged exposure to the tropical sun can cause algae to grow inside your compass (yes, this really happened to us), causing it to jam. We incorporated press-studs into the bulkhead-mounted compass, then made a simple square cover of cloth with four matching studs. We just let it hang down by the two lower studs when we are sailing. We also incorporated a little pocket in the square for a baby flashlight. It is extremely useful to have a compass light.

COMPANIONWAY COVER

In yacht acrylic, attached to the companionway frame by press-studs, we made a zip-up cover to the companionway, with the zip arranged like a capital L. This keeps the rain out and all but the heaviest seas - we never found it necessary to put our boards in.

COCKPIT LOCKER LIDS & FLOOR HATCH

Without good gaskets, water will get inside all of these compartments. We never really solved this one. Our original gaskets perished and we haven't been able to find satisfactory replacements. The COCKPIT FLOOR GASKET is rather more important: just hosing the boat down, a lot of water can get in here. Eventually we went to hand-cut 'Ensolite' closed cell foam, which is OK. The heat in the tropics seems to make most gaskets not stick very well.

LIFERAFT

If you decide to get a liferaft (and they cost upwards of \$1200 U.S.) then you have two decisions: to have it in a valise or in a canister, and where to put it. The manufacturers say the valise is better because you're less likely to abrade the raft when packing is done and, because a valise-packed raft

is most likely to be kept below decks or in a locker, it will last longer. We originally had a four-man Avon in a valise but had it repacked in a canister because I realised what a struggle it would be, in an emergency, to get it up into the cockpit. For a liferaft to remain accessible on a Vega, you must have it outside.

The traditional place to store one is on the coachroof, but it seemed to me that it wasn't a good idea to have all that weight and windage up there and anyway you don't want to be climbing around up there in probably horrific conditions. That leaves the cockpit. We stowed ours on top of the lazarette hatch, with strips of wood bolted to the fiberglass on either side to prevent side-to-side slippage. In order to prevent forward and upward motion (remember, you might have rolled the boat just before you decide to abandon it!) we installed two quick-release nylon straps which were attached to pad eyes on the rear decking and behind the mainsheet track. This means that you can't get into the lazarette locker, so in there we kept our emergency five-gallon water canister, which we'd need only when the liferaft had been thrown overboard. You're supposed to have your liferaft serviced every year. Having it done overseas can be a problem; It's vital to find a reputable agency. (Anyone that won't let you personally see the raft being test-inflated and repacked is probably not reputable!) Horror stories abound about canisters being repacked with bricks or even old National Geographic magazines, a ruse that won't come to light for at least another year and probably many, many miles later. Even with a canister, it is a good idea to make up a good lift-off cover out of yacht acrylic for the raft.

FLARES

To have a chance of being seen offshore, you need parachute flares, which cost about \$40. each. So, hoard all the flares you can, beg expired ones off your friends (they may not be legal, but they'll probably work) and, when you have your liferaft serviced, ask the agency if they can let you have (free) any shortly-to-expire flares that they may have taken out of freighters' and passenger ships' rafts. I didn't have much experience with flares but when we tried to fire off a SIGMA SKYBLAZER (small flares, widely available in orange packs of six) in celebration of our circumnavigation, (after taking all sorts of precautions to ensure our flare would not be mistaken for a distress signal) we got no response from any of the TWELVE we tried. The firing chain simply pulled out. A Pains-Wessex 'pencil-fired' flare worked the first time.

BILGE PUMPS

A backup for the regular bilge pump is desirable, and whilst you're installing it, you might as well put it where, if need be, you could pump from inside the cabin - i.e. on the starboard wall of the cockpit well, close to the instrument panel. We installed a Henderson Mark V, stuffing its' intake down where the ordinary intake goes, and leading the outlet astern, inside the cockpit locker to a Y-junction in the starboard cockpit drain pipe.

WINDVANE

Volumes could and have been written on the subject of windvanes. We installed a NAVIK (made by Plastimo in France). This light, is of a relatively simple design and powerful. Basically, we were pleased with it - we could hardly have been otherwise. It steered alone on all our major passages except one. However, a vane has its limitations; it will not tolerate the amounts of weather or lee

helm that a human will and it will not keep you on a dead run with as much as a sail up as you might have if you were handsteering. It takes many hundreds of miles before you begin to learn how to get the best out of your vane, but this vane never needs feeding, never complains, and never gets tired. . . .!

Weak points to look for on the NAVIK:

- I have seen five or six NAVIKS on which the white paddle cracked horizontally, about one-third of the way down. Anticipate this by putting on a preventative 'bandage' of three or four layers of fiberglass for two or three inches on either side of the rectangular hole in the paddle.
- The jointed connector from the turret assembly to the paddle assembly likes to work its way off the paddle assembly at inconvenient times. You can restrain it with wire or twine.
- A crucial weld on our vane failed where the large tube on the paddle assembly meets the white paddle itself. To remedy this, you need a new white paddle with trim tab, an appropriately sized piece of stainless steel (ss) tubing and welding gear for ss, all or some of which may not be available to you at the moment of crisis. . . .

For spares, take several jointed connectors, a supply of the appropriate teflon washers, and (for when all else fails), a supply of surgical tubing which, you will find, is the one vital ingredient in all home-made self-steering devices.

LOG

Our 'Walker' trailing log has been excellent, and we long since ditched our unreliable, power-consuming electronic log which was anyway always being fouled by weeds. In four years we have lost three spinners to sharks, two of them on successive days. Oil the log as suggested and check regularly for weak points in the line. If you can find reverse-wound wire leader, that might eliminate the shark problem. (Wire which is conventionally wound soon kinks irretrievably.) You can actually do without a log quite easily. Offshore you soon learn to estimate your speed quite accurately, and anyway, the log does not take currents into count.

MAN - OVERBOARD GEAR



Most of your safety precautions and energy should be aimed at never falling overboard in the first place. Being offshore with only two of you on board, the chances of one finding the other, even in moderate conditions, are mighty slim indeed. However, we have a lifering tied to a MOB pole with 30 ' of floating yellow line and a battery powered light which goes on when floating. The lifering has a self-deploying drogue with a whistle tied to it. The whole assembly is attached with a quick-release lashing to the stern pulpit. The flag on the MOB pole has a restraining sock over it. This is attached with a light line to the backstay so that it will pull off when the pole is deployed. Even supposing you locate your crew, you then face the formidable task of getting him/her back on board in a possibly comatose or helpless state. We have a home-made four rung rope ladder (doubling as a swimming ladder) attached to the base of the stanchion closest to the sheet winch, but this assumes the victim is able to pull him/herself out of the water. For a more serious situation, we have a 4x1 block & tackle system with a snap-link to be attached to

the end of the boom. The victim's end has a rope strop of sufficient length to go around the victim's chest & back and then back to the block with another snap-link. The two blocks and their line, etc should be carefully stowed so that when used, they are about six feet apart. *

In an emergency, the topping lift should be rapidly put on and the boom raised a little. The end of the tackle with the single snaplink is attached to the end of the boom whilst, at the other end of the tackle, the strop is attached either to the victims harness or around his/her chest and then back to the outboard block. Using the block & tackle for vertical hauling and the mainsheet to keep the victim close to the boat, you should then be able to haul him/her aboard. Needless to say, you should practice this system in calm and warm water. The following advertisement is of a commercial system of the type described.

HOW LIFESLING WORKS



1. Stop boat immediately. Maintain Visual Contact. Deploy Lifesling.



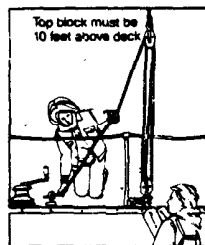
2. Circle M.O.B. until contact is made.



3. Stop boat immediately. Drop Sails. M.O.B. puts Lifesling on. Do not tow victim.



4. Pull M.O.B. slowly alongside boat.



5. Rig hoisting tackle. Top block must be 10' above deck.



6. Hoist M.O.B. aboard.

GOING UP THE MAST

For routine inspections of the upper rigging, we have a homemade rope ladder which we haul up on the jib halyard. But you wouldn't want to go up this at sea (actually you wouldn't want to be going up there at all, but you should be prepared . . .) So, you need either mast steps which we didn't have but which we would next time) or the means of hauling someone up. THE VEGA'S MAST WINCH IS OUT OF THE QUESTION, being far too small, so we made our 4 by 1 man-overboard block & tackle double up as a means of pulling someone up. You will need five times the height of the mast for this - say 150 ft. A Bosun's chair is easily fabricated from line and a piece of planking.

LIFE JACKETS

We use ordinary lifejackets, but with a rigging knife, whistle and personal strob light attached to each jacket. We make it a rule to always wear them in rough weather and always at night no matter how calm it may be.

EPIRB

An Emergency Position Indicating Radio Beacon sits in its' holder on the bulkhead at the aft end of the starboard bunk. I have some doubts over how useful this would be, as it is apparently pure chance whether or not satellites pick up its' message. The latest design of EPIRBs, the Class C, sounds a much better bet: it is targeted specifically at satellites, unlike the older versions.

RADIOS

For transmitting we have only a VHF. Obviously, this is of limited use offshore, but we do use it to warn approaching ships of our presence. In some of the more popular cruising locations (e.g. in Mexico) there are daily 'nets' on the VHF. We also have a compact Sony all-band receiver (#7600D) which is single sideband capable; this means, if we so desire, we can tune into ham nets, which often carry weather information. The VHF is permanently protected by a loose clear bag.

DEPTHSOUNDER

Useful when approaching an unfamiliar coast at night or in fog; also for assessing amount of anchor rode necessary. Ours is powered by its' own dry cell.

LIGHTING

By removing the bulb from one of the two principal cabin lights you can make a considerable dent in your own power consumption. Principally we use a gimballed brass kerosene light, mounted on the forward bulkhead of the starboard bunk. You need to take a couple of spare glass chimneys.

BATTERIES

If you keep them in the bilge, you must be very careful not to let them get covered by water - once, in rough seas, we failed to notice that the un-taped hawse pipe cover had flipped off and we were taking water into the bilge. This soon resulted in the loss of the batteries. The handcranking feature on the engine suddenly became very useful. We also screwed a little wooden slat in place, across the aperture where you insert the batteries (under the cockpit sole). In the event of turning turtle you don't have to worry about your batteries falling out and making a hole in the roof or hurting someone. You could also be burned by the battery acid.

STOVE

Most offshore cruising boats use propane; its dangers are well-known. But you should be aware that the fittings used in the US and Canada are not of the same dimensions as, for example, those used in the French possessions. Thus, refilling bottles can be a problem. We used a two burner kerosene stove with primus type burners and had no serious problems with it. Kerosene is universally available (but of variable quality, notably in Mexico) and is very cheap. Priming the stove in rough seas can be a problem: the answer is in a specially designed clamp on wick, which may take some finding and which we got from Thomas Foulkes Ltd (London).

WATER TANKS

Offshore, calculate on using half a gallon per person per day. This means that with a crew of two, you have only fourteen days supply in the main tank. We installed flexible tanks by Plastimo under both bunks (capacity of 12 to 18 gallons each) but had repeated problems with poorly manufactured inner plastic bags. The simplest solution is to have a series of good five-gallon jerry jugs stowed in various locations. As a rule of thumb, we carried water for twice as long as we thought we would be at sea. This paid off when, three days out of Hawaii and with over 2000 miles to go to BC, we found the main tank had drained out into the bilge, via a very slowly leaking water pump. The Whale gushers are good but you will need to take spares and master the art of taking them apart from time to time. For treating suspect water, small quantities of bleach will do the trick.

THE ENGINE

Ah . . . the engine. Sixteen years old - our old VOLVO MD6A is still more or less working, so it can't be all bad. Main problems were/are as follows:

- Slow and difficult to start. Having the fuel below the engine and no electric fuel pump seems to encourage the fuel, if there is the slightest air leak in the system to back down out of the injector feed pipes. Usually I find it sufficient to flip up the decompression lever, unscrew one of the injector pipes where it meets the engine on top, and crank the engine until a steady pulse of fuel is coming out. If this fails, obviously you need to check back, probably redoing filter installation first of all.
- Overheating: Soaking or boiling the thermostat in vinegar can be helpful, as can slightly enlarging the two small holes in the outer disc of the thermostat. Then check the impeller - you need to take it out to see if there are any cracks in the fan 'blades'. If all else fails, the tubes in your exhaust manifold are possibly clogged up and need cleaning out, but don't take the manifold off unless you have a spare gasket at hand.
- Two failures in four years of alternator regulators (symptoms: either a total failure to charge the batteries, or the opposite, leading to rapid boiling-off of the electrolyte). Buy a spare regulator or two before you leave and, if it is the type clamped on the back of the alternator, rewire it so it can sit in the more friendly environment of the electrical compartment.

