ter cylinders to also help the CG. While the internal rudder bell horns on the big rudders were strictly for looks. I used Debbie Iwatatie's ideas to install an instrument access panel and canopy latch with modification. Flush tie downs with holes for pip pins with rings on them, flush access canopy latch door, special access door to canopy latch with flush hinge and key lock, and flush nose gear cover all help decrease drag.

The Curtis Smith locking gear crank works great. The Davenport shimmy damper insures no shimmy. The solenoid valve primer system a la Canard Pusher, the nose gear mechanism cover to keep out the drafts, and the air filter clamped to my starter all improve dependability and utility of the Long-EZ.

I designed a front seat NACA vent for cooling air using a push-pull cable for actuation, while my design rear seat NACA vent uses a screw actuator.

The T-38 style access step is of my design. It was inspired from a T-38 and provides less drag.

Editor: EZ people (especially Berkut builders) who are less than 7 feet tall, look at this modification The step represents a good solution to the "high step up to the cockpit found on some of our canard birds.

I used Systems 3 paint which worked OK but was harder than I thought. Perhaps it was my inexperience or desire for a perfect finish but I am disappointed with a few places on my finish. Overall it is good. The clear coat is very hard and takes a nice shine but on larger surfaces I got a less than good finish with the initial spraying. I had to expend lots (and I mean lots) of elbow grease to make it shiny. I'm not sure if it was over spray or what, it just didn't flow out like it did on the small pieces. Small pieces were great - my rudders are BEAUTIFUL! If only all of it turned out like them. My hangar mate says after a few months and a few thousand bug strikes it just won't matter.

The Systems 3 company was very good as far as support and replaced several quarts of paint when I was chasing a problem. It turns out, despite their literature, the paint cannot be used again once it has been mixed with the cross linker. It sprays and hardens OK but craters form every couple of inches and the finish is lousy. The paint's limited shelf life is not mentioned in the literature. After learning these things, I did not have any more big problems. I'm afraid to total the hours I spent finishing but the painting took one full year.

Retractable Step

The following drawings document my attempt to duplicate the elegant step design from a T-38.

Start by laying up a 6 ply BID 2.75" x 3" door on a piece of plastic wrap. Knife trim when it is almost cured and tape it on the fuselage at the step's desired location. I put mine under the thigh support where the fuselage curves to the bottom 19" below the longeron and 6" aft of the instrument panel. Be sure to protect the fuselage with plastic wrap to prevent sticking.

This is the most critical part of of the step construction. The steel bearing tubes should be a light press fit into the aluminum support tube. Insert and rivet the bearing tubes in the ends of the support tube so that the steel inserts protrude from the aluminum tube about 1/32". This allows the harder steel to bear on the step and slider block, hopefully making the step last forever. Zinc chromate the steel parts. The tapered side of the support/bearing tube assembly allows the ends to rest firmly on the step and slider block when the step is down. This prevents the pieces from folding past 90 degrees; but allows the step to fold up for stowing. You may have to play with the taper angle and the pivot hole location to make the geometry work. You must get it right or the step will not be strong or will not fold. After I got everything working I eyeballed the location for the pivot hole then drilled a 1/16" hole and tried the step with a thin rod as pivot. I drilled out the hole a little at a time, moving the hole's center a little with each larger bit until the step folded properly. The drawings show my final dimensions. If you adhere to them you will be close on the first try. Finally, drill the 1/4" pivot hole.

Flush rivet the stop blocks on the slider block and the slider tube. (dwg #4) The stop blocks should allow the slider block to protrude from the slider tube just far enough that the step support tube hangs down at a 90 degree angle and rests against the slider tube's bottom edge. (dwg #1) Use a phenolic block to avoid galling as it slides into and out of the slider tube.

Cut out the area marked on the fuselage side and remove foam until you have a depression 1/2" deep with a 1/16" x 1/2" wide lip around the edges. Cut the slider tube square hole through the inner fuselage wall. You may have to remove part of the thigh support structure or round the slider tube end, but it will fit.

Attach the step door to the step so the step lines up with the slider tube while in the fuselage. Use the step brackets to join the fiberglass and step using countersunk rivets. You may shorten one of the brackets as one end of the latch is wider than the other. Check alignment before drilling and riveting. Flush rivet the Hartwell latch to the door.

