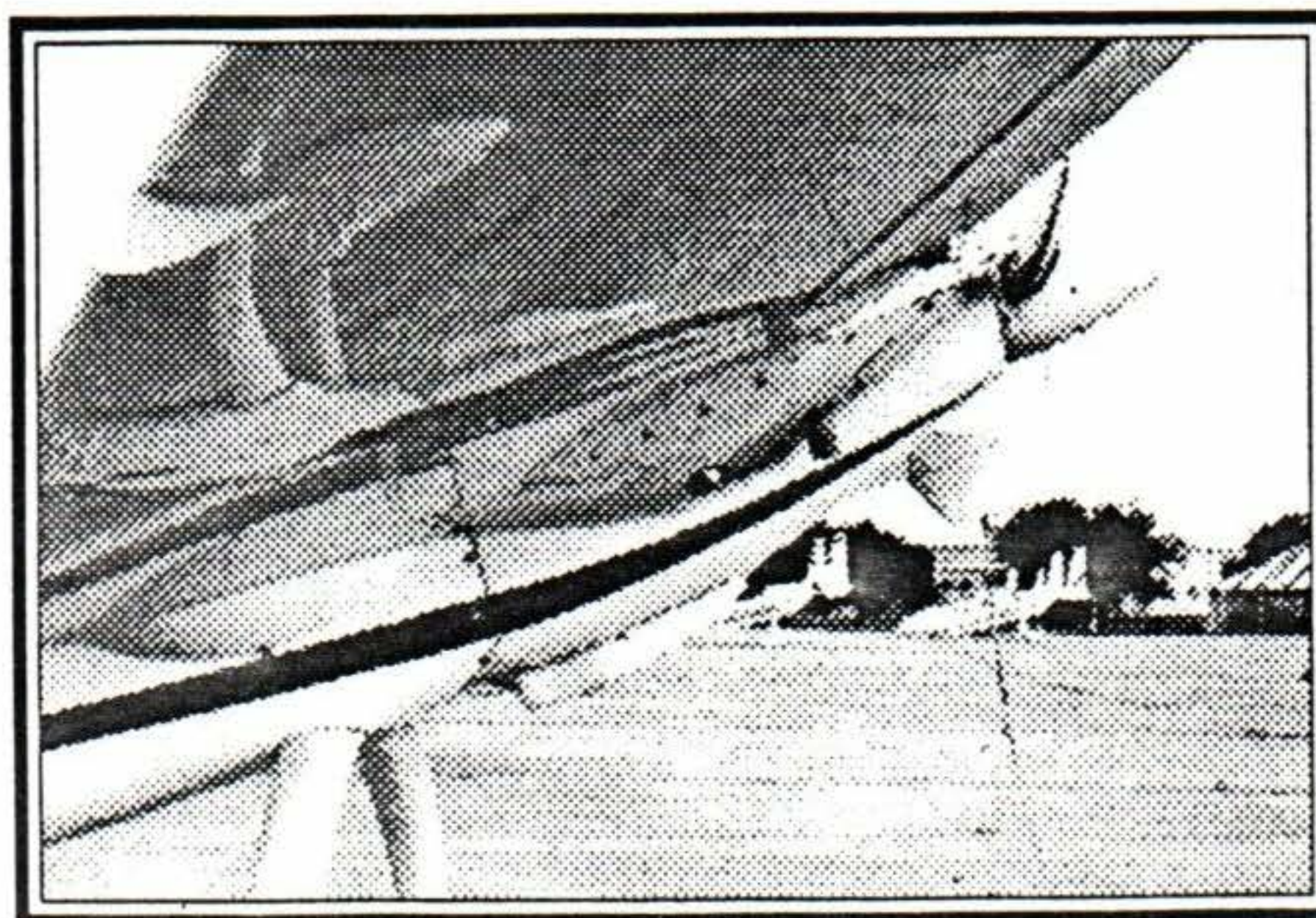


LEZ Tom Dewett  
 Down Draft Cooling? a d / eo



We have all become accustomed to seeing updraft cooling on our EZs and it's hard to consider something else. Well check this one out. Without the protruding male scoop or female inlet there is an almost straight run of smooth air to the propeller. That should improve prop efficiency a great deal. We need an article on this fine installation. I'd appreciate it if the builder would oblige by writing an article for the membership. I'm sorry I didn't get the owner's name.

Note the cooling air outlet doors close up completely for low power rapid descent.



Thanks Vancell!

Herb Sanders (GA) - I was glad to see that you honored Vance Atkinson for his articles and participation in CSA. Many people may not have stopped to consider the significant value we get from Vance, Ken Miller, and others who do the same testing.

When a new system comes out that we all have an interest in and someone is willing to buy the system, go to the work of installing it, experience the risk of injury, death, or even worse (loss of his EZ), foot the fuel bill and expenses to do the flight tests, and then give us an unbiased report of the performance and results, we are certainly getting a lot for our nickel.

AMEN Herb!!

### More Landing Gear Shake

✓ Baine Whipkey (GA) - I have heavy duty Cleveland wheels and brakes on my Long-EZ. While doing taxi tests I experienced SEVERE vibration when braking from 40 mph on down. I checked disc run-out and found each one at more than .020". I called Cleveland and found their run-out limits were .020". They checked my set and found my discs were good but replaced both of my wheel assemblies.

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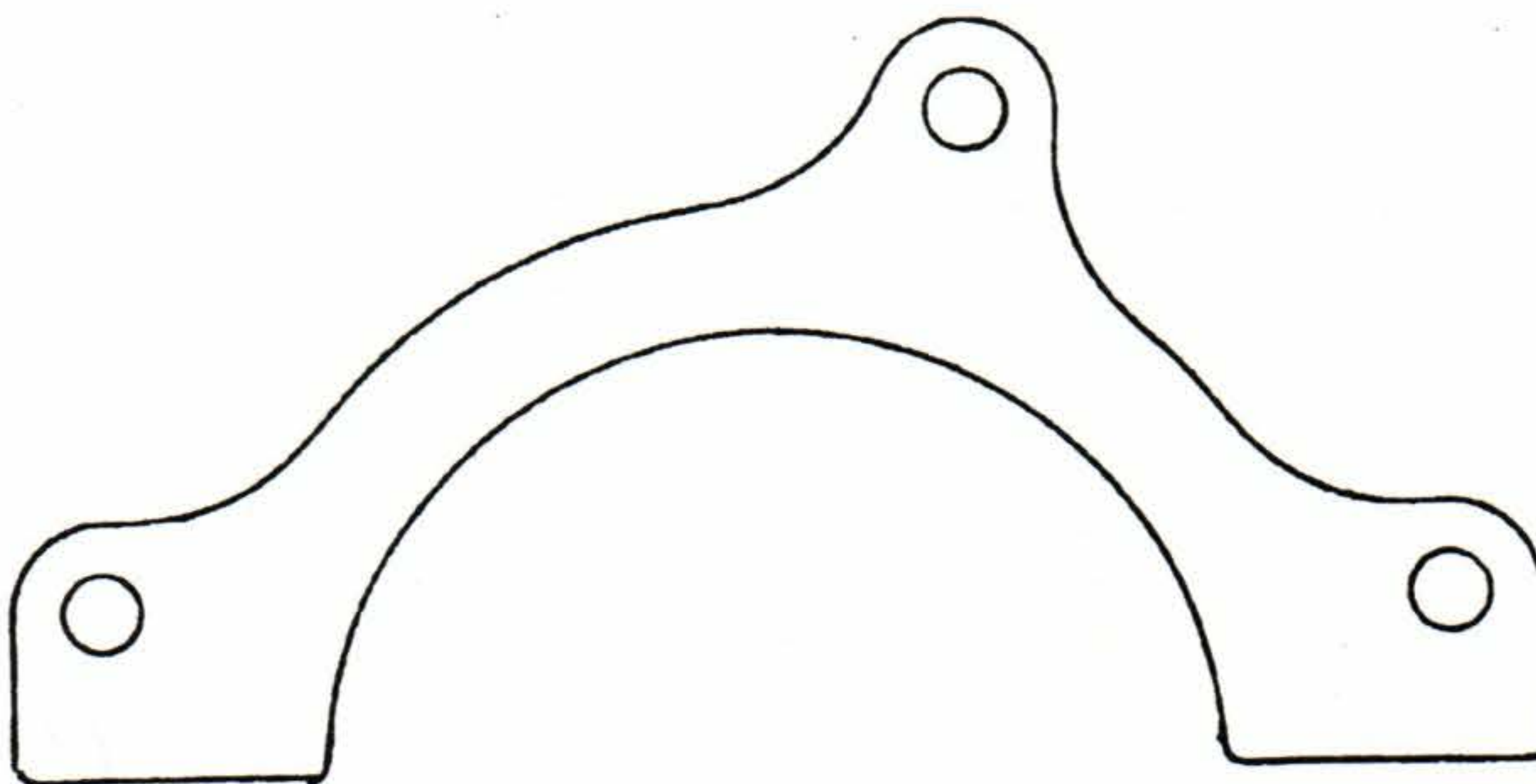
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### Crankshaft Seal Retainer

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*Editor note: If you drill and tap a 1/2" deep hole you'd better use a bottom tap or you may run out of threads before you get the bolt screwed in all the way.*

Reinstall the prop bushings, extension, and prop. You'll now have no more worries about losing your oil.