It is a good idea to use the decompression lever for starting and, in general do your best to conserve electrical power as you never know when you might need the engine in an emergency. With only the cabin lights, Nav lights and VHF to drain the batteries, we found no need for additional means of battery charging. It would, however, be easy to hook in solar panels (better than wind generators, which seem to need at least 15 knots to produce anything).

Maintenance: Change the oil when recommended i.e. at 50 hours. We changed the oil filter at 100, visually checked the CAV glass bowl filter for water at 50 and changed it at 100, the fuel filter on the engine at 150. It is difficult overseas to get appropriate grease for the reversing mechanism, so you should take a supply with you. Engine spares should include an injector, a spare thermostat, a pair of O-rings for the impeller shaft, impellers, the various filters (though local versions are nearly always available), oil (not always easy to get the right grade), one each of the big gaskets, an appropriate variety of hoseclamps and hose, and perhaps fuel and water pump rebuild kits. Also, anything relevant to your own engine's idiosyncrasies.

NAVIGATION



Largely a matter of personal preference. We used only a sextant, albeit a good one (Freiberger, Yachtman's three-quarter size), and the HO 249 tables, with no special calculator. Over 90 percent of cruising yachts now have Satnavs; however, in our view, their main snags are that they are a power drain and that if they fail you can't fix them. It is a fact of life that if you take a sextant as a backup to a Satnav (as you should) you simply will not keep your celestial skills (if you have already boned up on them) up to scratch. . . .

So, is a sextant sufficient? As long as you are prepared to maintain full night watches, never enter a harbour or close land at night (unless overriding safety considerations dictate that you must), then you will be fine. Don't worry too much about not seeing the sun or listening to people's stories about

not seeing the sun for three weeks. If you're looking hard enough, all day, you'll have sufficient of a glimpse to get a line of position during the day. We've occasionally taken shots of the moon, once or twice of the stars, as confirmation of positions obtained from the sun. It's not usually necessary to do the stars (which is a slightly more complicated process). Nor do you need to be a math whiz: I have zero mathematical ability but can now compute a sun-sight, using no calculator, in 3 or 4 minutes, 'cookbook' fashion.

CHARTS

We keep our charts in plastic tubes or in large garbage bags under the bunk mattresses. Charts represent a large financial investment and we tried to send packages of them home whenever we could to reduce the risk of losing them to mildew, etc. (the same applies to books - you must constantly be thinking about keeping the Vega as light as possible.)

HEAD

We left the head installed but filled in the compartment with removable shelving. The conventional head would be unusable in a rough seaway - a bucket is altogether more practical and sanitary. Keep the bucket permanently tied on.

SLEEPING

With only two persons on board (and I think a Vega would be excessively cramped with more) you don't need restraining weather cloths to keep you in your bunk. Only one of you will be asleep at sea at any given time, so just sleep in the downhill bunk.

INSULATION

Not that you need any in the tropics, but the foam-backed vinyl with which the boat is lined seems to have a positive aversion to heat and soon starts peeling off messily and irretrievably. A problem that we now are facing up to, back here in B.C.

THE BOTTOM

The growth of barnacles and weeds is very fast in warm waters, but fortunately the Vega is small enough for me to be able to go in and scrub her bottom at frequent intervals without needing diving bottles. A wetsuit is still a good idea for, say, Californian waters. We have only hauled twice in four years and found that we did really not need to haul the boat the second time. We used a rubber-type bottom paint by International (but be aware that many types of paints are not available in certain countries, and that the numbering and naming systems of large enterprises like International also seem to vary with each country - as does the quality of their paint).

In the trailing edge of the rudder we drilled a quarter inch hole, through which we would be able to thread a steering line in the event of rudder stock failure.



Remember to paint your waterline high enough for your anticipated increased draught, and it's also a good idea to flare the waterline up at the bow and stern. As mentioned above, be weight conscious all the time; the Vega is a light boat and much of her seaworthiness resides in her lightness.

DINGHY

Given the lack of stowage space on deck, an inflatable is your only option. We had an 8 ft Achilles with no engine (more weight, more mechanical problems, more fuel . . .) and were well pleased with it. At sea we kept it in its' bag on the Vee berth. Frequent doses of Armor-All helps to keep it in good shape. Other popular brands amongst the cruising fraternity are Avon and, to a lesser extent, Zodiac. This latter one seems to have been having bonding problems, judging by the lineups we saw at Zodiac agents all around the world.

EMERGENCY BUCKET

Not a second head, but a large, sealable white bucket, with a lifejacket tied around it, which we could grab in the event of abandoning ship. We keep it in the deck level alcove amidships, forward of the head, jammed in place with a piece of a wooden slat. Contents are as follows:

- Assorted tins of fruit, condensed milk, Spam, Granola and oatmeal bars.
- Assorted flares, including one parachute flare There are more in the liferaft and more still in our port aft cabin locker, behind the bunk.
- Signaling mirror
- Whistle, Matches
- 'Space' blanket, bailing sponge
- Fishing gear including large gaff hook
- Flashlight and separate batteries
- Pilot chart of the ocean being sailed, pencil & paper, pocket compass
- Heavy ss rigging knife (on top of everything else - to cut the raft free if necessary.
- First aid kit
- Small water supply, can opener, cup, spoons.



Occasionally we verbally rehearse an abandon ship drill - Devise your own routine to ensure that the most valuable items come with you in the raft and that you don't waste valuable seconds thinking out priorities and deciding who'll do what. Other items we would need to grab are, in order: extra water, the EPIRB, a small ready prepared bundle of passports, US cash and credit cards, more flares,

and then if time, extra food, the sextant, more water, etc.



DANGERS

What are the main dangers in offshore sailing? In our purely personal opinion, provided you're not sailing in extreme climates and avoiding cyclone seasons, the main danger is not the weather at all, but the risk of collision with a merchant ship. After that I'd put man overboard, followed by losing the boat through navigational errors or slackness. Weather comes fairly low down on the list, and most boats that get into trouble with the weather offshore seem to do so because they had not heeded a weather forecast, were sailing in the wrong area at the wrong time or were simply in too much of a hurry. Sailing a tight schedule is a fatal error. We didn't throw much heavy weather at 'Tarka'.

Basically, we sailed around the world via the Cape of Good Hope and never had consistent winds of over 35 knots - even then ours were in the right direction.

I do think the Vega basically, can handle most situations as long as the crew can!

INVENTORY AND LOCATION LIST

We kept a spiral-ring notebook in which we recorded where spares and so on were located. One needs to keep this from Day One for it to be useful. Keep it up to date as you use or move things. It is surprisingly easy to lose track of what you actually have.

For each major provisioning, one of us would stow items while the other wrote down where the various items were being stored. To note down what you use each day is a very useful exercise on a passage. At the end of the passage, draw up a list of what you consumed. This may be quite different from what you had planned to consume and can be useful on future passages in estimating quantities of food to be purchased, etc.

We recorded the charts we owned on a large British Admiralty Catalogue. Even when your charts are not all B.A., you can indicate on the many (reference) maps in the catalogue what charts you own. As we entered each new geographical area (e.g. the Mexican coast, the Great Barrier Reef, etc.) we would get out the relevant charts, order them and number them on the outside so that we could clearly see what they were without having to unroll them half way. The ten or twelve relevant charts would then be kept in a plastic chart tube, more accessible than the bulk of them, which remained under the bunks. Clear plastic chart slickers are a good idea.

LOG BOOKS

We used a set of thick hard-covered exercise books which we kept in a plastic bag. We made the log more of a diary than a traditional ship's log - sticking in postcards, clearance papers, stamps, bus tickets and so on. However, on a passage we were meticulous about reporting our daily position, mileage run and so on.

For keeping a track of our Dead Reckoning either on a passage or coastally, we used a white plastic board and erasable felt pens, with the following columns:

<u>Time</u>	<u>Mag. Course</u>	<u>Log Reading</u>	<u>Miles Covered</u>	<u>Notes</u>
-------------	--------------------	--------------------	----------------------	--------------

Thus, the entries after a night at sea might read:

1930	275°	32.1	12	
2230	282°	46.4	14.3	
0130	278°	57.4	11	
0430	280°	70.8	12.6	saw ship 0110
0730	285°	82.5	11.7°	

(Figures in the Mag Course column refer to the course steered over the preceeding three hours.)

Water soluble pens can also be used in conjunction with a piece of clear plastic sheeting, paperclipped to a pilot chart, to plot the weather system from the coordinates read out over the radio.

MONEY

We carried a cash float of about \$1000 U.S. dollars for emergencies and miscellaneous costs. *The dollar is recognized everywhere.* American Express Cheques in U.S. dollars are the most convertible kind of cheques. It is also useful to have an American Express (AmEx) card so that you can use worldwide AmEx offices for mail pickups.



For most purposes, we used a Gold Mastercard, and took our cash advances on it. As long as you keep topping up your account, this is a cheap and excellent system. Even the remotest islands now recognize the major credit cards.

Phone calls : It is often cheapest to call collect, especially from Mexico , where local taxes are prohibitive.

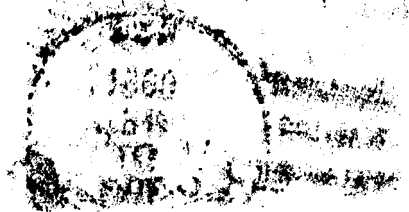
HOW MUCH DID FOUR YEARS & 36,000 MILES COST US?

Almost exactly *ten thousand (\$10,000.) Canadian dollars per annum*, after fitting out. This figure is all-inclusive for two people, taking in everything from haulouts, telephone calls and car rentals to photographic film.

Nick + Jenny

Nick & Jenny Coghlan
"TARKA THE OTTER" Vega #1639

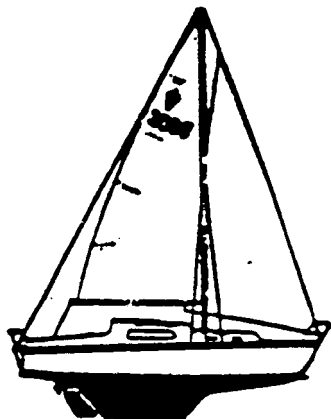




VODCA



C/O SIDNEY A. ROSEN.
10615 WHITMAN CIRCLE
ORLANDO, FL 32821



CHUCK ROSE
P.O. BOX 88784
HONOLULU, HI 96830-8784

Special Issue



The mast beam of the vega

It is well known among vega owners that the beam supporting the mast is a weak design. The original drawing by the designer Per Brohall is reported to have shown a different construction — a rounded vault —, but this solution was considered by the first boat builders (Larsson Trade, later Albin Marine) to be too expensive and the construction used in production became a straight beam. Most vega-owners have changed this and reinforced the construction in various ways.

The basic idea of the design.

Transfer of load

The principle idea is that all of the vertical load shall be transferred to the hull via the bulkheads on either side. The function of two "posts", one on either side of the opening between the cabin and the fo'c'sle, is only to prevent the bulkheads from buckling (i.e. bending forward or aft under the pressing load). These posts must not transfer any load directly to the hull, since the hull is not fit to take such concentrated load. Consequently one should make certain that the posts do not touch the hull by cutting away some mm at the bottom if necessary.

The beam must be firmly fixed to the bulkheads, which is done by means of through bolting. Then the bulkheads must be firmly fixed to the hull. For this purpose there is a "L-shaped" GRP flange which is glued to the hull and to which the bulkheads are bolted. There should also be a putty filling between the edges of the bulkheads and the inside of the hull. The bolts must be firmly drawn. See Figure 1.

There is a vertical groove in each of these posts into which the bulkhead is fastened and glued. It is usually possible to dismount the post by gentle hammering sideways. If a post has come loose it should be re-fastened with fresh glue.

Ventilation via the mast beam and the mast.

The design contains a rather ingenious ventilation system, which one will have to abandon and replace with something else. About 4" forward of the true beam there is a panel with holes on the port and starboard sides. Under and between this panel and the beam there is a bottom. The panel is held to the deck by a weak GRP flange. The design appears as a "false beam". The space inside this one is connected to the mast via a hole through the deck, the intention being that the mast shall act as a very tall chimney and suck air out of the boat. When this means of ventilation is destroyed it must be compensated for in some other way. See Figures 1 and 2.