Cover exposed foam in the depression with 2 ply BID using flox corners. Be sure the door will still close. Dremmel rout a slot and flox in a piece of aluminum 3/8"x3/4"x1/16" so the latch pulls the cover tight when the latch is engaged.

Assemble with clevis pin at slider block (top) and bolt at the step (bottom). The pin slides nicely in the slot in the slider block and the bolt threaded itself into the step. You can tap the step hole but I didn't find it necessary. File the head of the clevis bolt flat. Mine wound up about 1/32" thick. I filed the threaded end flush with the slider block's surface thus allowing clearance for the slider

Long-EZ First Flight

Jim Voss (TX) - The first flight of N81JV was early in the morning on June 19. Everything was perfect for the first flight - Charlie Precourt, a fellow astronaut, home builder and test pilot was there to inspect, chase and advise. My friend and helper, Merri Sanchez was there for photo documentation and to not let me fly if everything wasn't ready. Everything was, so I did, and it was great! Having flown Terry Schubert's Long-EZ just a few weeks before made it easy to feel confident about the first flight. Thanks Terry.

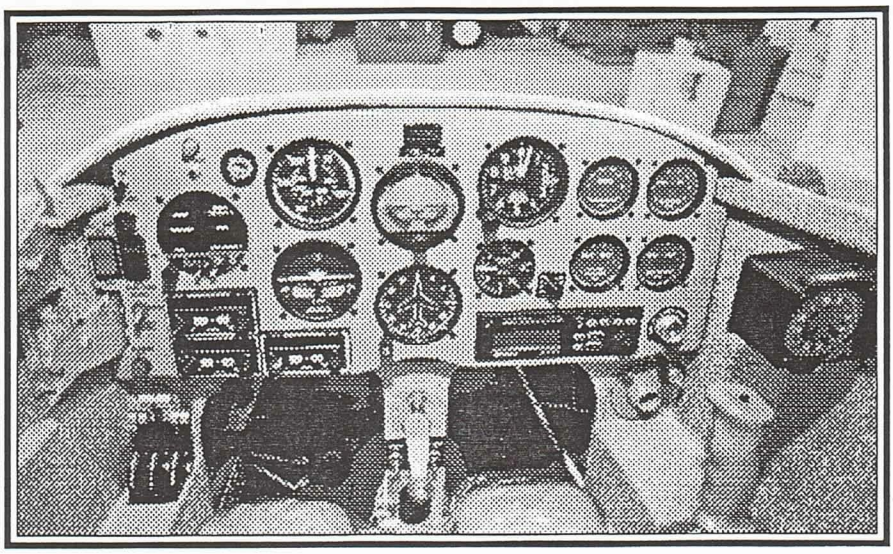
It was certainly a wonderful feeling to get in the air after over thirteen years and 4200 hours of labor.

As of July 3, I have flown 19 hours and am easily on track to finish my 25 and make it to Oshkosh. *ED. - He made it to OSH and Rough River.* I have been doing my flight test work in the best traditions of the Naval Test Pilot School, and so far my Long-EZ is performing admirably. I did my air-speed calibration with a military aircraft chasing and found my full throttle (2800 rpm) level flight speed to be 151 knots IAS or 162 knots (186 mph) TAS.

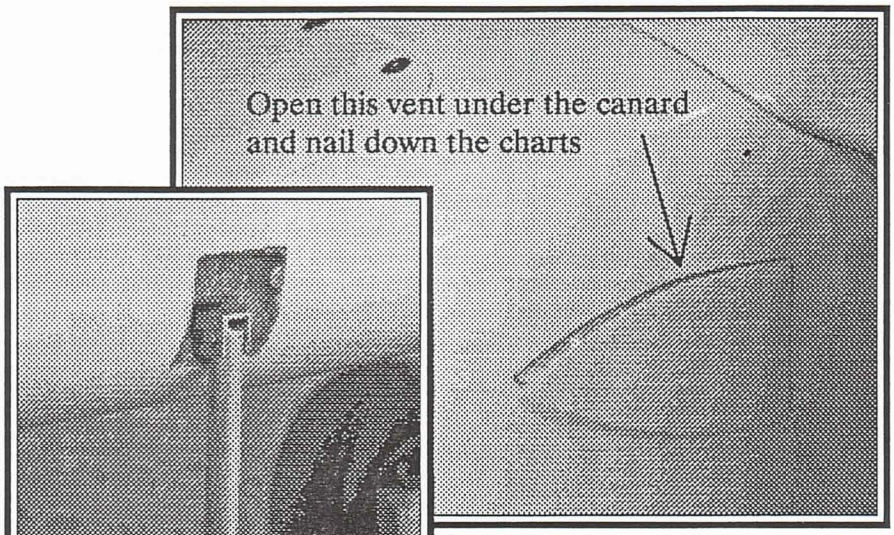
To protect my engine I will probably cruise at about 2400-2500 rpm and accept 120-130 knots. I have checked for high speed problems and have found none up to 190 knots IAS. I don't ever expect to be flying near that speed in the future, but I know it is safe there. I haven't done my climb performance testing yet, but it will be good - I have been seeing 1000 fpm on these 95 degree days here in Houston without looking for best climb speed. I hope to do even better after sealing wing gaps and installing wheel pants.

