

# Portland Area RV Builder's Group Newsletter

Issue 91.7

February 1992

## Last Meeting

Norm Rainey hosted our last meeting. We all had a good time looking over his RV-6A. Looks like this summer maybe it will fly?? Even had a guest from as far away as Wenatchee WA track us down because he was in town for business and he made it to the meeting.

## February Meeting:

**Place:** Rion Bourgeois House  
5275 SW Cherry Ave.  
Beaverton, Oregon 97005  
646-8763

**Topic:** Aircraft Lighting — Don Wentz

**Date:** Thursday, February 13<sup>th</sup>

**Time:** 7:00 PM

### Directions:

#### From Portland and points North and East:

- West on Hwy 26 to Canyon Road Hwy 8 exit.
- South on Canyon Road to light at 91st Ave. (Braley and Graham Buick is on the north side of this "T" intersection.)
- South on 91st to the light. West on Beaverton Hillsdale Highway one block to the light (MacDonald's is on the north side of this "T" intersection.)
- South on Jamieson to the bottom of the hill/curve.
- West on Pinehurst to the stop sign.
- South on Cherry to the 4th house on the west side of the street. (Look for the curbside hedge).

#### From points West and South:

- North or South on Hwy 217 to Beaverton Hillsdale Hwy 10 exit.
- East on Beaverton Hillsdale Highway to the light at Jamieson. (MacDonald's is on the north side of this "T" intersection.)
- South on Jamieson to the bottom of the hill/curve.
- West on Pinehurst to the stop sign.

• South on Cherry to the 4th house on the west side of the street. (Look for the curbside hedge).

## March Meeting:

Ron Ebersole has volunteered to host the March meeting at his house. If you have program ideas, please contact either Ron or myself: Ron Ebersole 642-3560. Sieve Harris 324-8131.

## Other Builders Groups

I have been trading newsletters with other builders groups around the country. So far we have had newsletters come in from:

- Rocky Mountain RVator (Colorado)
- Puget Sound RVators (Seattle area)
- EAA Chapter 59 in Waco, TX
- Bakersfield Bunch
- EAA Chapter 315, North Jersey Shore
- Chicago Area RVator

I am keeping a notebook with these newsletters in them. I will try and bring it to meetings for other people to read. There are lots of good builders tips and other information in the newsletters that should be of interest. People are also welcome to take it home and read it, but I do have to have it back to use the articles to republish in our own newsletter.

One of the things that at least one of these builders groups do is negotiate discounts with various local suppliers. This would be a real nice thing to get started here — it seems like a 10% or .15% discount to members of the RV builders group might be something that some businesses might offer. So next time you are looking for or buying supplies, tools, whatever — take the time to talk to the owner or manager and see if they would be interested in giving us a break — they would get some free advertising by having their name mentioned in our newsletter. Feed the names back to me and I will publish them.

## Calendar & Miscellaneous

- The 9th Annual Northwest Aviation Conference and Trade Show will be in Tacoma. Saturday and Sunday February 8, 9th.
- Don't forget. EAA Chapter 105 meetings are every month on the third Thursday. 7:00 PM at the PGE building, corner of Murray and Scholls Ferry Rd.
- A good word for Avery Tools. I purchased a spray gun from Avery almost 2 years ago. It's one of those ones that use the disposable cups — very handy by the way. Anyway, due to neglect, the sucker nozzle was clogged up and in my attempt to fix it. I ended up ruining it for good. I called Avery to order a new part if it was available (I didn't expect it to be, the whole gun was < \$30) or just order a new gun. He had made up some new nozzles in his shop and mailed me a couple — FREE. Now that is customer service. So I'm one happy customer.

## Tips & Tricks

### Instrument Panel — Ken Scott

When, at long last, it came time to design and build the instrument panel in my airplane. I had a lot to learn. Actually. I had almost everything to learn. I'd never installed an instrument in a car, let alone an airplane, and I'm the kind of guy who puts tape over electrical sockets in the spare room so the electrons won't spill out at night and stain the carpet. So I started where just about everyone starts -drawing diagrams - and told myself I'd figure out all that mysterious wiring stuff later.

The easiest way I found to lay out the panel was to make a complete (!) list of all the instruments, radios, switches, circuit breakers, mounting hardware and placards that were going in the panel. I'd already decided that my airplane was going to be VFR (no gyros) but would have complete engine instrumentation, including 4 cylinder EGT and CHT.