Reinforcement of the mast beam

Several methods have been successfully tried. Most of them contains an extra beam on the forward side of the original one, using the space where the ventilation duct of the "false beam" used to be.

Stainless steel plate, 3-5 mm

Use the panel forming the forward side of the ventilation duct as template and cut the plate to shape. Dismount the "false beam" and the bolts through the old beam and the bulkheads. Then jack up the deck gently a few mm (put a strong crossbeam under the jack, the GRP floor is too weak) and fit the steel plate. Mark the bolt holes, dismount the plate and drill holes, replace the plate (it is recommended to strengthen the bond between the plate and the old beam with epoxy glue), replace the bolts (it may be necessary to use longer ones) and replace the "false beam". (This leaves the ventilation intact.) Remove the jack. Figure 3.

Stainless steel L-shaped profile, 100 x 50 x 3-5 mm

Cut the 100 mm leg of the profile to shape as described above. Then the procedure will be much the same but the bottom of the ventilation duct will need some adjustment to give a nice appearance. This design is stronger than the one with a simple plate. Figure 4.

Aluminium L-shaped profile, 100 x 50 x 3-5 mm

An Al profile can be cut to shape manually which does away with workshop work. The Al profile is weaker than steel but may still be adequate.

Aluminium L-shaped profile, 100 x 50 x 3-5 mm plus wooden beam

Use an Al profile as above and add a wooden beam on the forward side, i.e. placed "inside the L" Bolt through them all: the old beam, the bulkhead, the L-profile and the new wooden beam. Apply epoxy glue between them first. This method stiffens both the legs of the L of the Al profile. Before you mount the new wooden beam you will have to cut grooves in it on its forward side for the electrical cables to the mast and a hole obliquely vertically to join the old hole through the deck. Also make shallow holes to countersink the nuts of the through bolts in order to make the covering board fit snugly. Use the old forward panel to cover the wooden beam for neatness. This solution destroys the ventilating function of the original design. Figure 5

Angular stiffening

The tension of the shrouds give a horizontal force that will try to "capsize the doorway" between the cabin and the fo'c'sle. In order to stiffen the construction against this the steel and Al profiles mentioned above should be extended downwards along the bulkheads by welding a plate about 300 x 300 mm to each end. These plates will be glued and screwed to the bulkheads. Figure 6.

Reconstruction of the vaulted doorway

This solution calls for considerably more work and handicraft.

Dismount the vertical posts and the old mast beam. Cut a ledge in each bulkhead about 300 mm below the deck (to be exact: half of the doorway width + d — see figures!) and about 50 mm deep. Cut a piece of plywood, the same thickness as the bulkheads, to fit between the bulkheads and into the newly cut ledges. Shape the top side of it after the top of the old beam and the under side of it into a circular arch, passing just under the beam and ending 3-

4 mm (d) inside each of the ledges (thus leaving room for a 3-4 mm covering — for neatness). Figure 7: New central board.

Then cut another piece of plywood with the length of the mast beam. Shape the top side as the top side of the beam and the under side centrally as the central piece, at the sides horizontally. This piece will fit on the forward side of the bulkheads and the central piece. Figure 8. For the aft side-make pieces no 3 and 4 as shown in Figure 9 and trim them to fit against the under side of the old beam. The ventilating duct will have to be trimmed to give place for piece no 2 on the forward side. Drill a hole centrally in piece no 2 to join with the hole through the deck to the inside of the mast! All the pieces will be glued and screwed together and to the mast beam.

For refinement you dress the under side of the vault with a thin piece of plywood, 3-4 mm thick, that will fill out the space you left on the ledge. Then, as extra stiffening and neatness, fit pieces about 30 x 50 mm along the curved edges, see detail in figure 10.

This solution will interfere partly with the ventilating system unless you widen the duct.

With this construction one could probably do without the old beam all together, replacing the pieces 3 and 4 with one like piece 2, but I have not made any calculations to prove it. Of course one could intersperse a piece of steel sheet as in Figure 3, which would certainly make the old wooden beam superfluous.

A stainless steel frame around the opening to the fo'c'sle.

This is a somewhat fancy solution that has been constructed on vega 3055 by its owner Per Wasberg, who is an expert in the field of bending thin steel sheets and welding. He made a "dressing" to the opening between the cabin and the fo'c'sle forming a very stiff doorway (enclosing the old wooden beam, the side posts and the threshold piece in its U-shaped cross-section and resting directly on the true bottom = keel). This frame takes care of both the vertical and side-sheering loads. Then he anchored down the chainplates of the main shrouds to the bottom corners of this frame, thus closing the triangle of forces at play..

A strut in the opening

This is of course the simplest solution that can be applied temporarily or in emergency.

Cut a hole in the GRP floor directly under the mast beam to allow a strut to be placed directly on the bottom or keel part of the hull. Make a strut of, for instance, a piece of 50 mm Al tube with a screw-up device at the top or a piece of wood 50 x 50 mm complemented with two wedges at the top end. Loosen the aft stay and the main shrouds before inserting and tightening the strut. You will have to apply some kind of fastening between the top of the strut and the mast beam, because the boat will flex when jumping along in a rough sea, so, much to your surprise, the strut will work loose even if it was well tightened. If you place the strut slightly off centre you might still be able to squeeze past it.

This device does nothing to stiffen the design sideways.

Joining the bulkheads to the hull

Assuming that you have got all the loads transferred from the mast beam to the bulkheads it remains to get the pressure on these ones transferred to the hull. As mentioned above the bulkheads are fastened to the hull with an L-shaped GRP flange. The weakness of this

design is that the connection is one-sided. Obviously a flange on either side of the bulkheads and through bolting would be stronger.

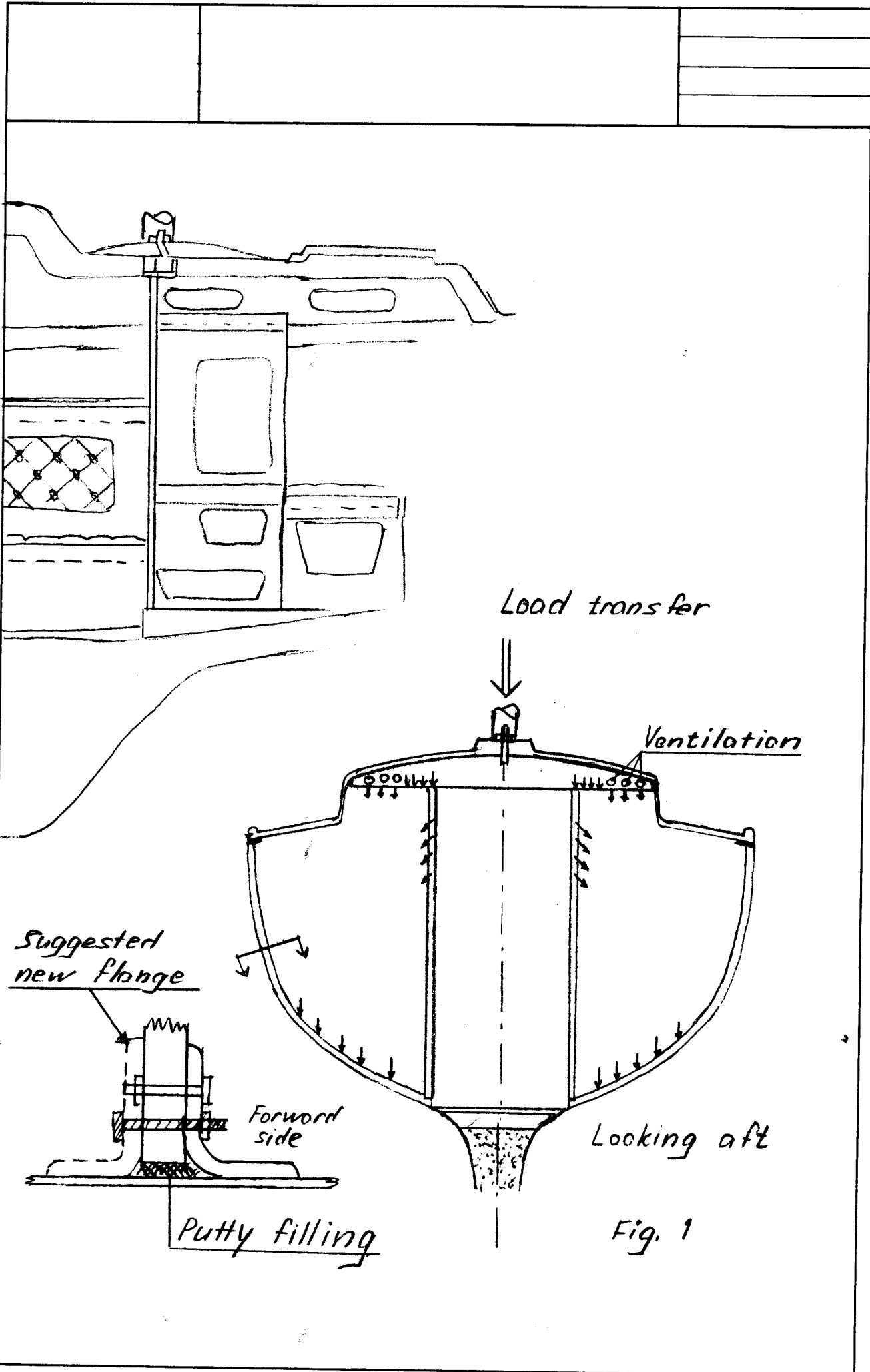
In order to execute this you must first dismount the bunks on either side. Start with the shelves behind the top of the back sides, then dismount the interior shelves inside the aft lockers, then the back pieces and finally the bottom of the bunks. It is a lot of un-screwing but no principal difficulty. Put the screws in separate bags and mark the bags.

Check that the space between the edges of the bulkheads and the hull is filled out with putty, otherwise do so. (See detail in Figure 1) I suggest you leave the old bolts in situ. Then grind away paint from a strip along the aft side of the bulkheads to give a clean surface onto which to glue the new flange. Mask off a proper width on the bulkhead and sand down the exposed surface. Cut a sufficient amount of glass fibre strips (about 10 layers, depending on the thickness of the glass web) Epoxy is reported to give a stronger bond to old polyester than new polyester does, but be careful because epoxy can give allergic reactions. Watch the curing process carefully and cut a clean edge along the masked line on the bulkhead when it is hardened just enough. When all is well cured drill new holes through all: the new flange, the bulkhead and the old flange and bolt through. If you wish you can dress the new flange with a nice piece of thin plywood or some other material.

Figure 1.

Now that the bunks are dismounted you might want to do some extra work, e.g. check all the bolts of along the bottom of the vertical side pieces (if the old holes in the plywood are worn drill new ones and put in new bolts, because this is a vital part of the longitudinal stiffness of the hull), fasten down the chainplates, insulate the hull etc., but that is another story.

Kind regards from vega #7 IMARI (* 1966 and now better than ever!)