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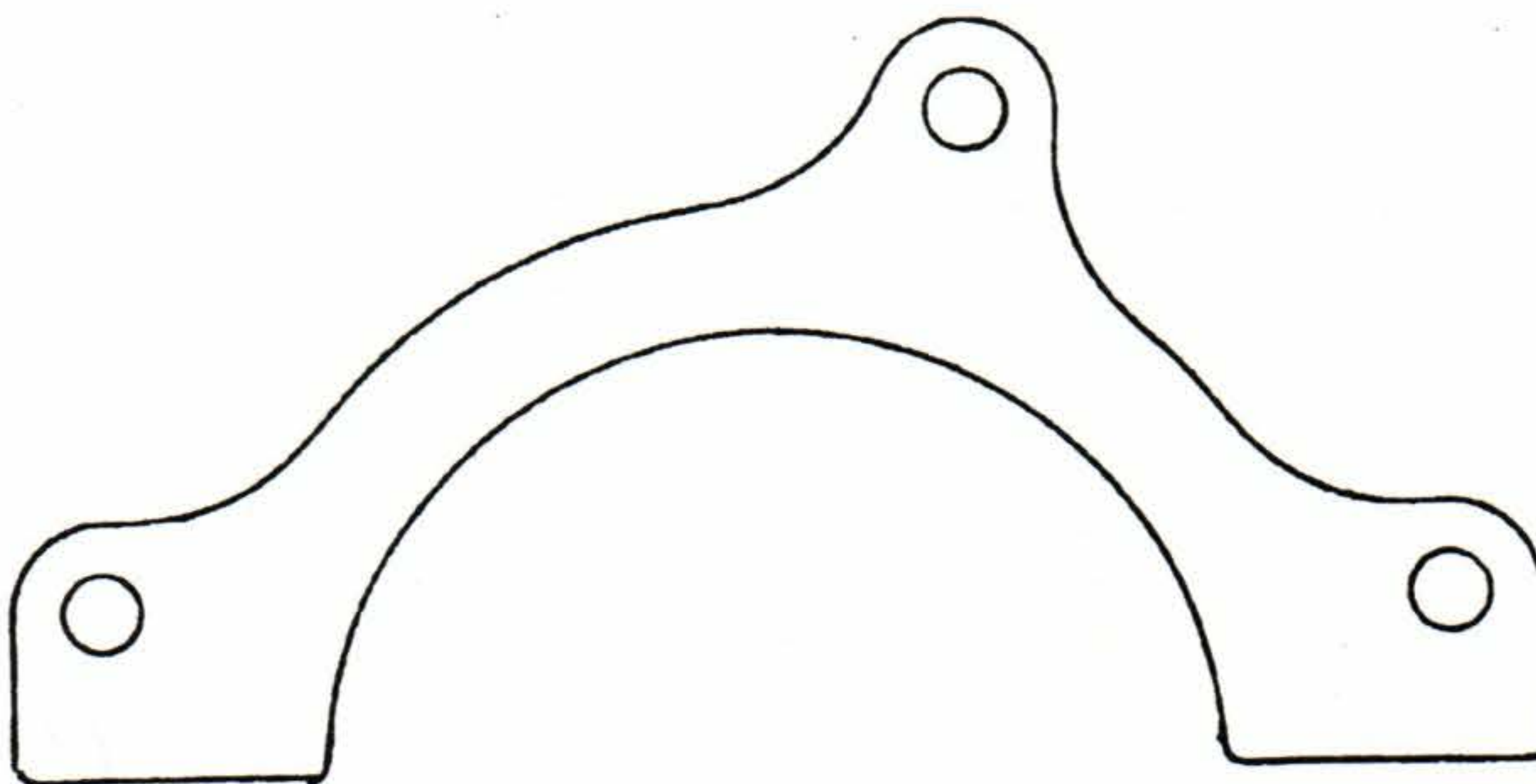
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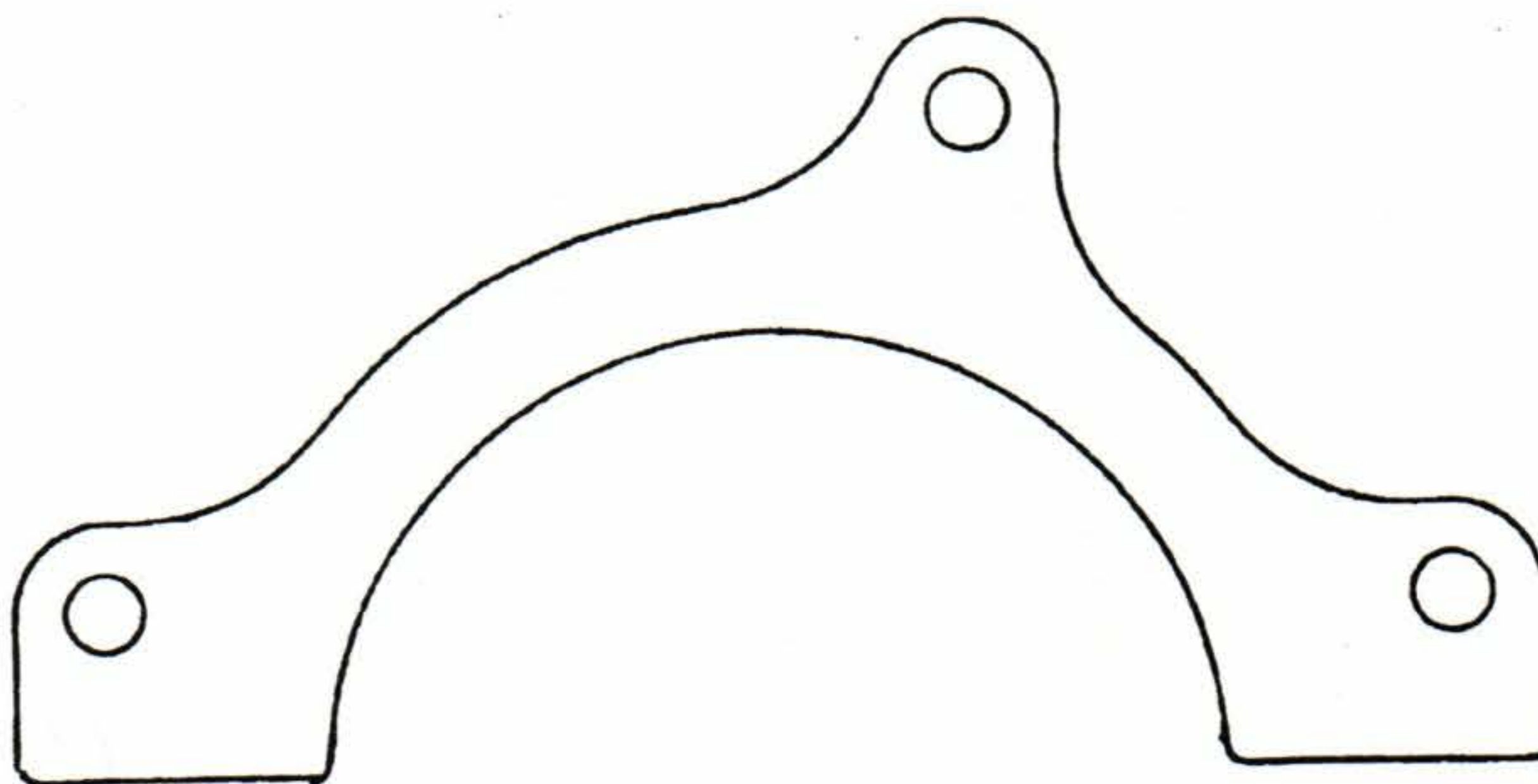
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## Oil Temperature Solved After 8 Years

✓ *Terry Scherman & Ron White (IA)* - My Long-EZ, N38AR, and Terry Scherman's Long-EZ, N180TS, are powered with Lycoming O-290 engines with large 10 row oil coolers mounted on the rear lower baffling. Both installations exhibited excessively high oil temperatures.

Over the years, I've tried various suggestions from other EZ pilots to direct air to and through the cooler. **NOTHING WORKED!**

When the OAT was 50 degrees F or less my oil temperature would be 200 degrees F at 2,400 RPM. If the OAT was over 70 degrees F the oil temperature would run 210-215 degrees F at 2,300 RPM. At air temperatures above 70 degrees F I would lower the engine RPM to keep the oil temperature below 215 degrees F.

I installed a second oil temperature probe at the prop end of the main oil galley. It ran 5-10 degrees F higher than the first one which is located at the output of the oil pump.