I did a few things differently from the plans. I extended the nose 10" because I think it looks better and I wanted to move the battery out of the cockpit. It helps the CG too.

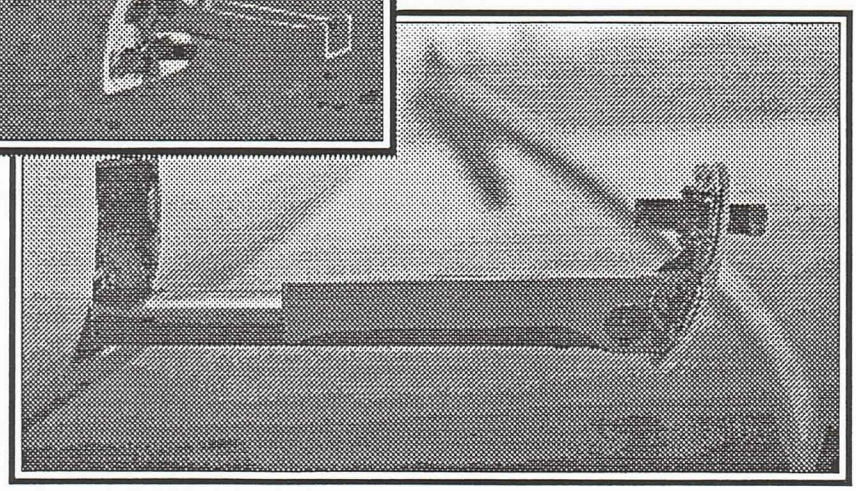
I installed front mounted brake mas-



You can have it all in a Long-EZ. It just takes planning and small instruments and avionics.



Outstanding attention to details!