Load transfer

Ventilation

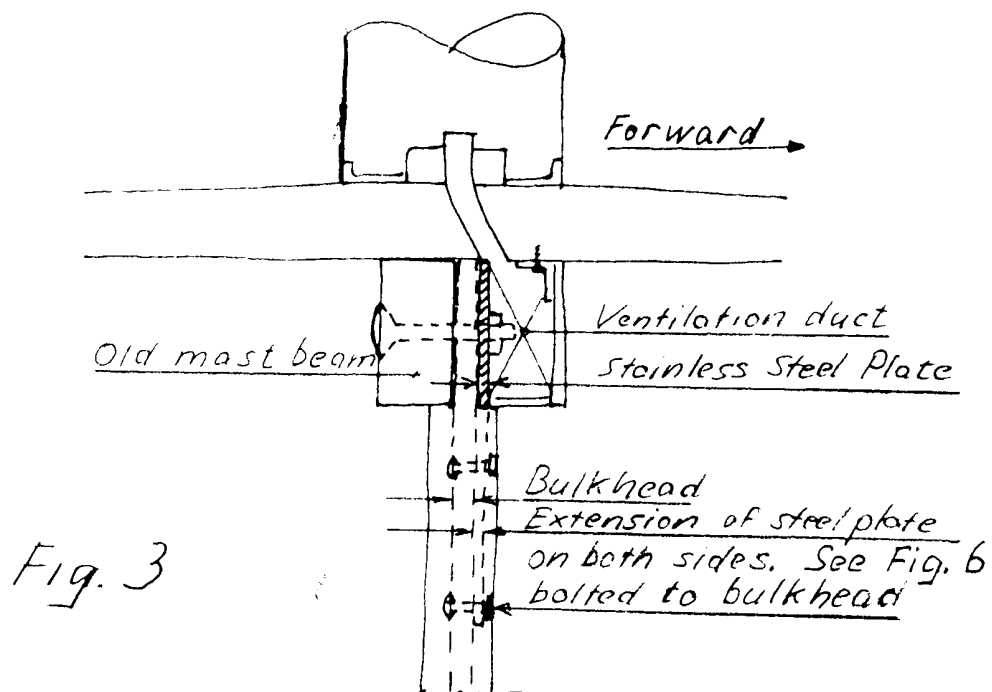
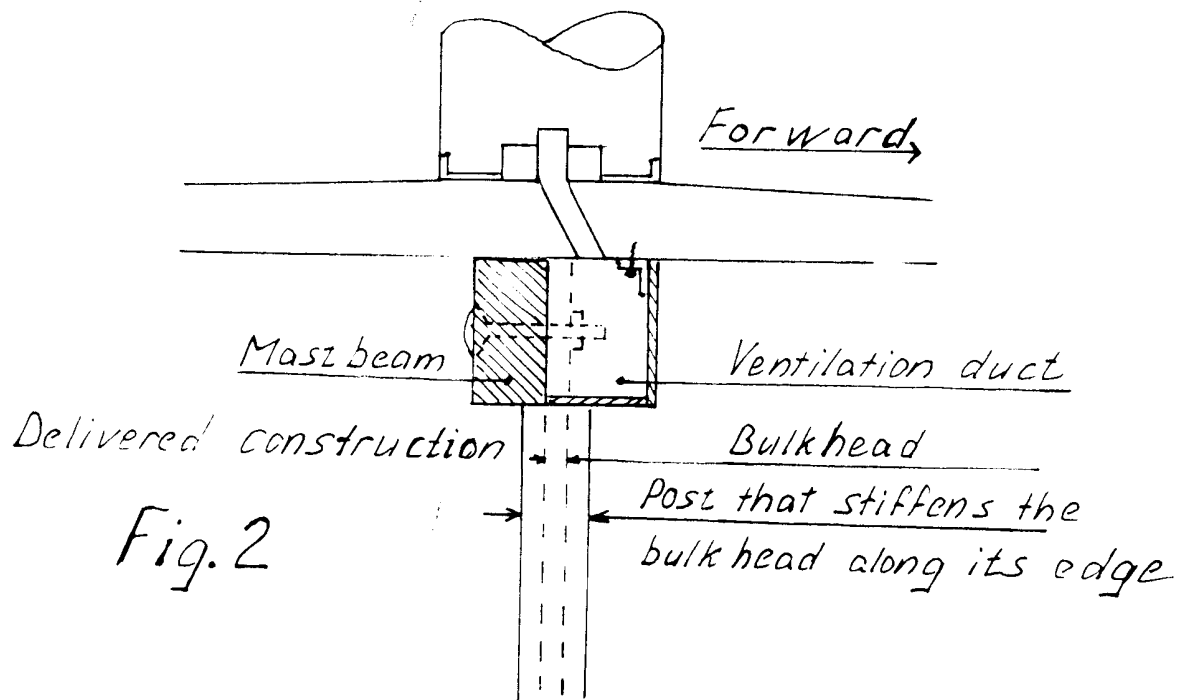
Suggested new flange