Terry moved his cooler above the mags to draw air out of the top of the cowl through a NACA scoop. This helped, but not like we had hoped it would. There was only about a 10-15 degree F temperature drop. A drawback to this cooler location was that the oil from the oil cooler would drain back into the oil sump after engine shut down. That caused the oil pressure to be slow to come up during subsequent engine starts. The oil had to fill the cooler before oil pressure would be had at the bearings. This was a concern because no oil pressure means dry bearings, even if only 5-10 seconds longer every time the engine was started.

Terry was also testing different oil filters since he had the original oil screen on the engine. From this testing he learned that he was getting a large oil pressure drop through the filter, lines, and cooler - over 60 PSI!

The pressure output of the pump was running 130 PSI to get an engine operating pressure of 70 PSI. This pressure was being limited by the 50 PSI oil cooler-filter bypass valve he had built in to the adapter. This told him that if he would not have installed the bypass he could have blown up the filter which was only rated at 150 PSI and it also told him that the oil was by passing the cooler. With cold oil (100 degrees F) the bypass would open at only 1,600 RPM.

At this time a hydraulic flow chart was consulted and showed that the, Rutan specified, - 6 oil cooler hose caused a 50 PSI loss at the Lycoming's 6 GPM flow. The chart also showed that a - 8 hose would have only a 12 PSI pressure drop. I then realized my high oil temperature was caused by lack of oil flow through the cooler not by lack of air flow through the cooler. I next installed - 8 hoses and fittings on my cooler and after 120 hours this summer here are my new oil temperatures:

When OAT is up to 70 degrees F my oil temperature is 100 degrees F above OAT. When OAT is up to 85 degrees F my oil temperature is 105 degrees F above OAT.

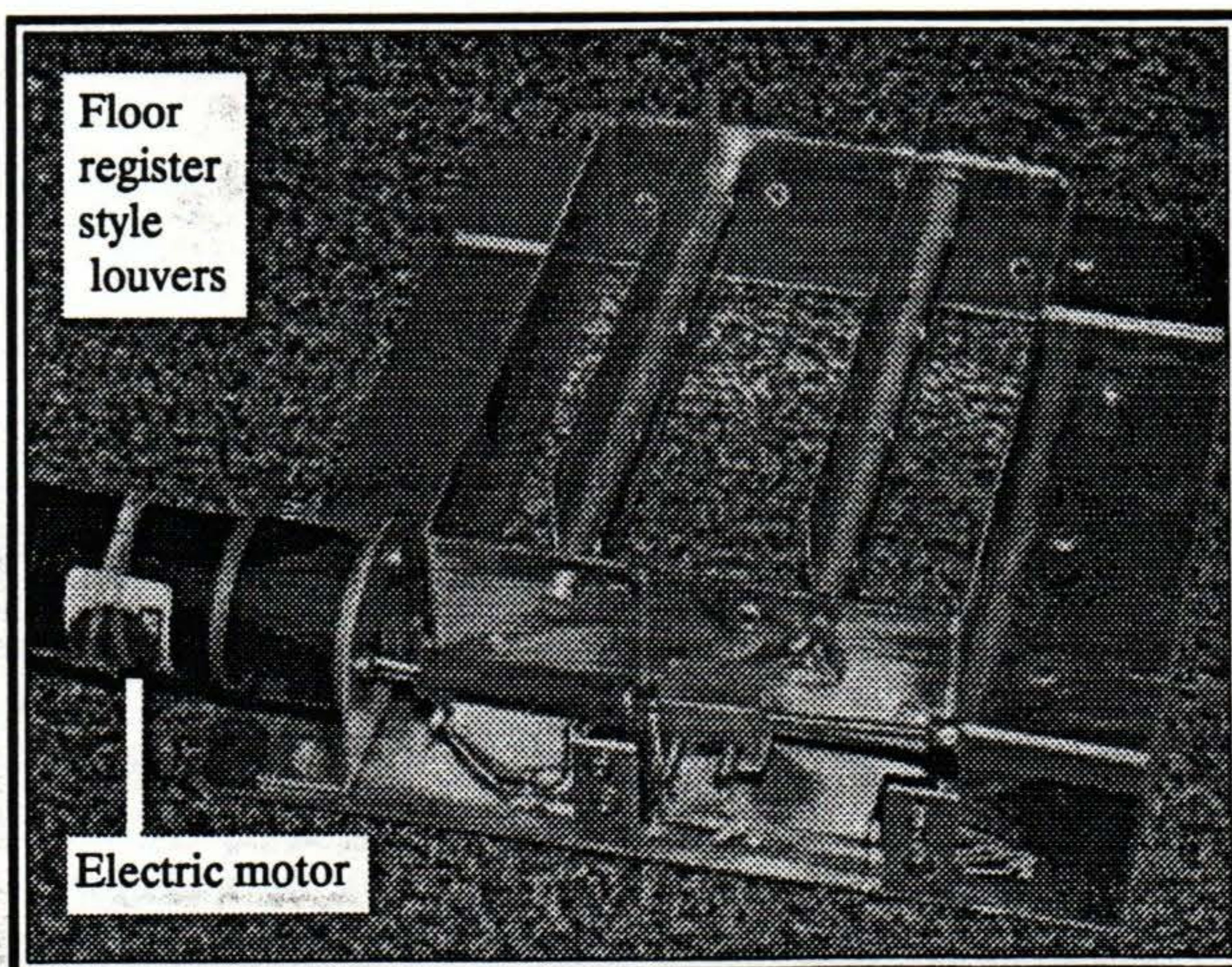
When OAT is up to 95 degrees F my

oil temperature is 110 degrees F above OAT. When OAT is over 95 degrees F my oil temperature is 115 degrees F above OAT.

The fix for the high oil temperature problem caused a different problem which I'd not had in 8 years of flying. My oil temperature was too cold. The first day I flew with 50 degrees OAT and 6 miles visibility I got carb ice for the first time in over 900 hours of flying.

To correct this problem, I now have a device similar to a heat register louver for a forced air furnace. This was made by a local CSA member, Tom McGovern. I put the louver over the output of the oil cooler to control air flow through the cooler. I operate the louver with a 12 volt DC electric motor controlled with a simple reversing switch. Stops and limit switches were built in along with 2 LEDs in the cockpit to tell me when the louvers were all the way open or all the way closed.

Now, for the first time, I can maintain a 180 degree F oil temperature regardless of OAT up to 80 degrees air temperature. Terry has also solved his oil temperature problems by installing a large automotive cooler with - 8 hoses and fittings at the inlet of the lower NACA scoop.