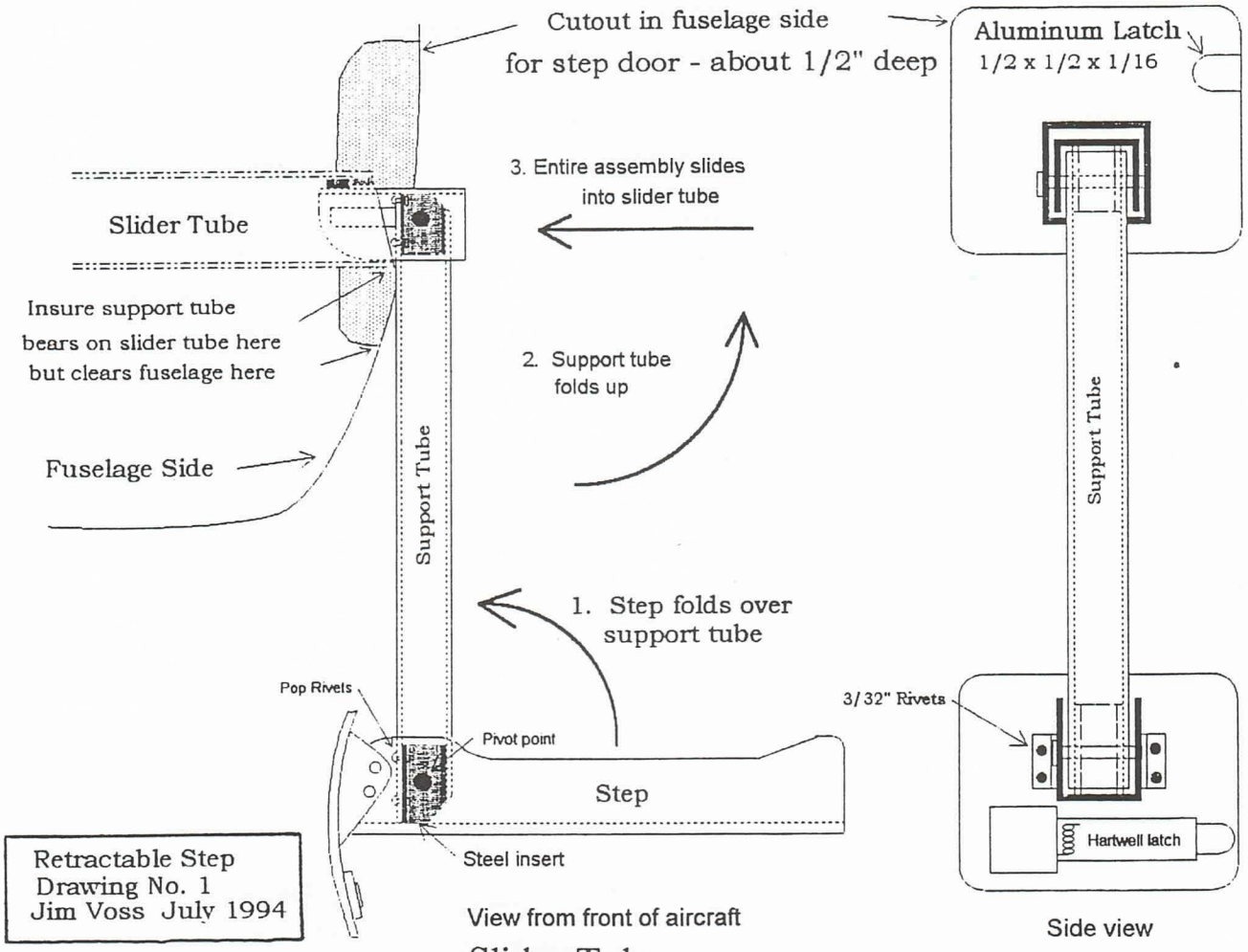
Jim's T-38 style folding step is perfect for high cockpits

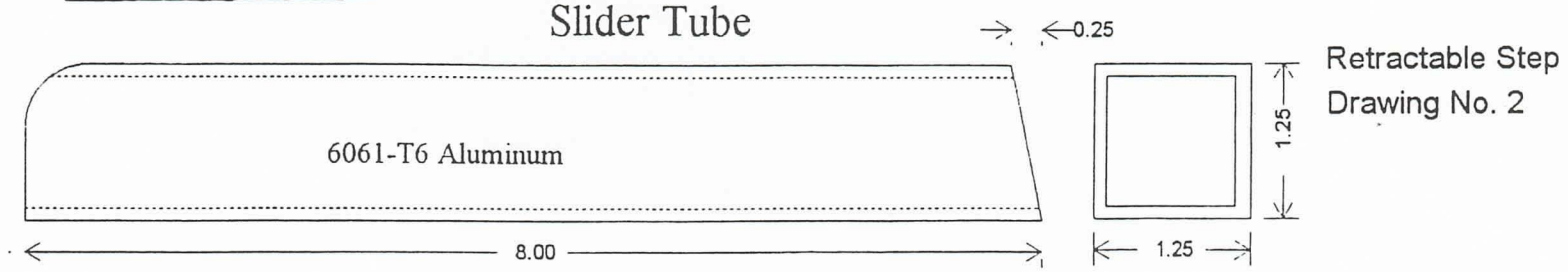
block to slide into the slider tube freely. Be sure everything fits and works before floxing the slider tube in place. **Tube location is important!** The side of the support tube should bear against the slider tube's bottom edge when the step is extended. Then the step can't swing inboard and damage your paint job. (see notes on dwg #1)