Forward side

Looking aft

Putty filling

Fig. 1



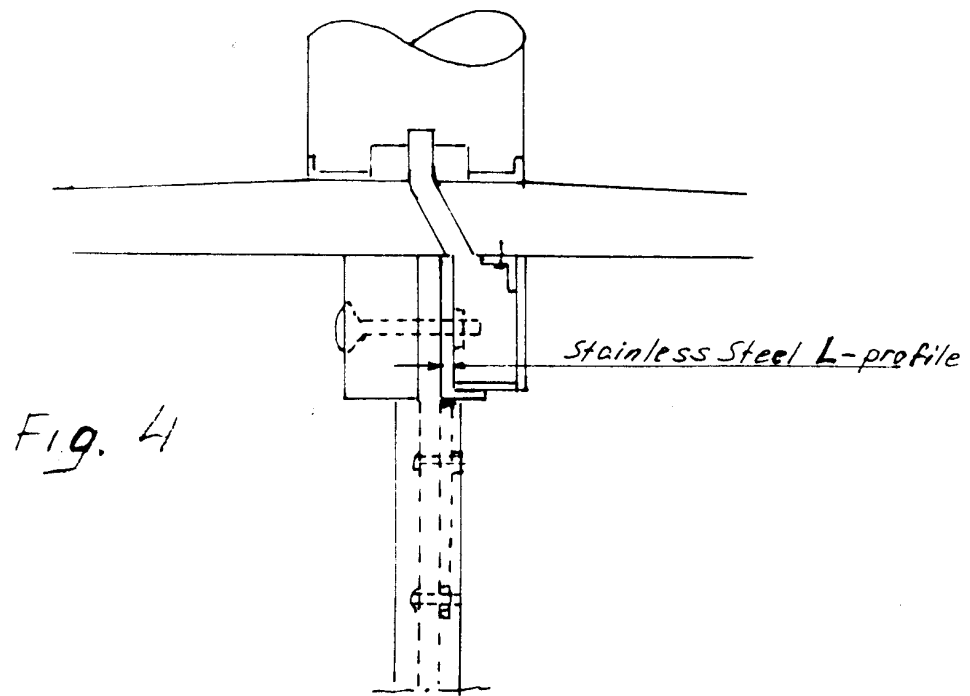


Fig. 4

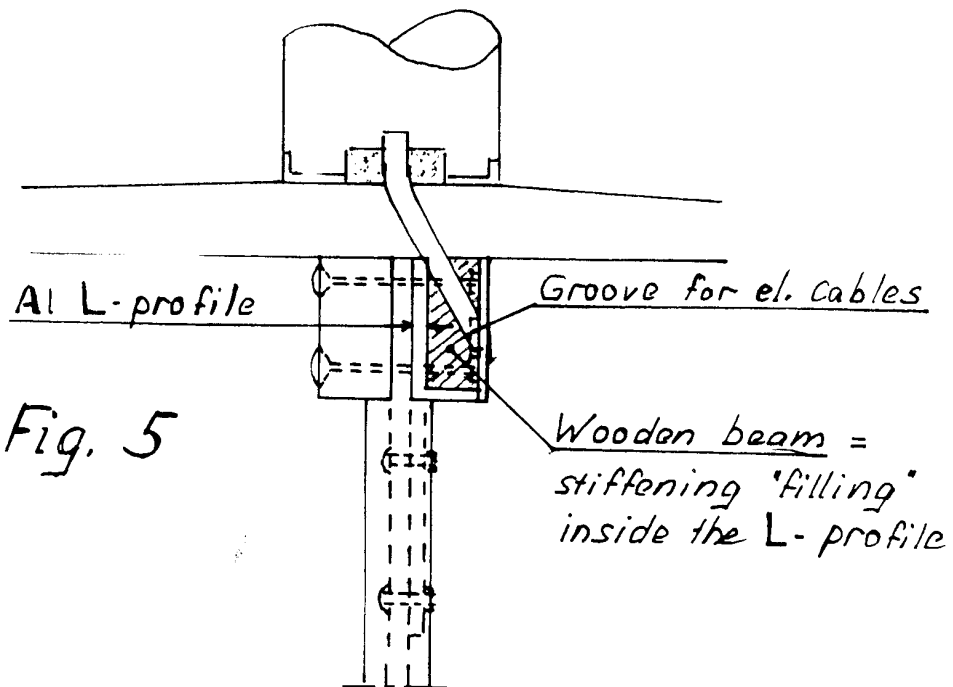


Fig. 5

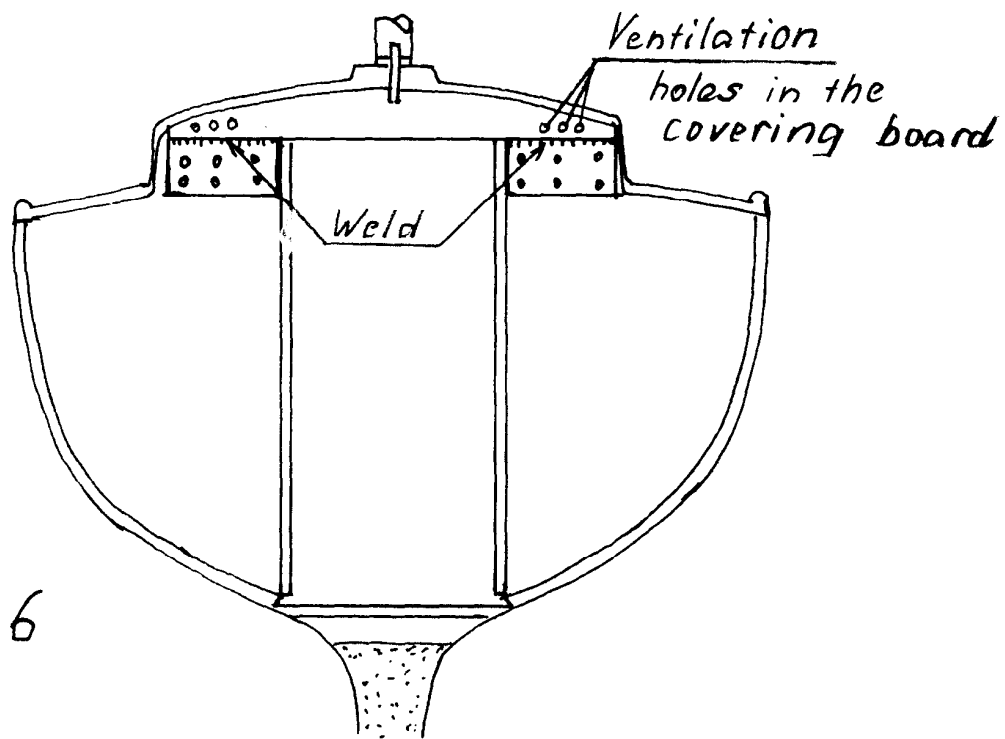
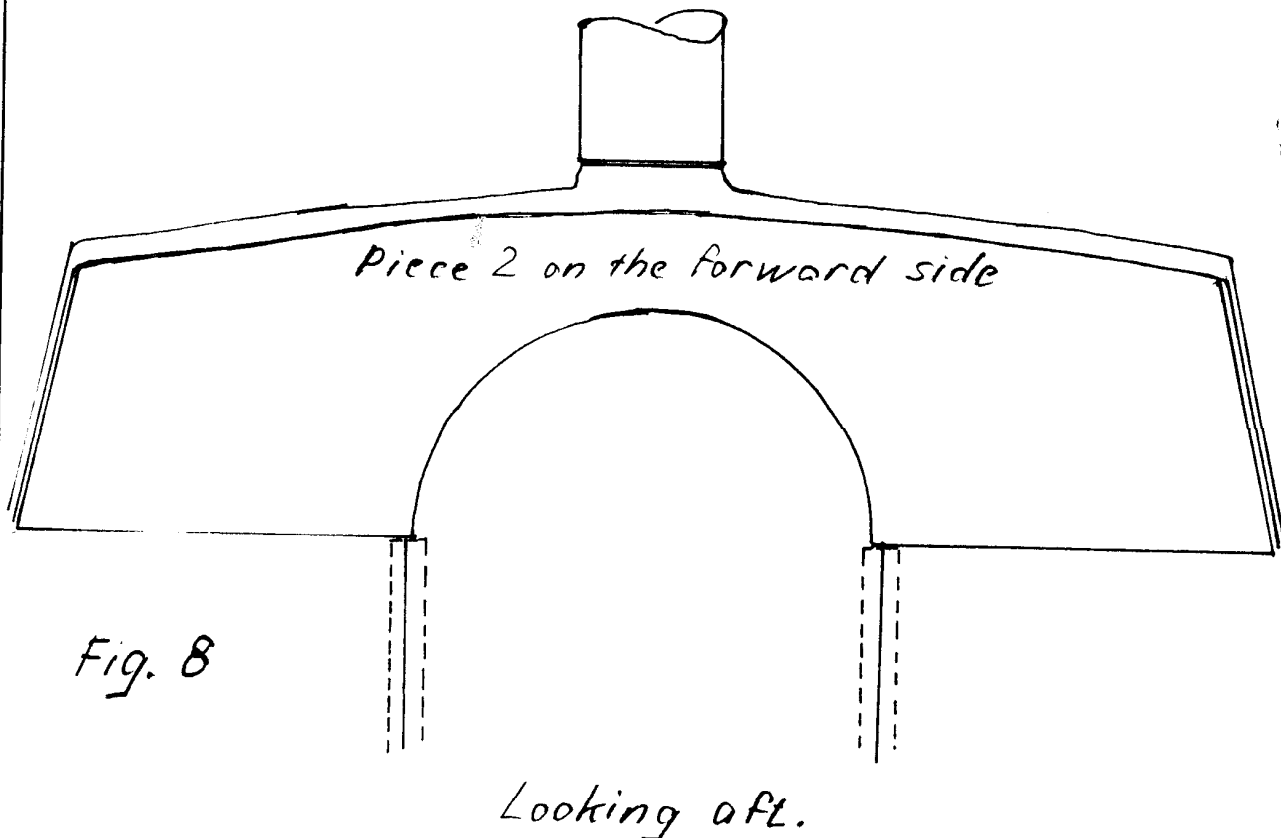
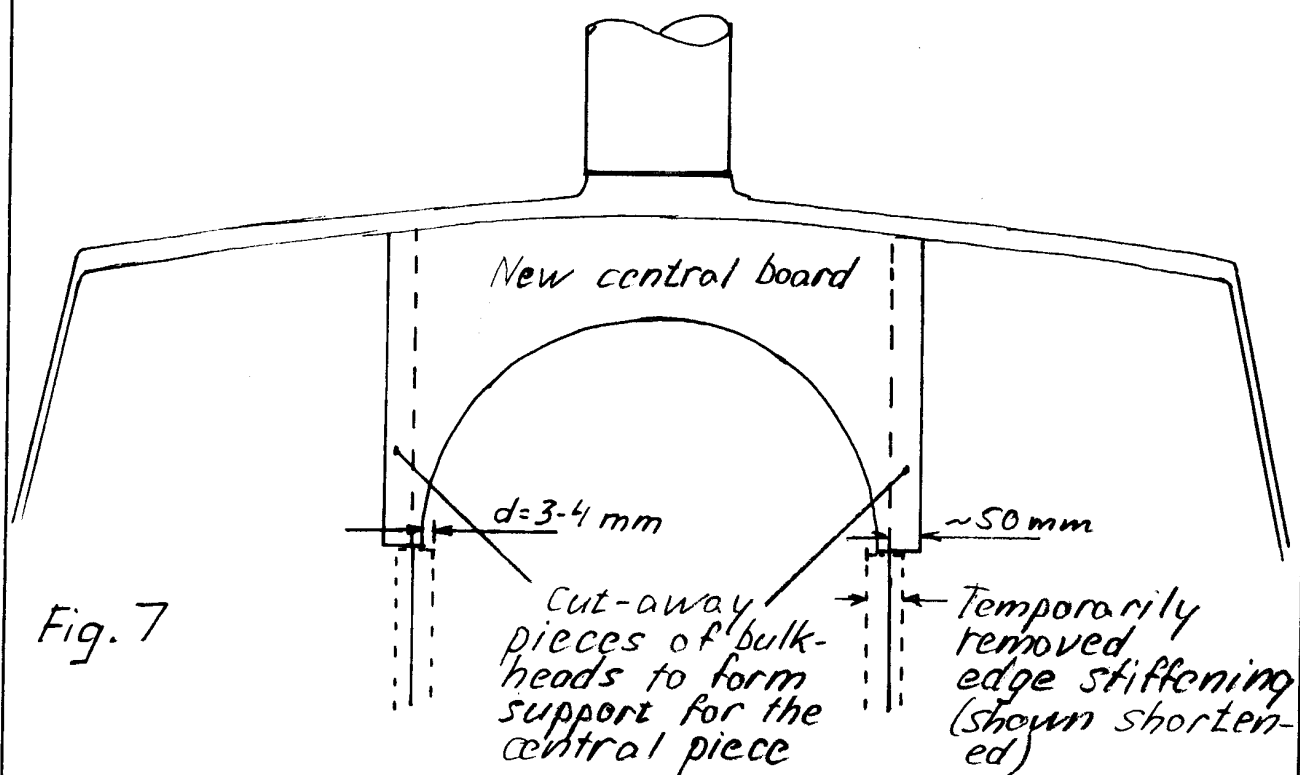


Fig. 6

Looking aft



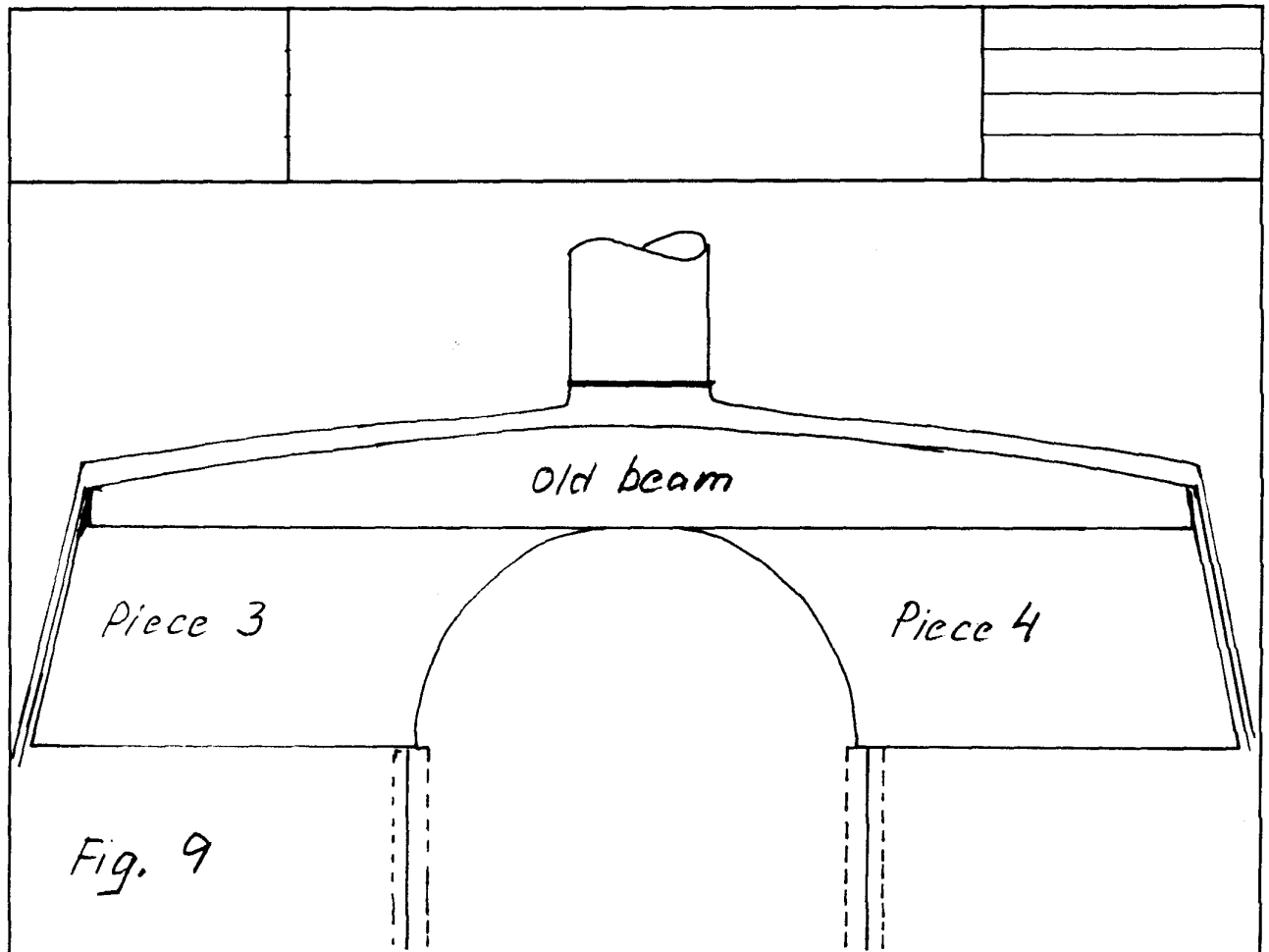
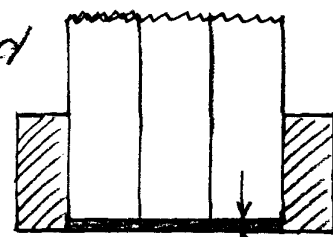


Fig. 9

Looking forward



$d=3-4\text{ mm}$

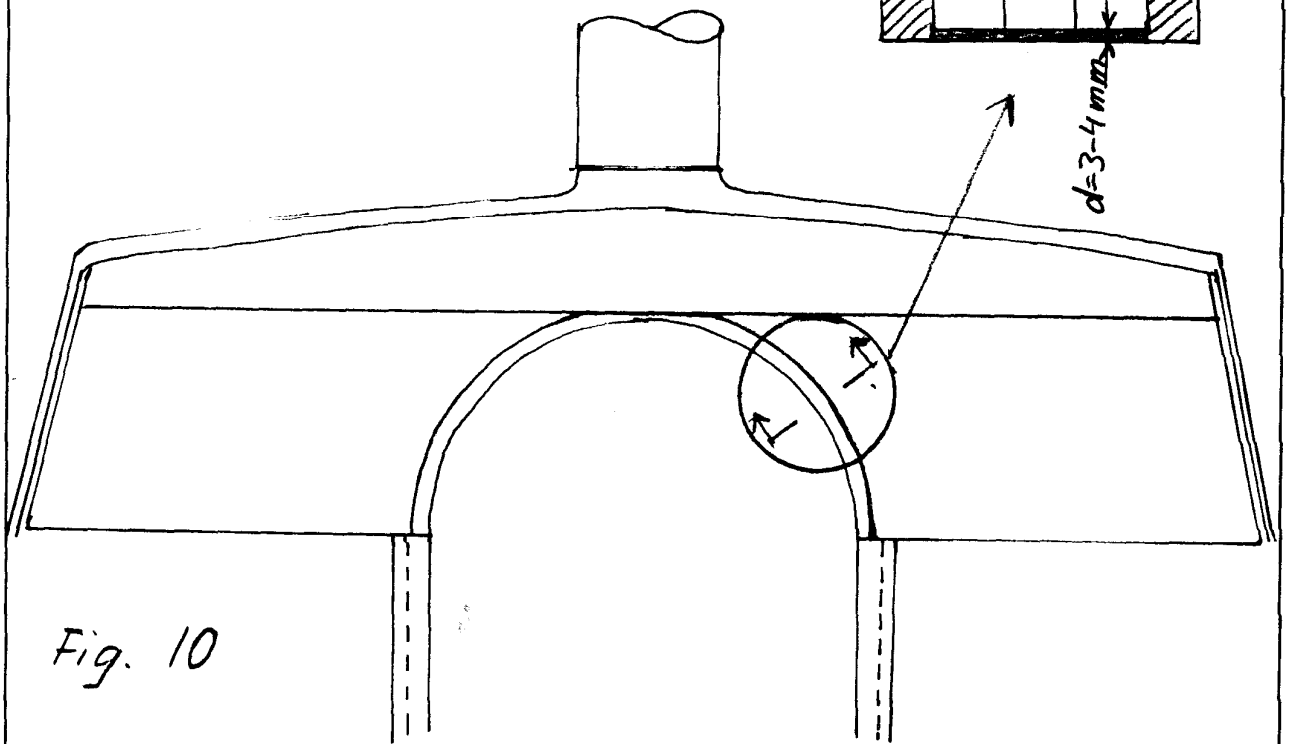


Fig. 10

Looking forward

MISCELLANY

Cockpit coaming has reinforcement for extra winch.

Small flap taped over diesel ignition key eliminates temptation to turn engine off by key (thereby ruining alternator).

Strip of tape marking neutral position of shift lever assures gear in neutral for less discerning ears.

Faucets in cabin and head sinks can be moved up or down.

Plastic window on dodger cracks easily in cold weather or when repeatedly folded. Handle with care.

Don't lubricate arm on forward hatch support, or it will never again hold up hatch cover.