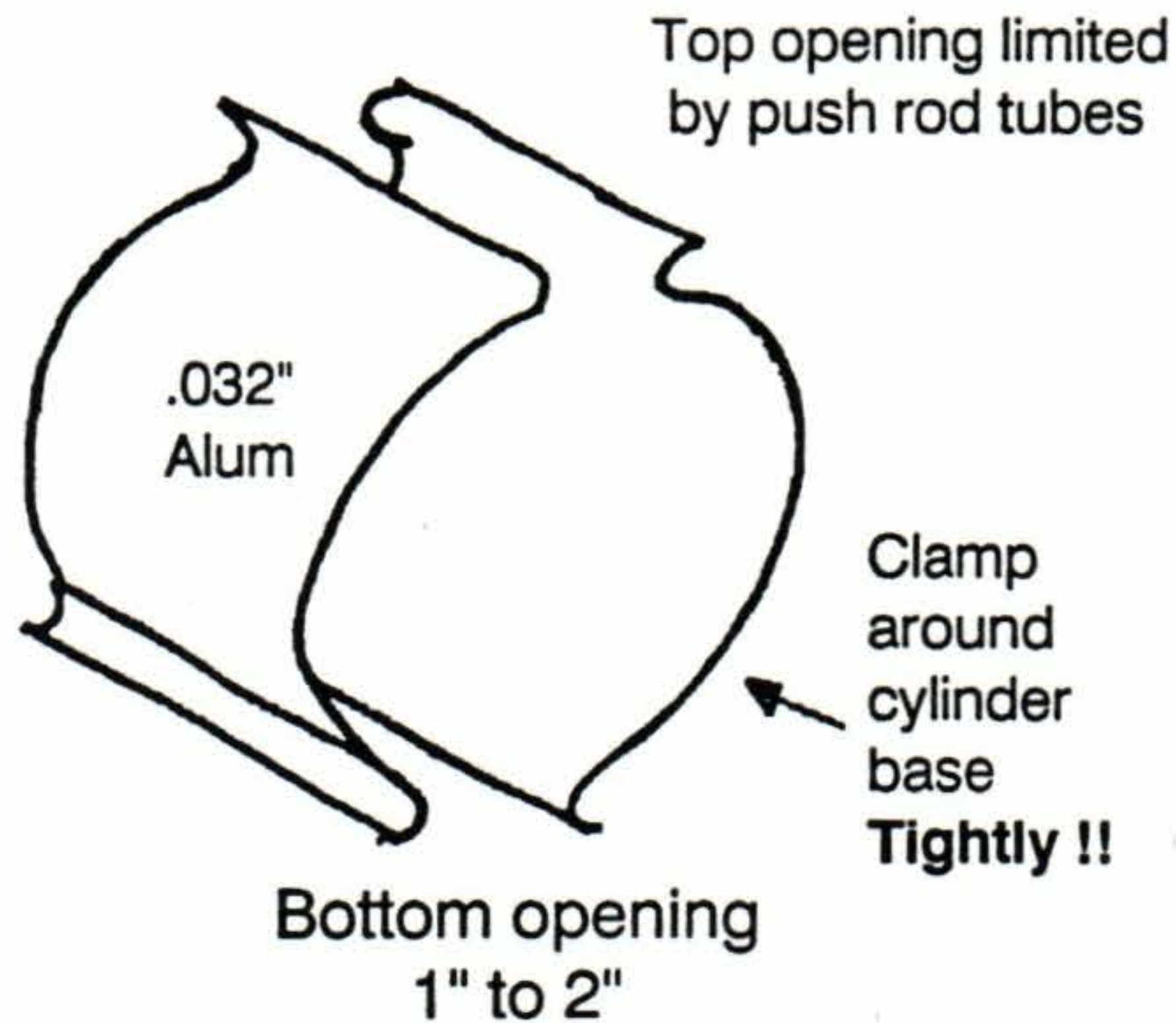
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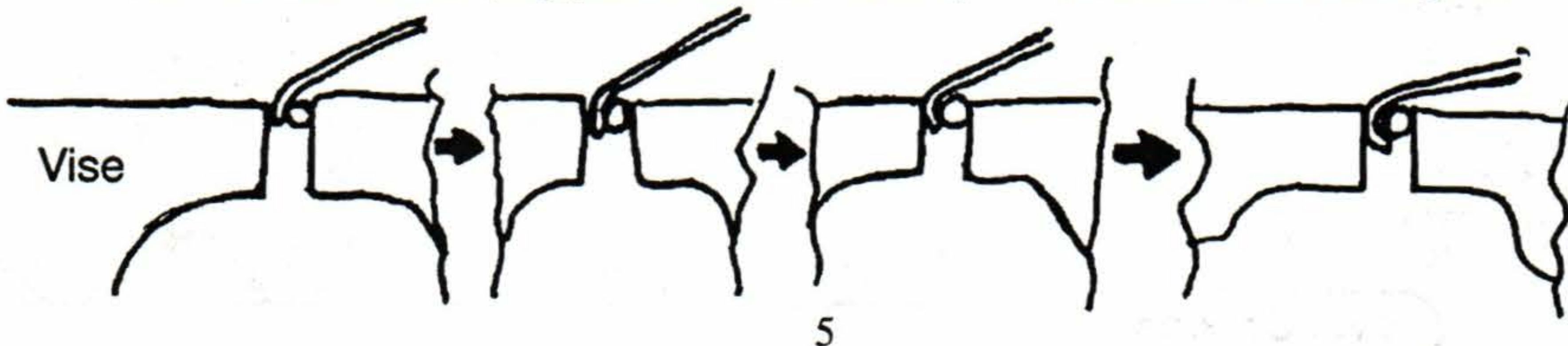
## Efficient Engine Baffling

Vance Atkinson (TX) - Do you want to know how to make those cutesy little curves on engine baffling material? Find your ratchet extensions. Pick one that has the diameter you want, then clamp it in the vice like so . . . start bending.

Ya want great cylinder cooling? Put two of these around each cylinder base before assembly of the cylinder on the crankcase. Put them on TIGHT! I mean TIGHT! Did I mention TIGHT? Do the same with the cylinder heads. I dropped my cylinder temperatures by 30 degrees with this. However, I did notice my baffles were kind of loose after 5 years.



After each successive clamping, push the aluminum down 1/16" more and bend 30 to 50 degrees.





## Low Pressure Oil Cabin Heater

*Michael Marshall (NM)* - The following engine oil system is used to heat my Cozy. In contrast to systems using engine oil pressure, this system meets the following requirements:

1. allows only low pressure oil into the cabin,
2. no heated oil is in the cabin during landing or takeoff,
3. does not compromise engine oil flow,
4. in the event of line rupture, it does not empty the oil sump,
5. works independently of the engine oil cooler.

A standpipe removes hot oil 1-3/4" above the bottom of the oil sump. This means that about 2-1/2 quarts (Lycoming's minimum safe level) will always remain in the sump. An electric oil pump mounted on the front side of the firewall pumps oil through 3/8" aluminum tubing enclosed in 1-1/2" duct to the nose. There a standard oil cooler coupled to a centrifugal blower heats the feet. Oil then returns to the sump through a fitting on the accessory case.

A panel mounted switch selects Fan - Off - (Fan and Pump). Engine oil temperature typically drops 5-10 degrees during operation. Since the pump I am using is far too large for this use (output of 4 gpm vs. need for .5 gpm) there is a relay device to automatically switch the pump on and off. The whole thing weighs about 14 pounds.

### Parts:

24 feet of 3/8" tubing, engine and bulkhead fittings and hose, 6 feet of SCAT 1-1/2" hose, PAR blower model 35115-0020 (order from marine supply store), preluber pump model M-93, Lycoming oil cooler.

A lighter cheaper oil pump would be great if I could find one.

If anyone has questions call me during the day at (505) 662-3608 or 662-6895 at night.

Warmly,

*Michael* N89CZ



## Tift's PROP TIPS

**Bruce Tift (OR)** - When repairing or refinishing customer propellers I have noticed damaged areas that you might wish to be aware of. This damage can be prevented which will provide longer prop life.

Many people operate their wooden props without any spinner. If you choose to do this and leave the airplane parked out in the weather moisture will lie in the center hole and cause splitting. The fix is to cover the hole with a metal plate to prevent weather getting to the hole's surface. It might be a thin aluminum plate under the crush plate or even a quarter RTVed over the hole. Anything to keep the water out of the area will do.

The next time you remove your prop's crush plate look at the prop face. It should be flat and not dipped in at the prop bolt locations. The low spots are caused by too thin of a crush plate. Such a condition results in uneven clamping pressure of the prop to the crankshaft flange.

### '93 Hot Dog Roast at OSH

**Ann & Gene Zabbler (WI)** - We, the "Wisconsin Bunch", would like to say a big "thank you" to all the people that made our Sunday night cookout a big success.

The weather was great, our hot dog cookers had a new cooker and we had a record turnout. We consumed almost 25 gallons of lemonade, 450 hot dogs and buns and gallons of snacks. 180 people signed our sign-in list. Next year we will have a map so you can "pin" your home airport.

Again, thanks to everyone who pitched in to help and to everyone who came.

Ann & Gene Zabbler  
Mary & Bob Le Masters  
Linda & Marty Pavlovich

### Molded Parts With No Pinholes

**David Dent (CA)** - I am presently installing new cowlings built off John Myers' molds. I was concerned about getting pin holes in the finished part until Craig Catto (the prop builder) showed me how to do it. After prepping the mold with wax and release you paint the mold with epoxy primer and let it dry. Then layup a ply of cheap deck cloth, with a tight weave, and then your normal cloth. I used one ply of Kevlar and one ply of carbon. They came out perfectly.



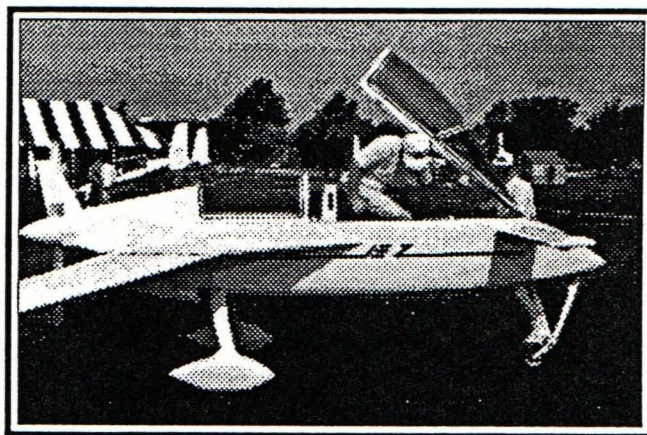
### Becker's Hangar Party

After all the years of building and dreaming Alex and Marianne Becker flew their beautiful Long-EZ to the KCGIG. You probably remember that it won the award for best exterior. The judgement was, undoubtedly, aided by the unique graphics the Beckers had designed for their bird.

No great achievement, like building an award winning airplane, is complete until it has been properly celebrated. On July 23 the skies around Michigan's Pontiac Oakland airport darkened with traffic inbound to attend the Becker Hangar Party. (slight exaggeration)

The weather was perfect and the excess food caused many a diet promise to be broken. The guest of honor, Long-EZ N57AM, parked on carpet in the center of the hangar. The party was a smashing success and fun was had by all. The next morning we had a formation fly out to Mackinac Island.

If life gets boring for you, why not throw a hangar party and invite all your EZ friends from a 2 state radius. It's amazing how far some people will come for a bratwurst sandwich and great company.