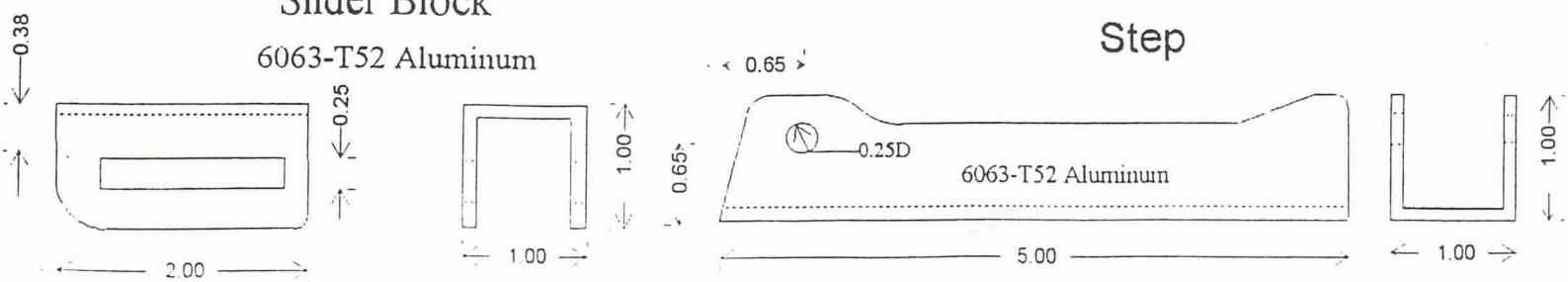
Drill depressions in the square tube to help the flox grip the tube. Assure the slider tube is in the proper place and stow the assembled step to insure a perfect fit when the flox cures. Be sure no flox gets on the ends of the slider tube or you'll need a chisel to open your step! After flox cure remove the moving parts, except slider block, and fill gaps around the slider tube with flox. Put 1 ply BID over the slider tube with 1" overlap on the inside of the fuselage.

Re-assemble the step with the clevis heads on the front of the step so they can't blow out if you fly with the step extended.

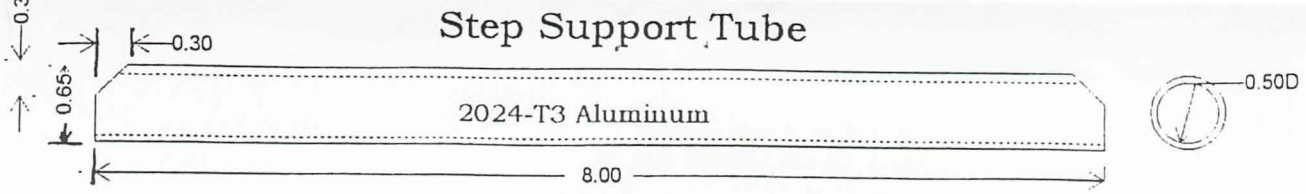
Fill around the door with micro as you did the speed brake and access covers. My step weighs .66 pounds and cost about $10. I proof tested it to 150 kts with no adverse effects. Good luck if you decide to build the step and call if you have questions. Jim Voss (713) 480-6185 nights.



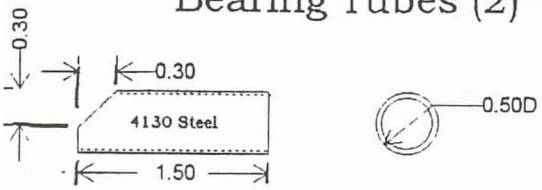




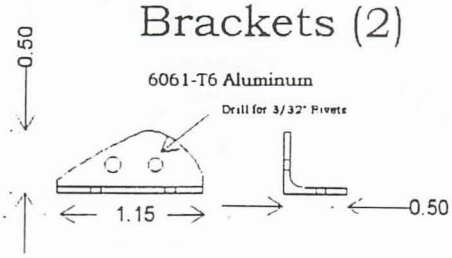
Step Support Tube



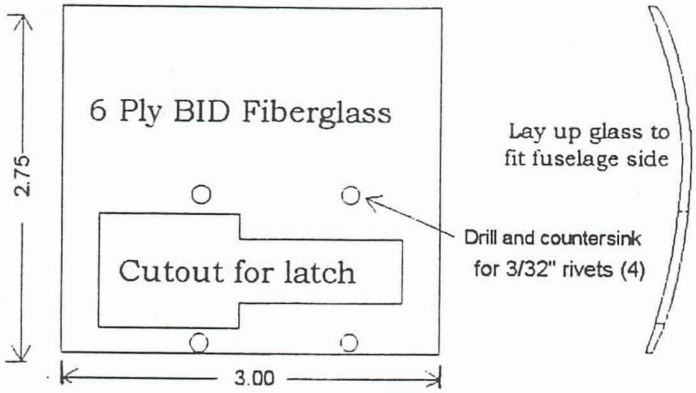
Bearing Tubes (2)



Brackets (2)