Spreader ends must be seized tightly around upper shrouds to prevent spreaders from flipping up under load.

There is a hook on the old type cockpit bilge pump that breaks and has to be brazed. Also, washers are not available for it; not made anymore. I used a plain rawhide shoe string, which just fits in the groove. It is 1/16" deep. Cut to measure. Cut ends on the bias and epoxy in the groove. Lubricate frequently with a silicone spray.

- Jack Berle

I disconnected the old cockpit bilge pump and sealed the bottom tube off with a rubber stopper. I clamped a hose extension to the existing hose from the bilge and ran it up into the lazarette, with plenty of extra length to reach into the cockpit for discharge. To the end of the hose extension I connected a Guszler 500 pump, which I store in the lazarette between uses.

- Art Levin

I can't see my bilge, but I had water in the bilge and could not find where it was coming from. I discovered that the drain on the cockpit seat where the hose attaches underneath had a broken fitting so that the hose was hanging down and draining into the bilge.

- John Romary

At the bottom of all shrouds it is worthwhile to put a little silicone each season; otherwise they get rusty. Put it at the top of the turnbuckle.

- Sam Amoss

In towing or being towed, especially when hard aground, put the line around the base of the mast.



If you need to replace the "VENT-O-MATE" ventilator on the forward cabin trunk, you can secure a replacement from BOAT/US. Item numbers and prices (1987) are:

<u>Item #</u>	<u>Item</u>	<u>Member Price</u>
140006	Entire ventilator with plastic cover	18.50
140008	" " " ss "	35.50
140007	Plastic replacement cover	6.25
140010	Stainless steel " "	26.00

Whenever the cockpit sole is removed, but at least annually, liberally grease all the movable control linkages belowdecks. Don't forget to check the stuffing box for grease.



A source for new burners for the ORIGO alcohol stove is:

Elvstrom USA, Inc.
Guilford, CT 06437

Telephone: (203) 453-6595

"AQUARIUS" was struck by lightning a short time ago. I had a chain over the side from the mast base. The radio antenna was melted, steaming light exploded (!), radio fuse was blown, and my depth sounder and knot log were gonzo! I was concerned about the propane and gasoline aboard because I didn't want "AQUARIUS" to become another "Challenger!" Obviously, there was no problem.

I contacted SR Instruments and was informed that usually after a lightning strike the devices cannot be repaired. They sold me a new depth sounder for dealer cost - \$190! Retail was \$295!

- John Cleveland

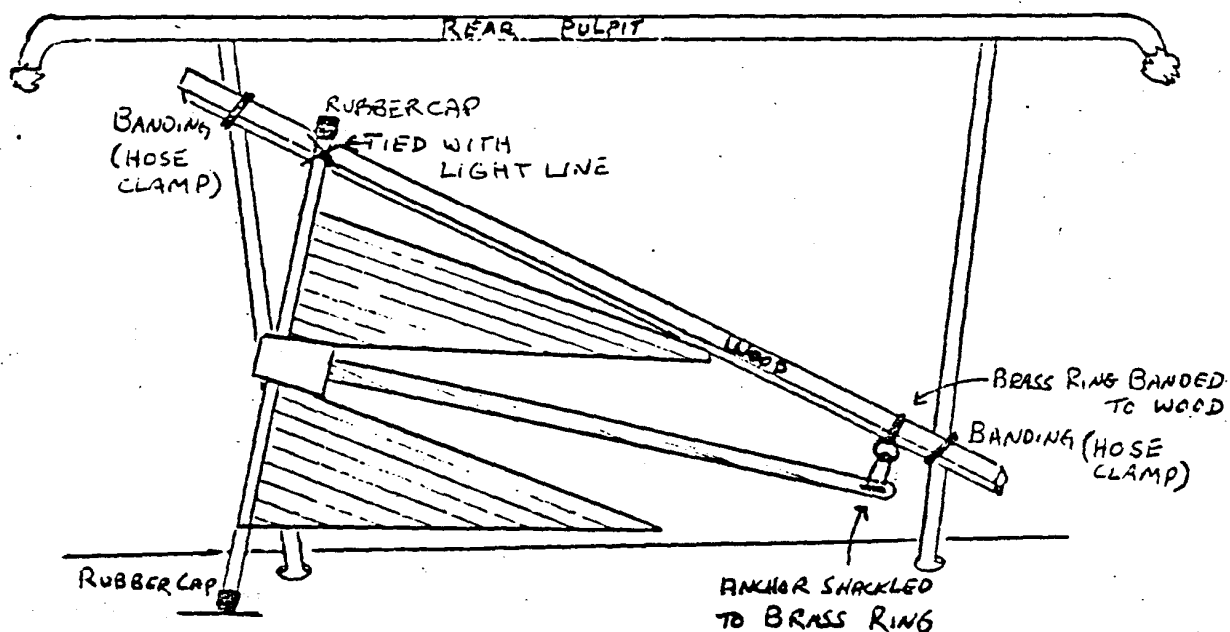
A very few Vega owners have installed a Sailor model, long shaft outboard engine on a stern bracket when the inboard engine died. One owner reported satisfactory operation, but recommended a 9.9 H.P. engine rather than the 7.5 H.P. he had installed. Another owner used an outboard for about a year and then went back to inboard power. The aesthetics may not be great, but economics may dictate this as a viable option.

Have you tried:

- Attaching a pair of aluminum shelf brackets with removable arms to the partition just forward of your stove so you can use the stove cover as a shelf?
- Using zinc-coated thumb screws (any hardware store) on your traveller instead of the large knurled bronze set screws?
- Using your stove in the cockpit on a hot day?

* * *

For ready access, I now keep my big #22S Danforth anchor tied to the stern pulpit just outside the coaming. I banded with hose clamps a long piece of wood to the rear pulpit uprights, and tied and shackled the anchor to this wood support, as illustrated in the drawing. In initially setting up this arrangement, it may be necessary to reposition the wood support to get the best fit of the anchor. This setup does not present an attractive appearance, but the anchor has always been very secure, even in the roughest weather.



P.S. My little lunch hook (#13S) is kept at the bow pulpit on an "Anchor Loc".

- Sid Rosen

We carry two 20# Hi-tensile Danforths and stow them on the rail of the stern pulpit, one on each side of the stern light. The line from the anchor is led outboard and forward to bow chock, then to one of the jam cleats or the stern bit. This permits us to do our anchoring from the cockpit, and we can then readily use a sheet winch when we heave in to short stay.

We have found our biggest difficulty in approaching a dock is the loss of orientation when we lean down to operate the engine control lever. Many remain erect and in control by handling the lever with their feet; however, we don't seem to have mastered that skill. After some six or seven years of sweating this problem, the light finally broke through. I took a 3-foot length of bamboo, removed the ball on the lever, and slipped the bamboo over it. You can use a piece of pipe, if you choose. We can now stand erect, keep our eye on the job, and control the engine with the greatest of ease. Try it -- you might like it.

- Bruce Carr

Servicing Single Speed Lewmar Winches #6,7,8,10

Lewmar winches are simple and designed for easy maintenance. Nothing will fly apart or jump out when the drum is removed. Even the bearings can be accidentally dropped without damaging them.

The drum is retained by a circlip recessed into the spindle on the top. Lift one end of the clip by inserting a knife blade or screwdriver, and wind the circlip from the groove. The drum can then be withdrawn from the base. Take care not to stretch or distort the circlip.

Clean off old oil, grease, and caked salt from gears and roller bearings with a fine brush dipped in kerosine. Dry with a clean non-fluffy cloth. Oil all pawls and ratchet gears, and lightly grease roller bearings, drum bore, and gear teeth.

Reassemble winch in the reverse sequence of dismantling. Examine the circlip for distortion or damage, and replace if necessary. It must fit firmly in the recess which retains it. Spare circlips are readily available from marine supply stores that carry Lewmar winches.

Recommended lubricants: Lewmar grease (7010), Lubriplate Marine Lube "A," etc.; light machine oil (3in1, or equivalent).

Spare Kits:

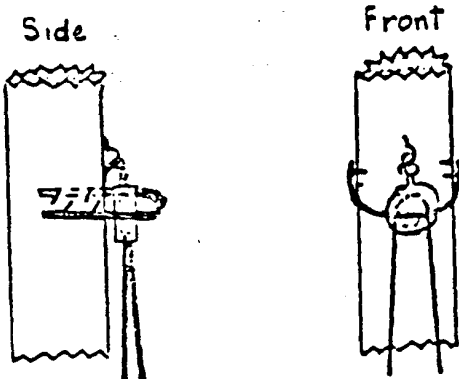
- 7001 - single speed winches except 5/8 socket #8.
- 7002 - two speed and small self-tailing winches
up to and including #42ST except 5/8 socket #16.
- 7008 - various circlips.
- 7009 - Allen key set.
- 7010 - grease.

Repair of winches should not be undertaken without reference to the full service manual, which is available from the nearest Lewmar service point at \$3.00/\$6.00, or from the following

Distributors:

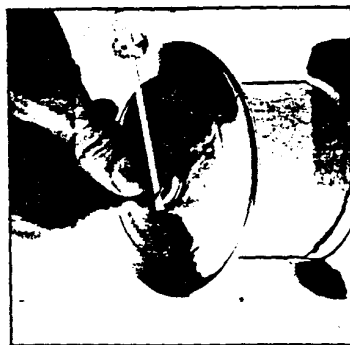
- East Coast - Lewmar Marine, Inc.
Airport International Plaza
125 Wilbur Place
Bohemia, Long Island, NY 11716
(516) 567-7770
- South Coast - R.B. Grove, Inc.
261 Southwest 6th Street
Miami, FL 33130
(305) 854-5420
- West Coast - Lewmar Marine, Inc.
4009 Segerstrom Avenue
Santa Ana, CA 92704
(714) 979-5413
-

Having purchased a 2"-diameter adjustable whisker pole, I later found it to be too heavy to use in light winds. The weight of the pole would pull down the clew of the jib/genoa and cause the sail to flatten out and to be close to the hull. The obvious solution was to add a topping lift for the pole. This was effected by shackling a block to the pad eye above the navigation ("steering") light on the mast. Once installed, different problems arose, since the loosened mainsail topping lift constantly fouled on the block. Sometimes, when taking down the jib, while the jib halyard was still loose and flopping about, the jib halyard would also foul the new block. To circumvent this, I plan to rivet a large bail (to act as a guard) around the forward part of the mast and outside the block. This will keep the rest of the running rigging away from the block since they will be outside the guard.



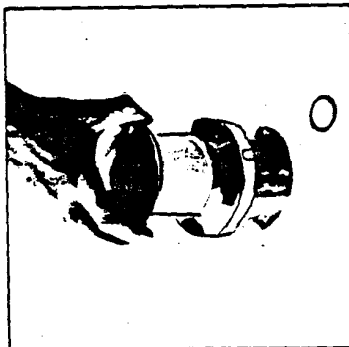
- Sid Rosen

Servicing Single Speed Winches 6,7,8,10



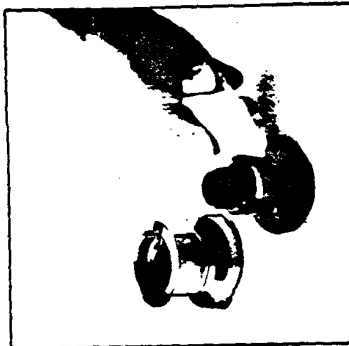
1

Remove the circlip with a small screwdriver or knife blade.



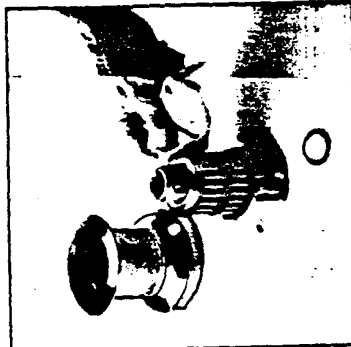
2

Lift off the drum



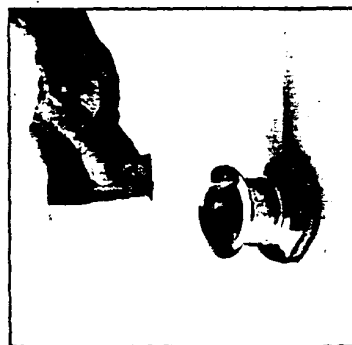
3

Wash centre stem & drum with kerosene. Dry with a non-fluffy cloth.