Just when you thought nobody could come up with another Vari-Eze mod . . . . This beautiful airplane was seen at the KCGIG



## How to Save a Few Bucks on Engine Oil (and almost ruin your engine)

*Dewey Davis (VA)* - I recently learned an old lesson about engine oil. **Airplane engines need good lubricants designed specifically for aviation.**

I had been flying my Cozy (O-320-D2J) for about 100 hours with Mobil AV-1. This seems to be a pretty good oil as I never had any engine problem while using it. However, it is also very expensive. Even when I order a case by mail, plus a couple of oil analysis kits, shipping, etc.), it costs nearly \$100; and that won't even cover two full oil changes.

I called Mobil and asked why Mobil AV-1 costs twice as much as regular Mobil 1. I got a vague and unconvincing answer that left me with the impression that they charge more because they can get away with it.

About the same time, I learned of another EZ driver that was experimenting with the new Castrol synthetic oil, Syntec. This oil had been performing well for many hours in his Continental O-200, has great viscosity specs (5W-50) and costs less than \$4 per quart; much cheaper than the Mobil AV-1 synthetic. I decided to try it in my Lycoming . . . . . bad move!



The next part of the story was related by Vance Atkinson in the last newslet-

ter. I had just about 10 hours on this oil when I arrived at Fort Pierce, Florida. June and I were on our way to the Bahamas just after the Sun-N-Fun Fly-in. There, I discovered oil streaking from the cowling.

Investigation revealed a bent pushrod which was caused by a sticky exhaust valve during start-up at Lakeland. The consensus among the local mechanics was that sticky exhaust valves are not unusual with mid time engines like mine. We got the pushrod replaced and staked the exhaust valve well to assure it was moving freely. They recommended I use Marvel Mystery Oil in my gas and oil to prevent a similar problem in the future.

The engine ran great (actually it had been running fine with the bent pushrod too) so we pressed on and I resolved to get a thorough checkup upon return to home base. A few days later, in the Bahamas, the same exhaust valve stuck on start up and bent the push rod again. Now I really had a problem! Thank heaven for Vance Atkinson, Scott Carter, and Ken Francis. These guys stuck with me, helped diagnose the problem, and came up with a field expedient fix to get me going again.

Scott Carter performed his magic on the bent pushrod using the limited tools available on the island. (There is no truth to the rumor that he hammered it straight with a conch shell). We got the engine running again and it ran real solid, as it always had. It seems that the valve only sticks on start up, when the engine is cold. The contracted valve guide offers less clearance to the valve stem. Once the engine is started it runs fine.

I circled the island for a good long while before we made a dash across the pond to Florida. At 12,500 feet, I could see land most of the way, but the pucker factor was pretty high for the flight.

After clearing customs, I immediately took the airplane to the FIT school in

Melbourne where I knew they had plenty of mechanics, parts, and tools. I left it there overnight and told them to fix that valve.

They were good about letting me help with the repair. It was pretty interesting to see the "microsurgery" technique they used to remove the exhaust valve, ream the guide, and reinstall the valve without ever removing the cylinder.

I made an uneventful flight to Virginia. The next day, while preparing to taxi to my local FBO across the field, exhaust valve #3 stuck! Now one stuck exhaust valve might be written off as bad luck, but two stuck valves in the same week is no mere coincidence. Something was very wrong! At this point I called Lycoming. After describing the history, they told me that the Castrol synthetic oil was indeed the likely cause of the problem. Apparently, some of the additives in that oil will burn and make carbon residue. Lycoming engines, unlike automotive engines, do not have exhaust valve stem seals to keep the residue out of the valve guides. Ten hours with this oil had produced enough gunk to cause problems. All the guides needed to be cleaned.

**Moral of the story:** We builders have experimented with a lot of automotive products; alternators, starters, ignition systems, even entire engines as well as autogas. But sometimes, even the best automotive product is just not suitable for aviation use.

Be careful out there!

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### Lycoming Cylinders For Sale

Four Lycoming O-360-A1A cylinders. 1st time run out. \$175 each.

Contact:

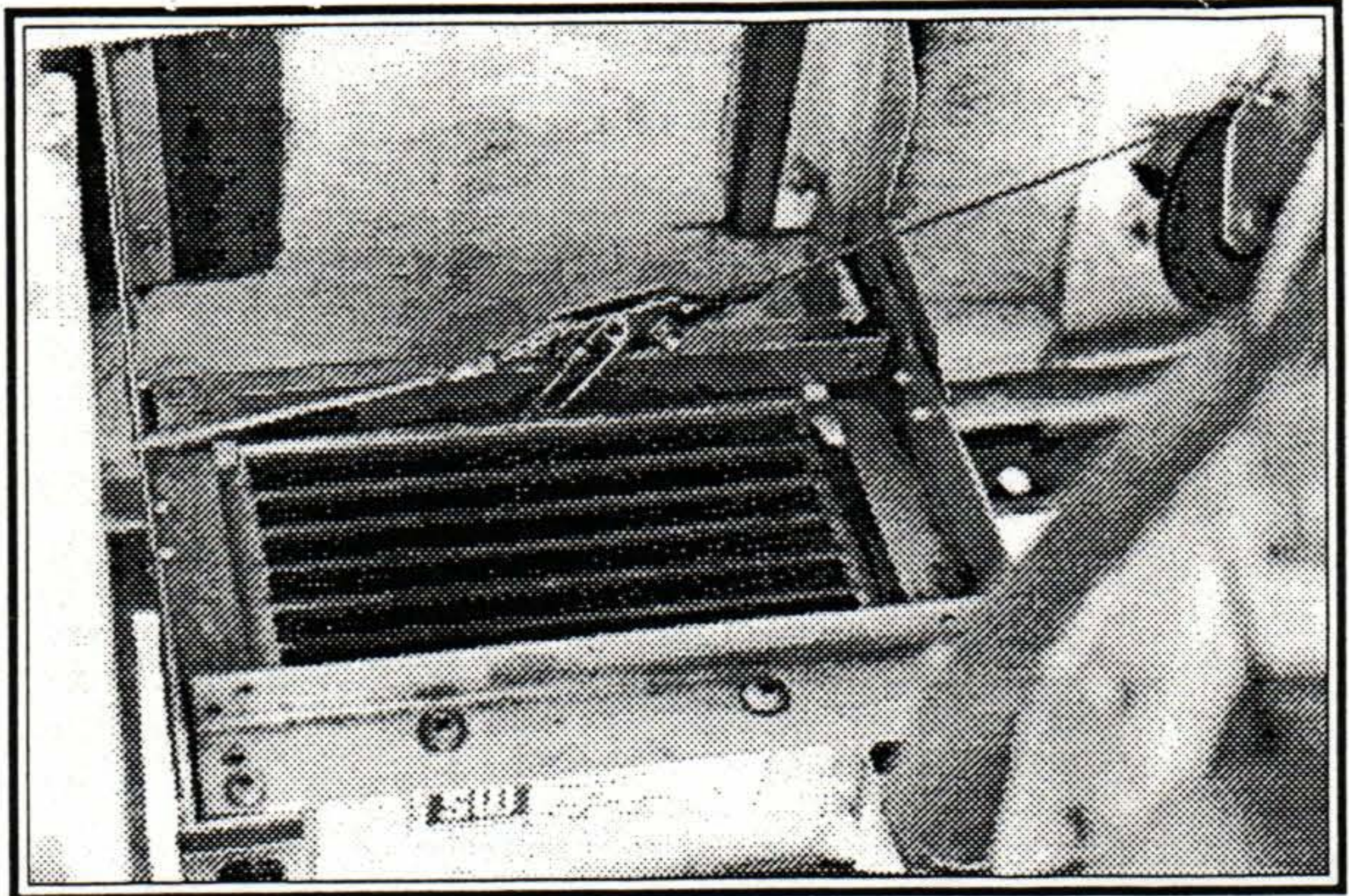
Jim Price  
(313) 656-0475



## Oil Cooler Mount

*Dave Haggard (KS)* - Are you tired of removing the oil cooler from the lower cowl every time you do maintenance? Wouldn't it be nice to have the thing permanently mounted? I've attached my oil cooler to the spar and it has worked well. It stays there and does not need to be disconnected when I remove the lower cowl.

The mounting brackets are bolted to pads that are glassed to the spar center section.



## High Time Airframe Maintenance

At KCGIG 93 Mike Melvill mentioned he now had over 2000 hours on his airframe. Much of it has been rather hard time as he does aerobatics frequently and has been known to exceed normal speed restrictions on occasion.

His airframe repair/maintenance has been very limited due to good design and good builder craftsmanship.

He replaced the following items: the original Brock light duty stamped nose wheel was replaced with a cast aluminium wheel from Wicks, the Davenport shimmy damper replaced the spring loaded phenolic rod, the rod ends on the nose gear extension drive tube were replaced with heavy duty units, the nose gear strut pivot bushing was replaced due to excess lateral movement, and all control rod ends and aileron hinges were replaced just for peace of mind.