The flight instruments ended up being an electric turn coordinator (used) and a VSI, an airspeed indicator, an altimeter and a wet panel mount compass, all bought new from Van's Aircraft. The engine instruments were almost all new and included a digital gauge and a four position rotary switch (from Electronics International) which when con-

nected to the appropriate senders gave me my 4 cylinder EOT and CHT. I used individual gauges for oil pressure, oil temp, and volts. A split 3 i/S" gauge from a Mooney gave me fuel pressure and manifold pressure. The tach is a new 3 I/S" mechanical unit  
The list looked like this:

#### Engine:

EGT/CHT, Oil Temp. Oil Press  
Volts. Fuel/Man Press. Rotary  
Switch

#### Flight:

Altimeter, Turn Coord. ASI. VSI

#### Switches:

Taxi Light, Land Light, Strobe,  
Panel/Nav, Panel intensity, Fuel  
Pump, Elec. Primer, Master,  
Mags, Avionics Master.

#### Radios:

Loran, Comm, Tpd, Intercom

#### C/Breakers

Instruments, Radio1, Radio2  
Turn Coord.

The fuel gauges, engine controls and panel lights would not be mounted on the instrument panel. The light switches, avionics master, and fuel pump were Potter Brumfield combination breaker/switch units.

I then took the aluminum panel and marked every piece of structure in back of it on the face. I DIDN'T want to cut a hole for an instrument and find myself looking at a rib or mounting bracket. When I knew where I couldn't cut holes. I made cardboard representation of each item, discs for instruments, rectangles for radios etc., and stirred them around on the face of the panel for oh. months, until I had something could live with. Then I marked the centers of all the hole cutouts, and where the mounting screws would go. Measuring, measuring, measuring. Later I found that Aircraft Spruce makes a handy little template that locates centers of different size holes, mounting screws, and distance between instruments and sells it for about \$11.00. I also found that Del Zander had made his own templates and loaned them out for free. I borrowed Del's. When I was absolutely, totally, completely sure I knew where everything was going, I cut out the panel. Cut it out of Masonite, that is, and mounted every last item in it and installed it in the airplane. I only interfered in two places with the structure and made one instrument impossible to connect to a static tube. Not t(X) bad. Ripped it all out. rearranged a few things, built a new Masonite panel, mounted absolutely everything and reinstalled it in the airplane. This time

everything fit. But when sitting in the cockpit. I found the arrangement kind of goofy. I've spent enough time in airplanes with haphazard panels — this one was going to make sense. So out everything came, and this time I got it right. All the engine instruments grouped together nicely (to the left of the flight instruments, which is a little strange in a side-by-side airplane), everything to start the engine together where the left hand can reach it while the right manages the throttle, all the flight instruments in the conventional places, the light switches together in plain sight, and nothing to the right of the radio stack where I'd have to lean over to see it. Cool. Made it all in Masonite again, but this time I was so sure it was right that I used spray adhesive to glue a light cardboard to the face of the board. I laid out all the hole centers, etc., drilled them, and then peeled the cardboard away and saved it. This time when the false panel was mounted, everything fit and looked good.

I took the paper overlay, stuck it on the real aluminum panel and drilled all the same holes. A couple hours work with an instrument panel punch and a flycutter had all the holes complete. Why a flycutter when you have punches for the standard sizes? Well, of all the instruments in my airplane, exactly one was the "standard" 2 1/4 diameter. The automotive gauges were 2 1/8". The compass had a weird bulge for the adjustment knob; the rotary switch was square. . . . The 3 1/8" instruments worked out all right. A word about the punches: my friend Jeff Hedrick had bought a combination punch and offered to let me use it - a kind offer because these things are expensive. The punch is usable by drilling a 5/8" center hole, inserting a large bolt and using a pair of large wrenches to tighten the punch halves through the work piece. Worked great in .032, but .063 took a lot of effort and constant repositioning of the punch. No problem. The shop I work in is equipped with a megaton hydraulic press, made to press gears onto transmission shafts and things like that. Arrange panel and punches in press, pump handle, listen for loud snap, remove panel with perfect hole. Piece of cake. Without the press I think I would have used the flycutter for everything.

Once all the instrument holes were cut, I drilled all the switch and breaker holes with a Unibit, one of the great inventions of the 20th century. The rectangular cutouts for the radio stack were made with a drill, a hacksaw and a lot of careful filing. This is when I found out that the faceplates on the aircraft radios are only microscopically bigger than the hole the radio slides through. In fact, on my Narco transponder, there were roundhead screws on the case that protruded farther than the faceplate, so to slide the box in, the hole in the panel had to be

larger than the faceplate could cover. Clever. The King radio and the IIMorrow Loran used Hush screws, so their faceplates covered. Barely.