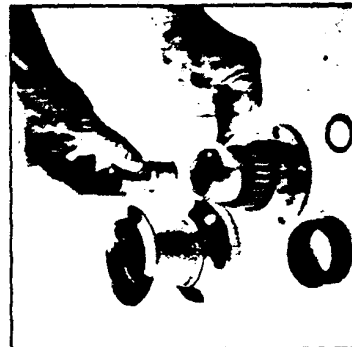
4

Wash centre stem, roller bearings & drum bore with kerosene. Dry with a non-fluffy cloth



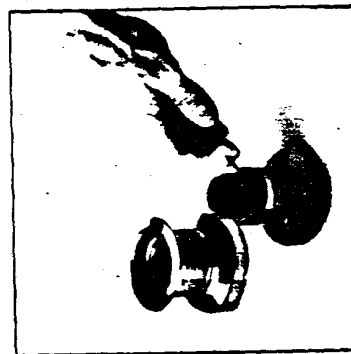
5

Nos 6,7,8 & 10
Lightly oil the upper & lower pawls



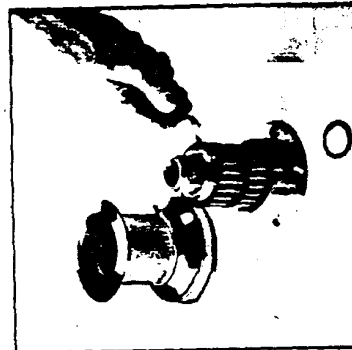
6

Nos 6,7, 8 & 10
Remove centre spindle key, slide out spindle & grease lightly



7

Nos 6 & 7
Lightly grease centre stem.



8

Nos 8 & 10
Lightly grease roller bearings.

Reassemble winch in reverse sequence to above.
Check for correct operation.

Continued on next page

SERVICE MANUAL

A full service manual is available from your nearest Lewmar Service point (Price \$3.00/\$6.00). Full servicing of any winch should not be undertaken without reference to this manual.

DISMANTLING

Lewmar winches are simple & designed for easy maintenance. Nothing will fly apart or jump out when the drum is removed - even the bearings can be accidentally dropped without damaging them.

STANDARD WINCH NOS 6,8,10,16,24,25,30,40 & 42

The drum is retained by a circlip recessed into the spindle. Lift one end of this by inserting a knife blade or screwdriver, and wind the circlip from the groove. The drum can then be withdrawn from the base. Take care not to stretch or distort the circlip.

SERVICING

1. Clean off old oil, grease,,and caked salt from gears & roller bearings with a fine brush dipped in kerosene.
2. Dry with a clean non-fluffy cloth.
3. Oil all pawls & ratchet gears.
4. Lightly grease roller bearings, drum bore and gear teeth.

ASSEMBLY

Reassemble your winch in the reverse sequence to the order of dismantling. Examine the circlip and ensure that it has not been expanded unduly. It must be a firm fit in the recess which retains it. Spare circlips are readily available from your nearest Lewmar dealer. Keep spare circlips on board. Make sure it is not damaged and seats in the groove correctly.

RECOMMENDED LUBRICANTS

Grease: Lewmar grease (7010)(Lubriplate Marine Lubs "A" etc)
Oil : Light machine oil (3 in 1 or equivalent)

TOOLS REQUIRED

Small screwdriver or knife blade
Clean non-fluffy cloth
Cleaning fluid
lubricants

Nick and Jenny Coghlan have been voyaging in the Pacific in TARKA THE OTTER (#1639) for many months, visiting all the legendary islands we only get to read -- and dream -- about. The NEWSLETTERS have been carrying reports of their progress so we all can enjoy the voyage vicariously. They have learned a great deal about their VEGA, and have many tips to pass on about deep-water sailing, including sail combinations and self-steering with a NAVIK vane, reefing and sail changing, water tightness, navigation lights, bottom paint, engine maintenance, interior maintenance, water use and storage, chafe, power consumption, lots of miscellany, and the overall offshore performance of the VEGA.

Queries can reach them c/o Shawnigan Lake School, Shawnigan Lake, B.C., Canada VOR 2W0 (altho a reply will take some time).

A Simple Sailing Awning

by karen sides

If Old Sol's scorch gets you down, here's a cool solution

It was one of those mercilessly hot, deadly calm summer days when the sun beat down on us, frying our brains and burning our skin. We found ourselves unthinkingly reciting passages from *The Rime Of The Ancient Mariner* regarding shrinking boards and slimy seas as we stared over the side, counting the blades of turtle grass on the bottom to affirm that we were still moving.

It became abundantly clear that we needed a real sailing awning, not just one of those glibby affairs one drapes all over the boat when anchored. We set about designing "an ideal awning" that would not only provide shade but would also withstand the gusts of a squall, be quick to put up and take down, and allow one to safely stay inside the lifelines when going forward. We felt, that, ideally, it should also provide

some protection from rain, be tall enough under which to stand and store easily and compactly on deck or below. It definitely had to be simple to make and inexpensive.

The awning we devised certainly is simple and costs very little. It consists of two lengths of PVC pipe, four T-joints, fabric and eight grommets. The only tool required is a saw.

The final product makes the cockpit look somewhat like a covered wagon, with the PVC pipes forming an arc, which is covered with material. The PVC pipe supports for the awning rest on the lifelines; light lines attached to the four corners and the center front and back of the awning hold it in place.

We usually attach the forward center line to the mast and the aft one to the backstay using a clip. We can attach the aft one to the rudderpost if we're

going to be tacking often, otherwise we just unhook and rehook it when we come about. The four corner lines are attached to stanchions or whatever is convenient.

With a little ingenuity the basic design can be adapted to almost any boat with a lifeline. The actual placement of the awning supports will vary on each boat, but for the best support it is a good idea to place them near a stanchion. For an awning longer than eight feet it may be advisable to place an additional support in the center to avoid sagging.

Awning

Step 1: Measure the desired length and width of the awning. Add one foot (for a five-inch sleeve along the fore and aft edges plus one inch to turn under for the seam.)

(continued)

Step 2: Cut two square or rectangular pieces of any suitable material, such as a Vivatex or Sunbrella, to these specifications.

Step 3: Lay the pieces side by side along the center edge. Hem one edge and overlap the center line edges by one inch and sew them together.

Step 4: Fold under and sew a $\frac{1}{8}$ -inch hem along the port and starboard edges.

Step 5: Fold under a six-inch sleeve allowance on the forward edge but do not sew yet.

Step 6: Punch a grommet hole through both thicknesses at the center seam about $\frac{3}{4}$ -inch from the folded edge so that the tie-down line can go around the PVC pipe for added pulling strength. Then, make a mark in each corner $\frac{3}{4}$ -inch from the folded edge and $\frac{1}{4}$ -inch from each side. Punch a grommet hole through a single thickness where marked. The material from the fold will show through the hole in the top layer of material. Do not cut through the second layer or you will have two holes on each side.

Step 7: Unfold the sleeve allowance and put a grommet in each of the four holes (two at the center and one at each side).

Step 8: Refold the sleeve allowance, turning under one inch on the raw edge, and sew. Repeat Steps 5 through 8 for after edge.

Awning Support

Step 1: Cut in half a 20-foot piece of $\frac{1}{2}$ -inch diameter thick-walled PVC pipe.

Step 2: Push the two pieces together using the built-in coupling in one end of the pipe.

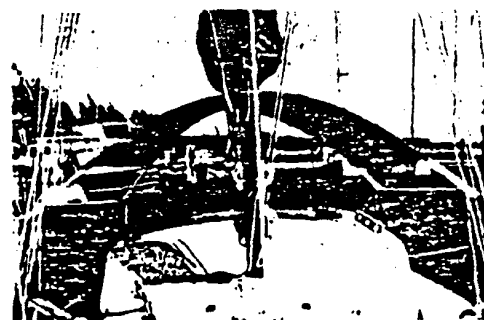
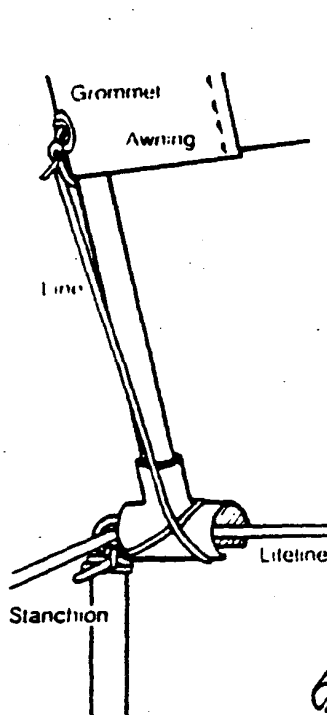
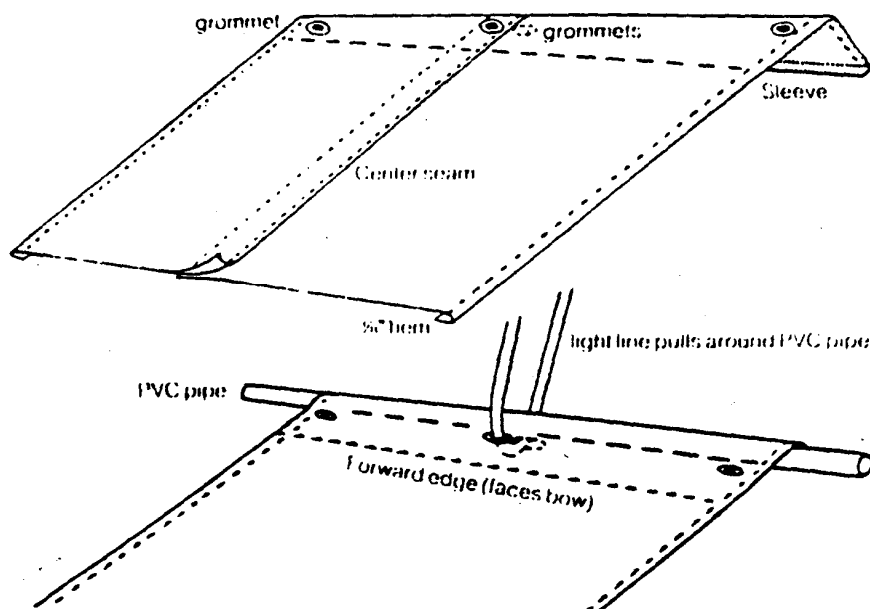
Step 3: Get a rough estimate of the finished length of the support by bending this pipe in an arc from the port to the starboard lifeline at the point where the forward edge of the awning will be. (You will fit it exactly later, so better too long than too short at this point.) Cut the PVC pipe to roughly the desired length. Repeat for the aft awning support.

Step 4: Cut a $\frac{1}{2}$ -inch wide piece out of the long edge of each of four T-joints for $\frac{1}{2}$ -inch PVC pipe.

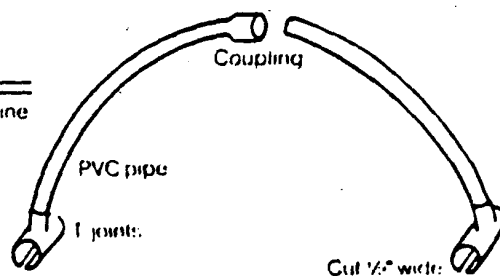
Step 5: Push the awning supports through the sleeves in the awning and attach a light line long enough to reach the stanchions to each of the corner grommets. The center lines should go around the PVC pipe for added pulling strength.

Step 6: Slip the T-joints on the ends of the supports.

Step 7: Fit the awning on the boat. Carefully measure and cut the ends of each side of the awning supports until you get the fit you want.



Although the finished awning makes the cockpit resemble a covered wagon, it provides shade while sailing as well as at anchor under a variety of wind conditions.



Attach the four corner lines to the stanchions. Make sure the top clears the boom so that you avoid the possibility of wearing a hole in the awning or the furled sail.

In our usual southern Florida and Bahamas cruising areas we leave our super simple sailing awning up just about year-round, so we've had an opportunity to test it in a variety of conditions over the past several years. It just seems to bend with the wind and we feel reassured knowing that it will withstand a sudden squall. However, it can be taken down and lashed to the top of the doghouse in seconds or,

given a little extra time, it can be taken apart at the couplings and stored in a compact package below. It's also inexpensive enough that, should we ever get into any real trouble, we would cut it loose and throw it over the side.

Best of all, in a simple and inexpensive way, it provides cooling shade so there's no more burned skin or fried brains.