That is an amazingly short list for a homebuilt that has had that kind of time put on it. We EZ drivers have been blessed with a fine design. You builders may want to incorporate some of the above units in your project to improve service life.

## Fuel Hose Failure

*Dennis Reguli (TN)* - I recently purchased a Cozy, N812LC, and was attempting a takeoff when the engine sputtered, choked, then lost nearly all power. We were not airborne so we aborted the take off, without mishap, and returned to the run up area. As before, the run up to 1700 rpm was smooth, the mags checked OK, and fuel pressure was in the green.

The second attempted take off resulted in the same engine problem, so we aborted again.

Some full power run ups in the hangar area indicated an extreme loss of power above 2,100 rpm. Steve Wright and Bill Gerth were gracious enough to help us check the gascollator and finger strainer. Although no blockage was found, they were certain the problem was fuel starvation. After more dismantling, we found constrictions in both rubber fuel lines. Tapping the fuel line on the pavement revealed small flakes of rubber approximately 1/8 in square. None of these flakes were found downstream in the finger strainer.

Ken Ashley, the original builder and only previous operator, said he had

never had this problem in the three years he had flown it. He also stated no auto fuel had ever been in the system either.

We have since replaced the rubber fuel lines with Teflon and have had no reoccurrence. This incident raises another question; will the rubber oil lines experience the same degradation and malfunction?

*Editor note: I've written Dennis requesting the specific type and manufacturer of his "rubber" hoses but have not yet received a reply.*

## Cowl Collects Water

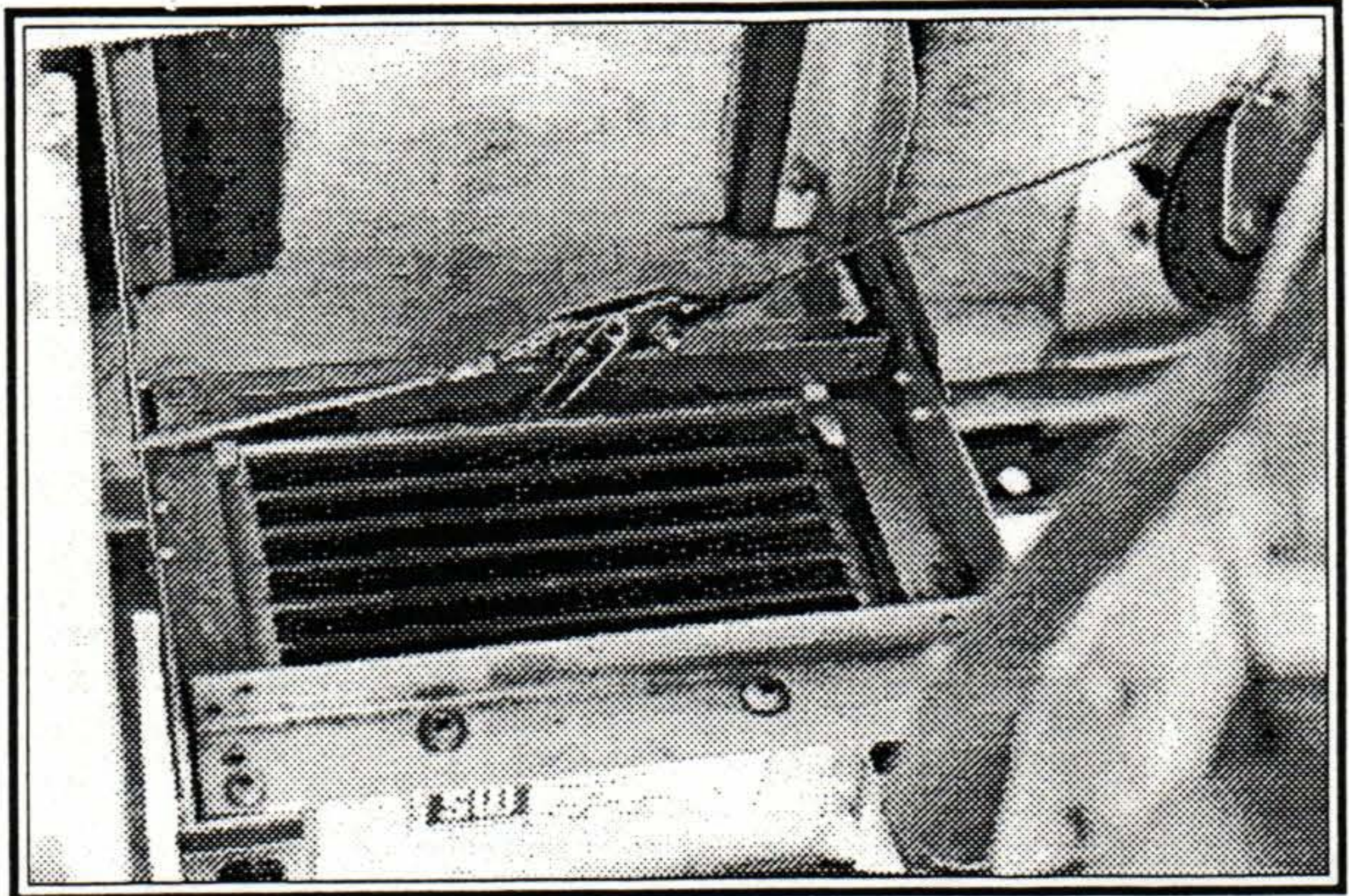
The latest issue of EAA Technical Counselor News tells of a Long-EZ that had been parked outside in the rain. A week later the owner removed the cowl for maintenance and found water running out of the lower cowl. It's source was found to be the cowl stiffener. No visible entry point could be found. It was recommended that a hole be drilled in the lowest part of the stiffener to drain any future water leak. Water in this area could cause significant C.G. changes.



## Oil Cooler Mount

*Dave Haggard (KS)* - Are you tired of removing the oil cooler from the lower cowl every time you do maintenance? Wouldn't it be nice to have the thing permanently mounted? I've attached my oil cooler to the spar and it has worked well. It stays there and does not need to be disconnected when I remove the lower cowl.

The mounting brackets are bolted to pads that are glassed to the spar center section.



## High Time Airframe Maintenance

At **KCGIG 93** Mike Melvill mentioned he now had over 2000 hours on his airframe. Much of it has been rather hard time as he does aerobatics frequently and has been known to exceed normal speed restrictions on occasion.

His airframe repair/maintenance has been very limited due to good design and good builder craftsmanship.

He replaced the following items: the original Brock light duty stamped nose wheel was replaced with a cast aluminium wheel from Wicks, the Davenport shimmy damper replaced the spring loaded phenolic rod, the rod ends on the nose gear extension drive tube were replaced with heavy duty units, the nose gear strut pivot bushing was replaced due to excess lateral movement, and all control rod ends and aileron hinges were replaced just for peace of mind.

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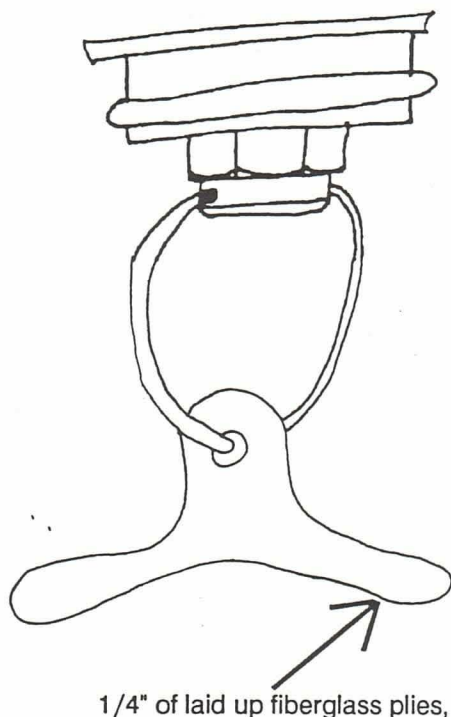
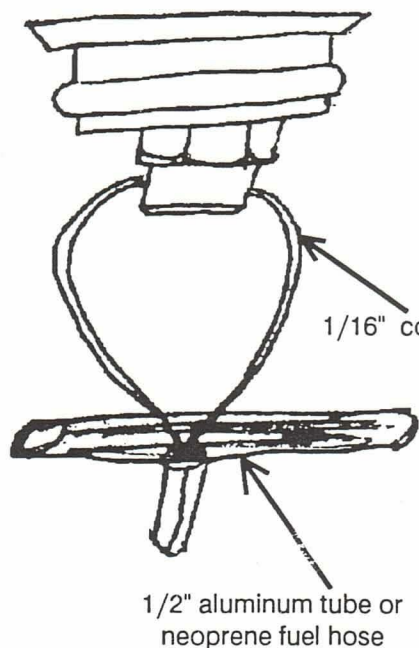
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## Alternate Fuel Cap Security Methods

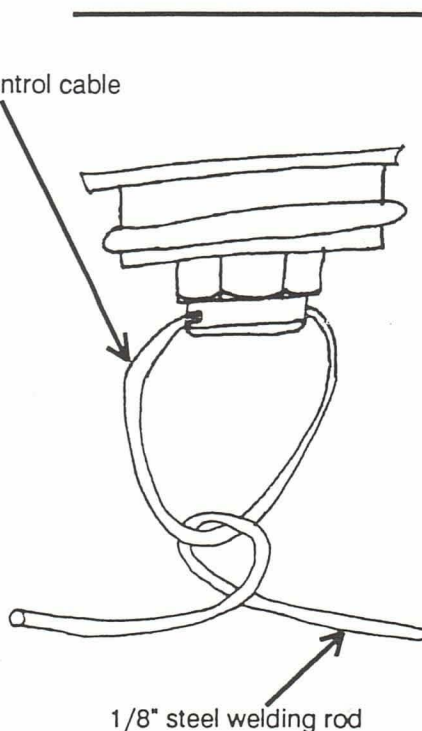
I have always been impressed with the way you people think up various solutions to problems. The fuel cap security issue has seen you outdo yourselves, however. The following sketches depict some of the ideas sent to me. Try one on your bird. They all should work.