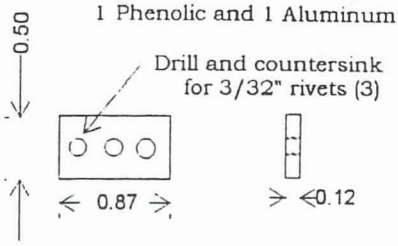


Step Door

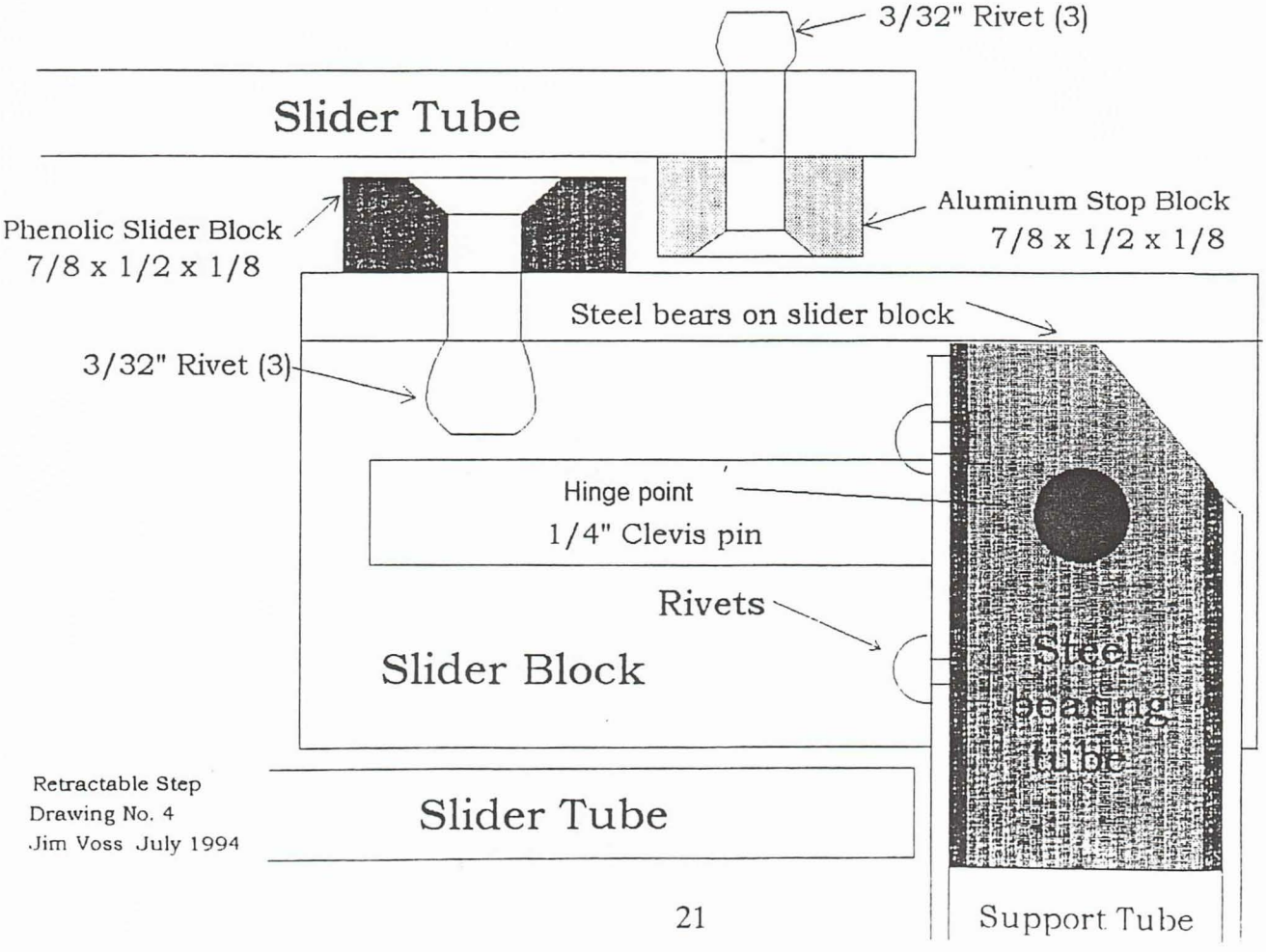


Stop Blocks

1 Phenolic and 1 Aluminum



Retractable Step
Drawing No. 3



Retractable Step
Drawing No. 4
Jim Voss July 1994