Karen Sides, of Key Largo, Florida, has cruised the Bahamas and Florida Keys for 10 years with her husband. The awning pictured in this article has been in use for the past three years aboard Lyra, their 27-foot Swedish-built Vega

Pierce Reed (GALE III) sent us the following data - showing how to construct a cradle for the Vega.

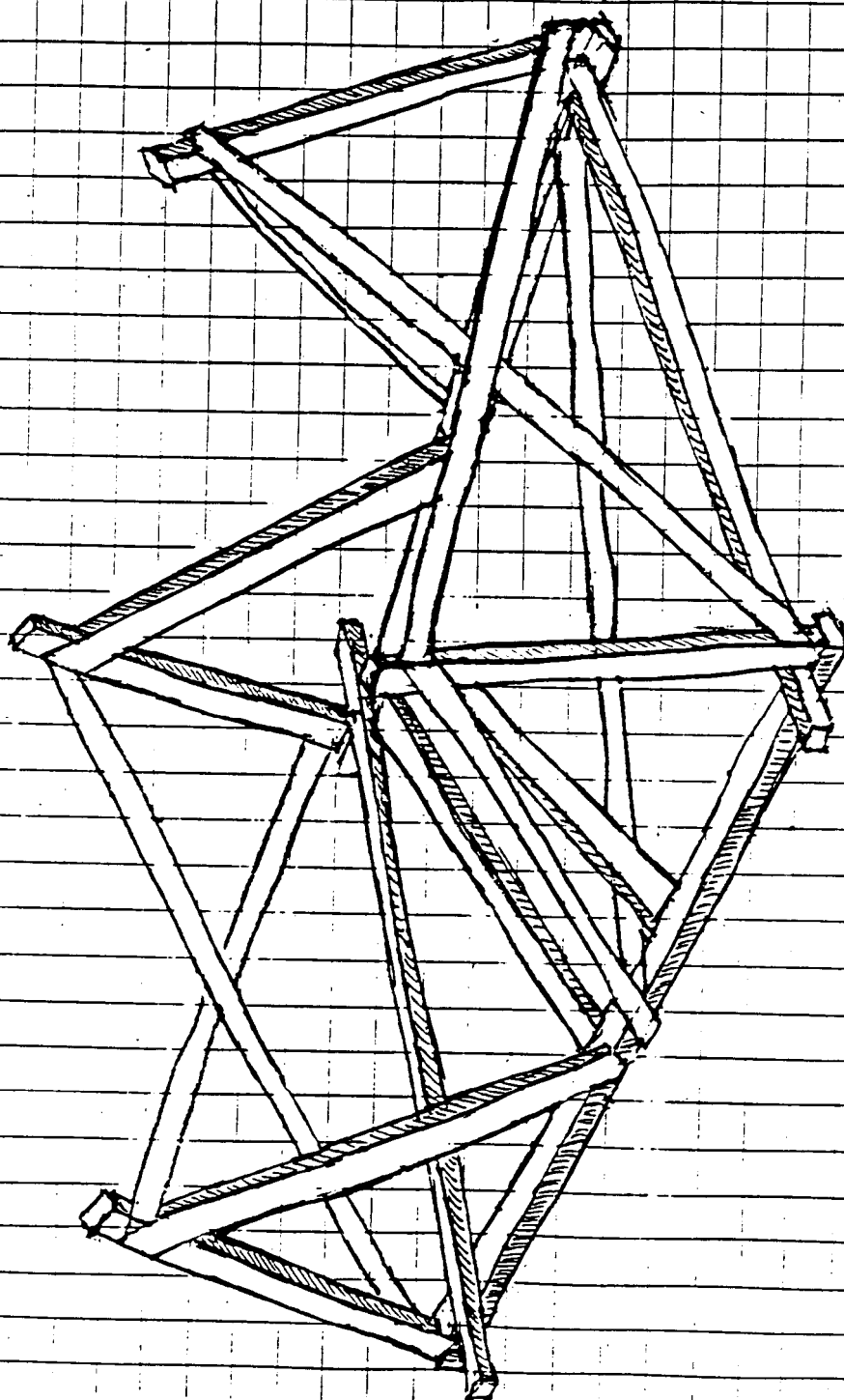
VEGA

SHIPPING CRADLE FOR

MADE OF HARDWOOD.

THIS ONE HAS LASTED 10 YEARS

& HAS BEEN TAKEN APART 3 TIMES & STORED

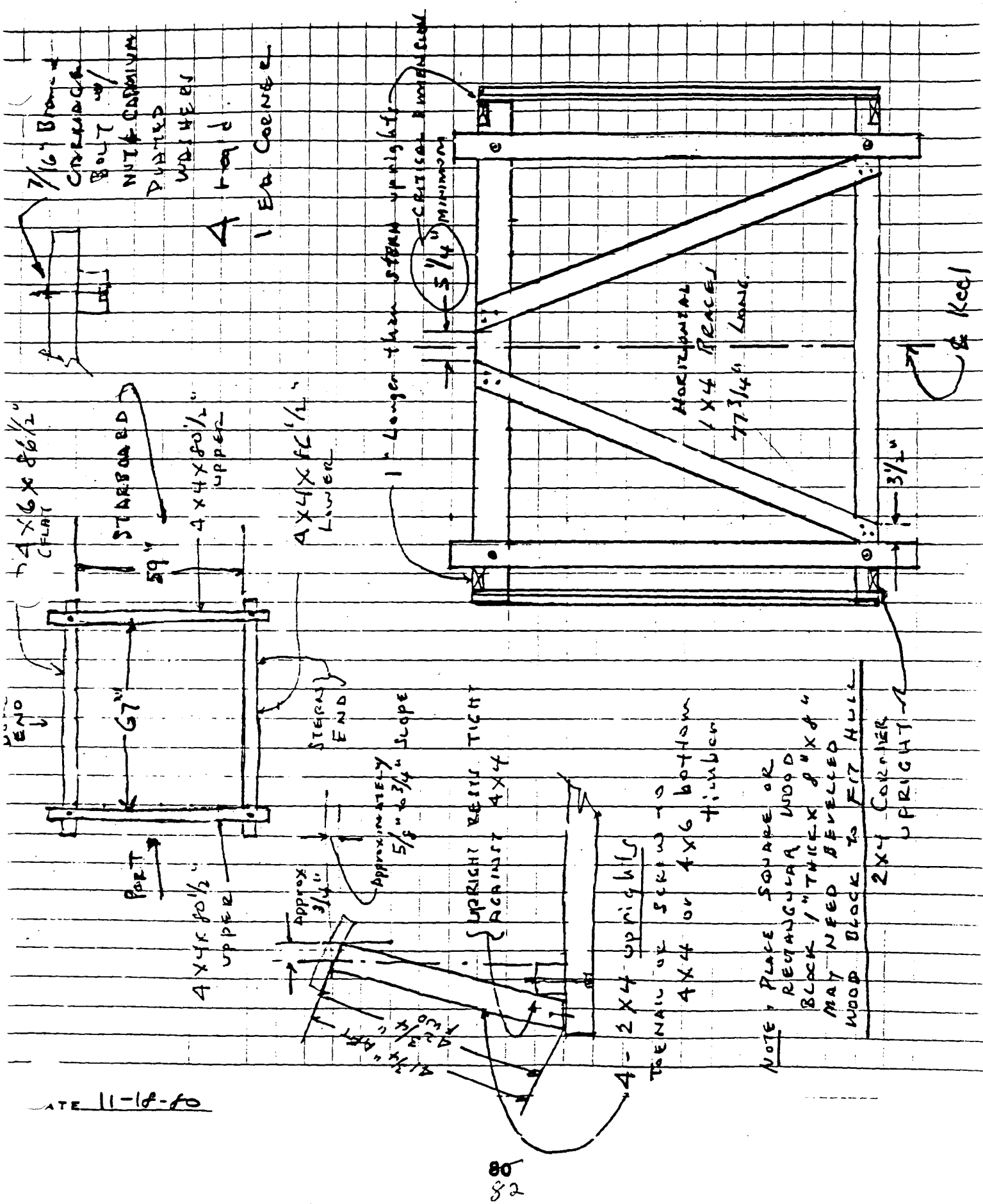


Dear Sir -

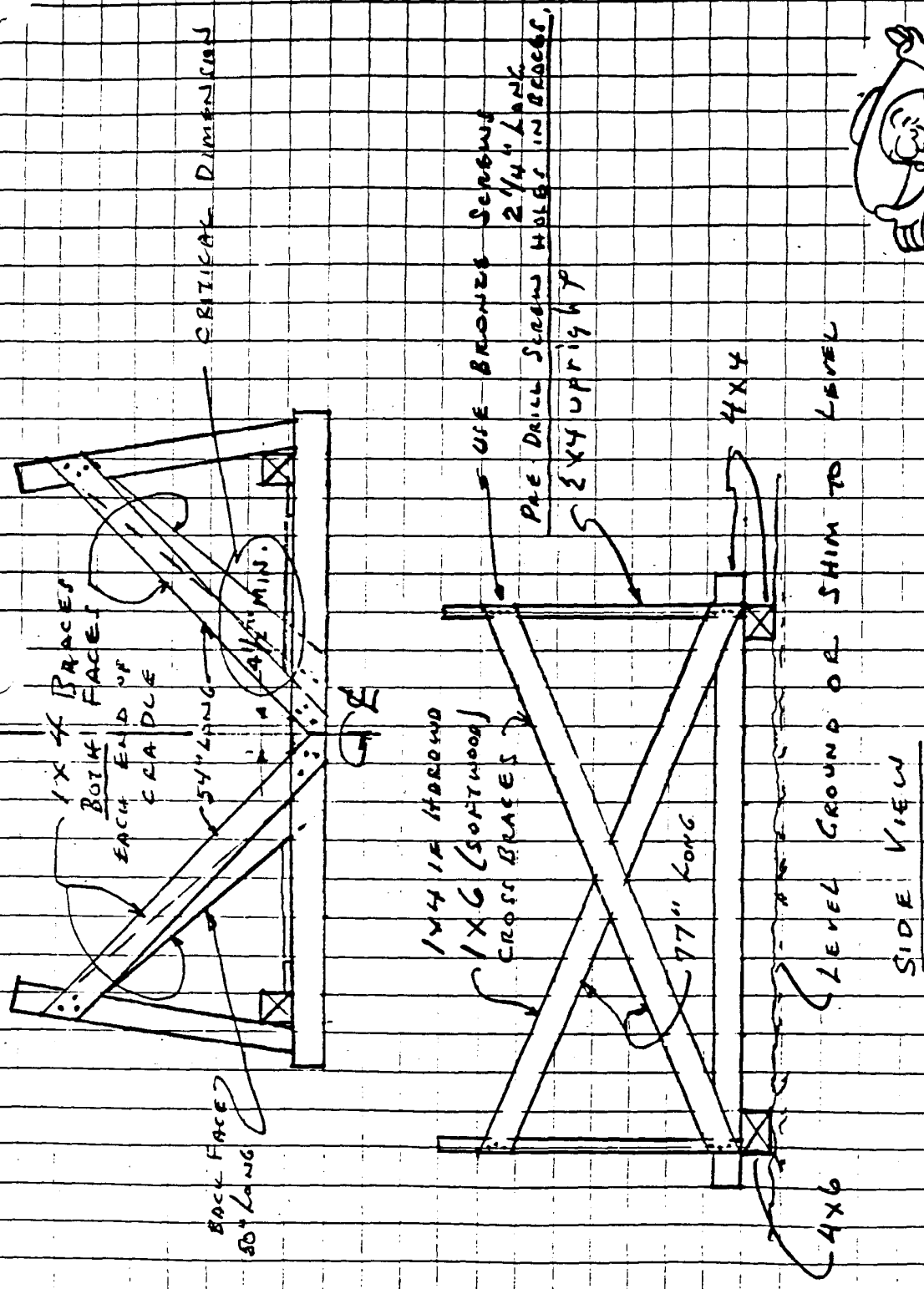
THIS WAS DONE IN A HURRY & IS A VERY
ROUGH SKETCH - BUT PERHAPS IT WILL HELP

Pierce Reed

ATE 11-18-10



NOTE: PLACE SQUARE OR RECTANGULAR WOOD BLOCK 1" THICK 8" X 8" MAY NEED BEVELLED WOOD BLOCK TO FIT HULL



NOTE: UPRIGHTS & TIMBERS
MUST BE OAK & FULL SIZE