## Alternate Fuel Caps

*Charlie Beard (GA)* - When I built my Long-EZ I used some heavy duty 3" opening gas caps from Spruce. They are mil spec and have 3 or 4 "dogs" that extend from the cap when the lift tab is turned to the right. The lift tab can't lock down into its recess unless it is fully turned. It also has ball chain attachment for security; although I don't know how strong they really are.

I really like these caps. The "real" George Scott gave me the suggestion.



### For Sale

Kalus Savier 62" prop for O-235 Long-EZ - \$450, spinner/backing plate, B&C alternator bracket, Brock air filter & air box valve, big tire wheel pants, SAE #1 3"-4" prop extension & crush plate, Lycoming starter, and King KR 85 ADF w/everything - \$500.

Contact:  
Stan Susman  
714 - 642 - 7678

## Finding Oil Leaks

Today I finished up my annual excursion at chasing oil leaks. I tried a new trick, relayed to me by Vance Atkinson, and it showed a leak I've been chasing for 900 hours and haven't been able to locate. I probably can't fix it without splitting the crankcase (NO, NO, NEVER, NEVER !!) but at least I know where it is.

The trick is to wash down the engine and get it good and dry. Then throw corn starch all over the engine. Boy is that a messy thing! That stuff goes everywhere. Then run it up and look for leaks (wet spots in the white residue). Naturally you won't find any so cowl it up and go fly for about 15 minutes. Don't be surprised if your airplane smells like gravy and looks like it is a crop duster as the white powder flies out the back of the cowl. After landing pull the cowl and presto there are the leaks! It really works!

## Testing for Water in Your Fuel?

It seems that more and more people are using mo-gas in their airplanes and are able to get it on cross country trips with increased regularity. One of the problems with this purchase is you are never quite sure if there is any water in the fuel. So many water absorbing oxygenates have been added to today's fuels that it is difficult to see if there is any water in the sump's sample.

I recently came across this tip in the U S Aviator magazine and thought it would be worth passing on.

Carry broken up bits of Alka-Seltzer with you on the pre flight inspection and drop them in the fuel sample. If they fizz you have water in the sample. If not, then the fuel is water free.

Obviously you shouldn't pour the sample back in the tank. It'll make your engine have indigestion. Then you'll need Pepto-Bismol.



## Comparison of 2 blade and 3 blade props

Vance Atkinson (TX) - The following performance figures are results I obtained on my Cozy N43CZ using my 2 blade Great American prop and a 3 blade Performance prop.

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The 2 blade prop was sized for my O-320 engine while the 3 blade was intended for a 175 to 180 hp O-320.

Because it was so hot the all out speeds are disappointing, but I expected that, and at least it affected the props equally. After looking at my other charts for my Great American prop I found normal temperatures produced about 12 knots more. I assume it would affect the 3 blade the same.

To determine relative efficiency between the props I ran comparisons at 7 gph and at 7.5 gph. Both tests were leaned the same amount

Surprisingly, with the noise canceling headsets on there is no difference in

the perceived noise level of the two props. There is a lower vibration level with the 3 blade. It felt almost like a 6 cylinder engine. The 3 blade had a more "whinny or whistling noise" and seemed to run smoother. On long trips this may be a very desirable feature.

My conclusion is the Performance 3 blade is not worth \$1600+ for 2 knots more efficiency and a lower vibration level. I think the Performance 3 blade would have done better if it was sized for my engine. On the other hand, I think the 3 blade had a better blade design than the 2 blade and that had a lot to do with efficiency.