Finally everything was cut out and it was lime to paint the panel. I color coded mine - an idea I stole in part from Nevada RV-4 builder Ron Sutton. Since the engine instruments arc in a non-standard spot I wanted them separated by some visual cue, lest I try and read my tach as an ASI during some exciting moment. All the engine instruments are backed by a gray subpanel, separated by a black trim line from the blue instrument panel. I thought about backing all the flight instruments and communication instruments in painted subpanels of different colors, but decided that would make the panel too busy visually. Here again, Jeff Hedrick came to the rescue, donating his fresh air system, his time, and his expertise with a paint gun, to spray the panel with two colors of Imron.

I've never been impressed with panel lettering made with a Dymo labeler, nor have the preprinted press on labels sold through catalogs thrilled me. I LIKE letters and lettering - I've even, to the great astonishment of those who have tried to read my normal handwriting, been paid for my work as a calligrapher and letterer. I did NOT want to spend my flying time looking at a graphic disaster and wishing I had done a better job. I was originally looking for someone who could cut vinyl letters to the small size I needed. Nobody could do that, but one fellow volunteered to make a screen and use it to print the legends directly on the panel in an epoxy paint. We sat down at his computer and, in two hours, designed and located all the lettering. I left him the painted panel and a few days later picked it up with every label, including the passenger warning, printed neatly in Helvetica Condensed Bold. It was a little fuzzy around the edges, but I could live with it. Total cost: \$84.00. (I can't help but think that with the advent of 300 dpi and better resolution laser printers, it must be possible to print onto a transparent film, then cut and apply the legends so that the film becomes invisible and only the lettering shows. I'd love to hear from anyone who has any experience or ideas on the subject.)

I had planned to paint the heads of the screws holding the instruments in place, but when I started installing the dials with stainless screws, the color was so unobtrusive, especially in the gray sub-panel, I skipped it. Jeff Hedrick spent several evenings with me, doing most of the wiring, hooking up radios, making a plug for the encoder (they do NOT come with a cable to connect with the transponder. Because there are so many makes of transponders, a cable must be custom wired to fit

the one you are using. I have a Narco encoder — it came with a wiring diagram for Narco. King and other transponders.) and coaching me through some of the basics of wiring. To a great degree we followed the schematic published by Bill Benedict, who also spent an afternoon with me, trying to jam the basics of electricity into my head.

One of my best investments was a trip to Boeing Surplus in Seattle, where I purchased all the necessary wire for the entire airplane, along with a supply of connectors, tubing for conduit, and other assorted bits and pieces. Everything was of the finest quality; Teflon insulated, silverplated conductor wire in all gauges from 24 to 12, shielded wire for the intercom and radio, some really big stuff for battery and starter cables. The material cost for all the wiring was less than \$25.00. Finally the panel was complete. Mine is designed to be removable with 13 screws, so we stuck it in the airplane and admired it. It looked terrific! One of the most successful parts of the project so far; it is one of the few personal touches in my airplane (we will ignore, for the moment, the titanium brake pedal episode) and one of the most satisfying. Now if the canopy turns out this well .....

### **Rudder Pedal Bearing Blocks -- Ken Scott**

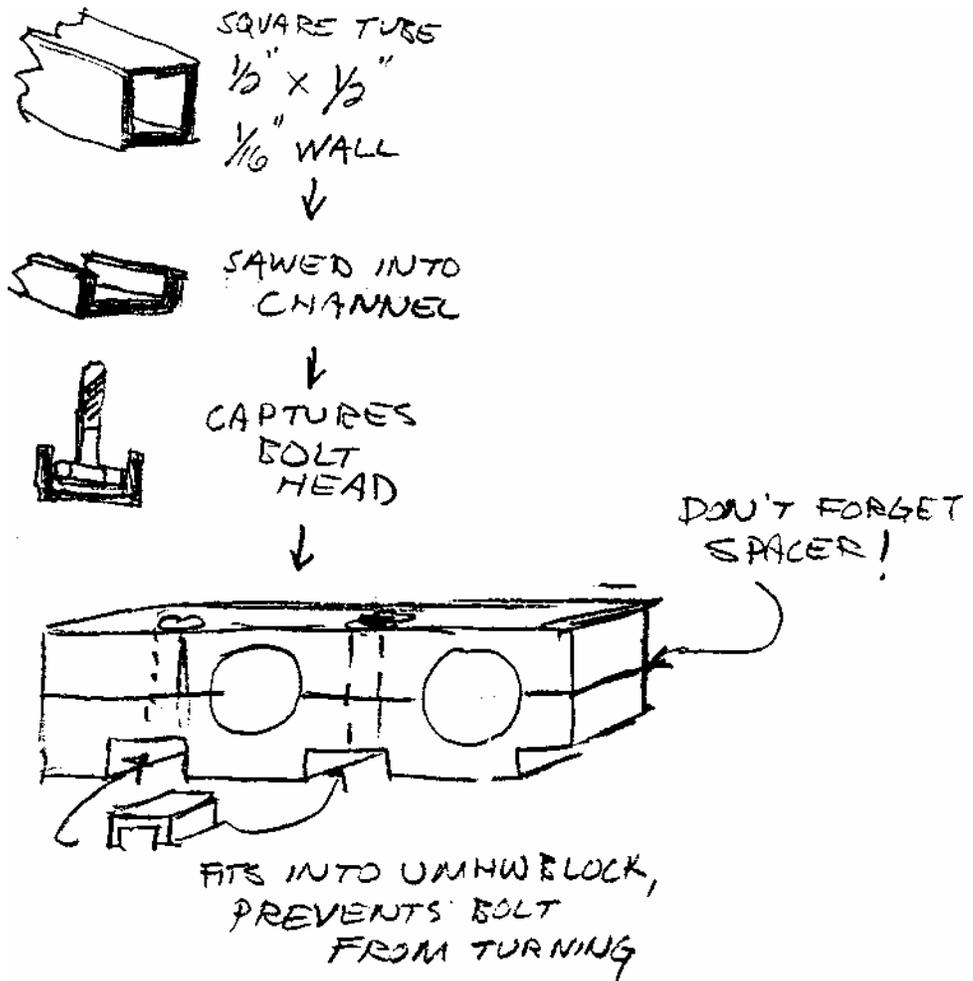
The rudder pedal tubes in the RV-6 ride in bearing blocks of UMHW plastic. These blocks come in one piece and are sawed in half to allow the tubes to be installed. They are then drilled and held together with bolts. The heads of these bolts rest in slots cut into the blocks, next to the floorboards. If you ever have to remove the top half of the block, you must get a wrench on the boll head to keep it from turning. No problem just cut the slots the size on the plays and a small wrench will fit right in there. Ha. Once those rudder pedals are in, get-ling a wrench in there will teach you several new words. I was bemoaning this fad to a friend who was just getting to the stage of installing his rudder pedals (and who, kindly, avoided asking me must WHY I needed to get the blocks off when I had supposedly installed everything to stay . . .) and he came up with an elegant solution.

He found a scrap of square steel lube, approximately 1/2" square O.D., and cut it into a pair of channels. The inside dimension of this channel is exactly the right size to hold the head of an AN3 boll. He cut the slots in the UMHW blocks so the channels were a snug fit. The channels were then installed under the bolt heads, capturing them and permitting the nuts to be tightened without need-

ing a wrench on the other end. Neat. (Oh yeah. DON'T forget to put a washer in between the block halves to replace the material removed when the blocks were sawed in two. Otherwise, when you tighten the blocks together, the rudder pedals are pinched so tightly it is very difficult to move them. (SEE DRAWING ATTACHED).

### **Trading Post:**

- Low cost leading-edge landing lights for RV4/6/6A. Retrofittable to completed aircraft. Lightweight, clean, simple installation. Single and double lamp versions (fit either wing). 55 Watt Halogen single unit \$69.95. double \$109.95 (add \$10 per lamp for 100 watt). Complete kit includes plexiglass lense, location templates, all mounting hardware (no switches/wire), detailed instructions. (\$10 discount to Portland Area Builders Group members) 503-543-2298 for info.
    - Duck works
    - 50641 Firridge Ave.
    - Scappoose. OR 97056
  - For rent, T Hangar at Scappoose Airport. 75/month. Call Don Went/ (fi'696-7185 or 543-2298.
- 
- Wanted, borrow or buy small sheet metal brake and/or shear. Call Don Went/ (£'696-7185 or 543-2298.
  - RV-6 Tail kit. new in box. Sell for cost (\$740) and will throw in \$205 plans for free. (503) 642-7928.
    - For Sale: RV4 Kit. It's all there:
      - Tail Kit - Basically done
      - Wing kit - 80% done, you finish fuel tanks, flaps, ailerons, bottom skins.
      - Fuselage kit - on gear, rolling. Much interior done.
      - Finish kit - 0320 engine cowling, canopy kit. wheel pants, etc.
      - Also includes rear seat rudder pedal kit. throttle quadrant, fuel tank sending units, etc.
      - \$18K. 591-9040



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