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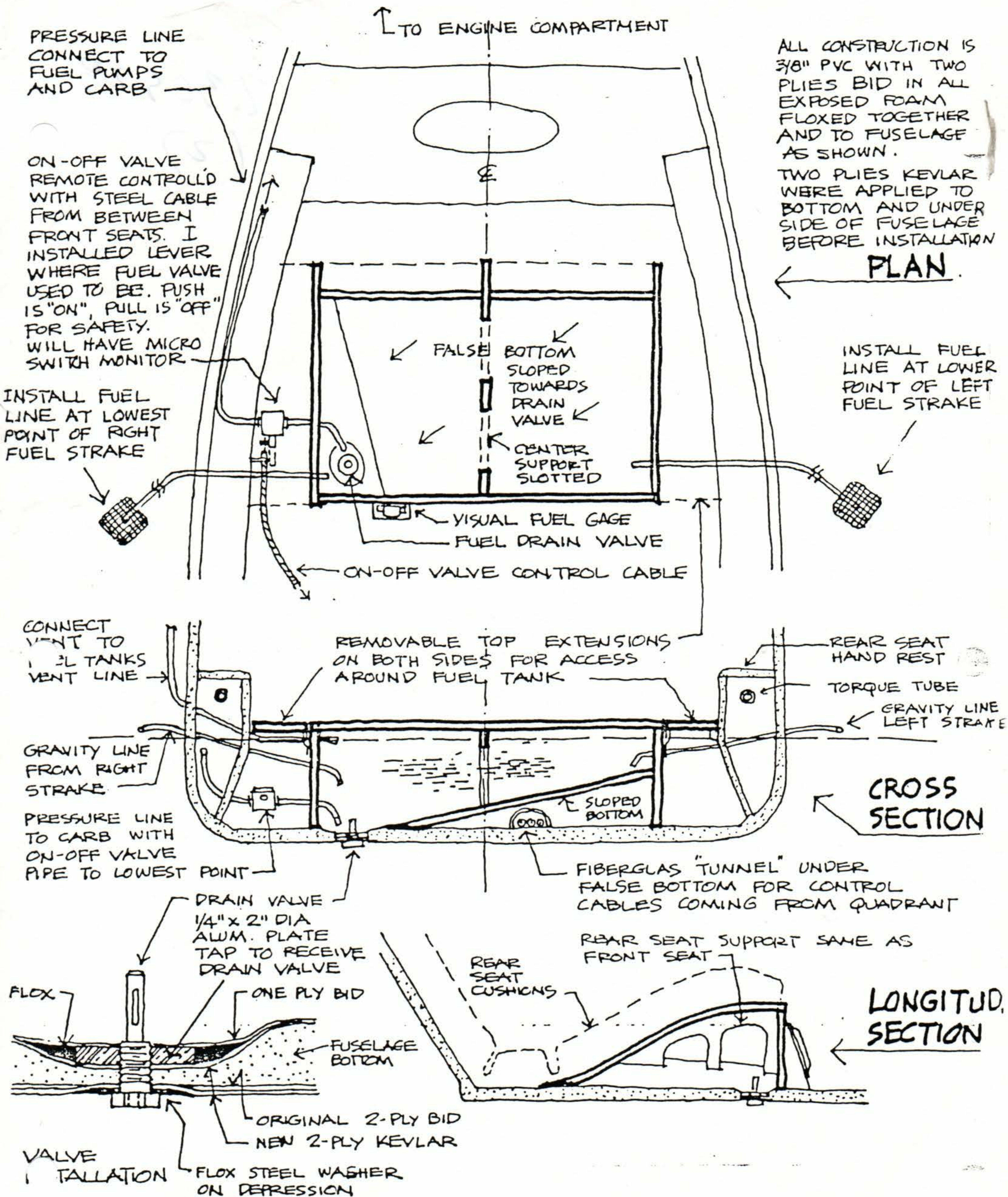
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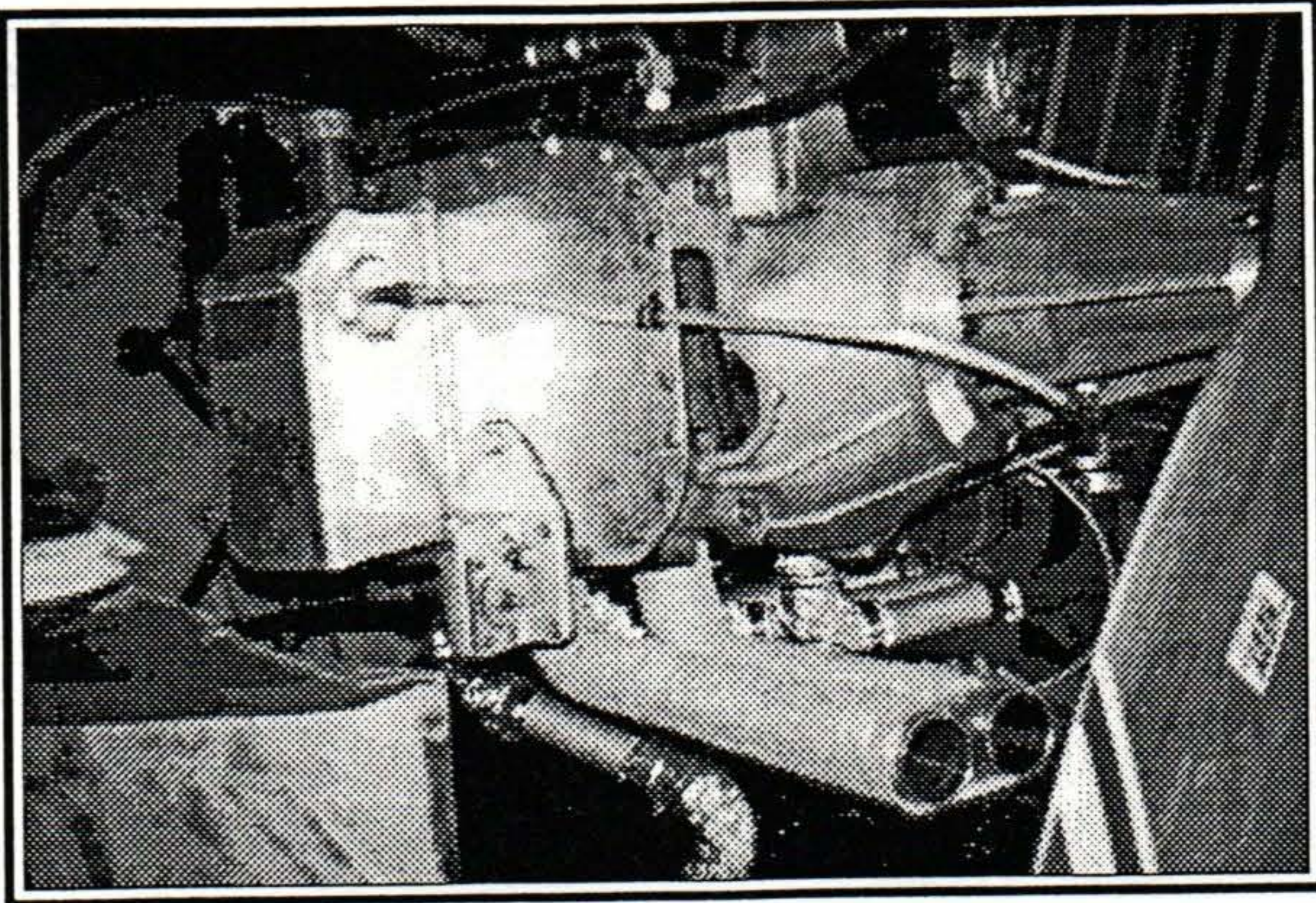
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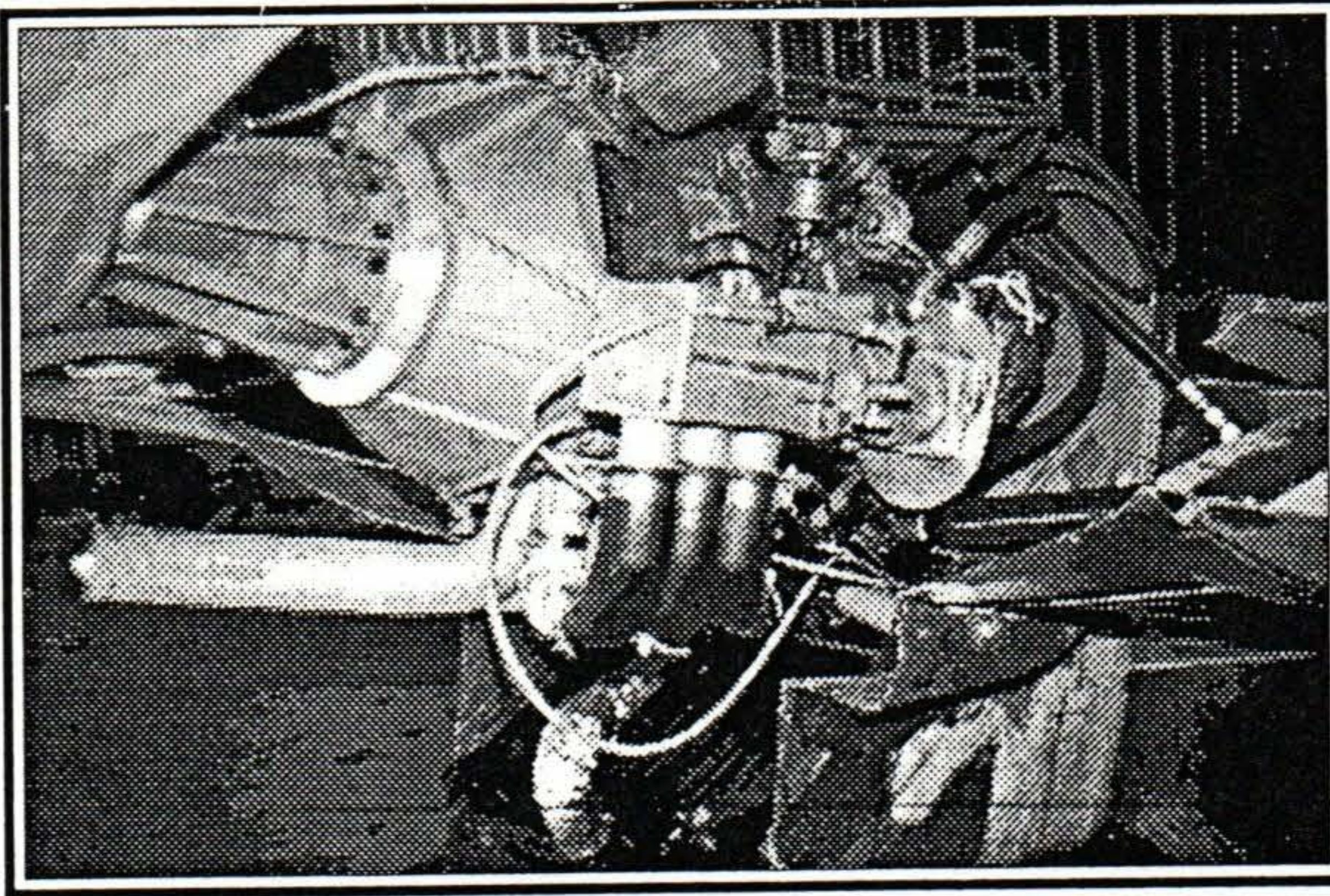




### Mazda Powered Long-EZ

I just got these exciting photos from Ron Gowan of Raonoke, Texas. He had the cylinder of his O-235 C2C fail in flight and decided to convert to a Mazda.

The engine has not run yet but is expected to soon. Ron predicts changes will be needed to complete the installation but . . . so far - so good.



O-235 For Sale \$750

Lycoming O-235 C2C with 1133 TT, 400 since chrome top overhaul, one cylinder bad. The engine needs major overhaul. Basic engine only - \$750.

Ron Gowan  
316 Darrell Road  
Roanoke, Texas 76262  
317-491-4646



### It Tried to Tell Me

*Aub Liebig (Australia)* - I recently experienced total electrical failure due to improper capacity master switch/circuit breaker. I installed the AN3022-2 that Burt called for but did not know that the switch/breaker came in different amperage ratings. In my ignorance I assumed it was the correct switch just because the AN number was correct. It was a dumb mistake and I feel ashamed to relate the story. However, there may be a bloke out there as ignorant as I so here goes.

The amber low voltage light on the B & C regulator had been blinking on and off trying to tell me something for sometime. I thought it was a fault in the regulator warning circuit as when I keyed the switch the starter cranked the 9.7 to 1 compression ratio O-235 quite smartly.

I was departing Townsville, a very busy controlled field, when I noticed no radio traffic in the headset, no liquid display on the radio, and no green strobe transponder flash. I realized I had a total electrical system failure and could not communicate with the tower. I was concerned about the big jet traffic and fervently wished I wasn't there.

In desperation, I gave that master switch a mighty wiggle and shake and all the electrics came on again.

Upon landing for fuel, hours later, I found the master switch had welded itself "on" so we had a hurried lunch and departed for home.

When at home, I discovered the master switch I originally installed had a 15 amp rating instead of the 45 amp rating called for. It had worked OK for years.

*Editor note: It takes a big man to admit a mistake to help others avoid it. Hopefully, we can all learn something from other's mistakes.*

*P.S. I thought the correct AN number switch would give the correct amp rating also.*