ADVENTURE NEWSLETTER #3
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PLANS The Adventure's plans are complete and being printed except for the cowling and engine installation chapters which will follow shortly. The sections in print are 150 pages of 8 1/2 x 11 format sketches and instructions and 20 11 x 17 sheets of template drawings. Two copies of each template drawing are included so one may be used to make patterns and one retained for reference. All sheets are drilled for a three ring notebook.

PARTS AND MATERIALS DISTRIBUTION The Aircraft Spruce and Specialty Company of (Box 424) Fullerton, California, will be working closely with Mead Engineering to provide a complete bill of materials for the Adventure. The prototype's materials were purchased from these folks and the service was excellent with good, quick delivery by truck or United Parcel Service. You aren't being railroaded into buying from these folks if you'd rather do business elsewhere, but I've had good luck dealing with them and recommended them highly.

Ken Brock Manufacturing of (11852 Western Ave.) Stanton, California, will be offering axles, engine mounts, canopy latches, fuel valves, control stick assemblies, elevator crossover assemblies, rudder belcranks, pushrod inserts, nosewheel assemblies, carb air valves, exhaust pipes, spinners, and possibly other prefab metal parts. Some of these are the proprietary designs of Brock and others, not Mead Engineering Company. Anything M.E.C. designed is included in your plans so you can build it yourself if you want to, but those that M.E.C. bought for the prototype instead of designing are not defined. To do so would cheat the original designer.

Mead Engineering Company is maintaining a soft line on materials substitutions. If you can find suitable substitute materials locally or from other distributors, you are welcome to use them. No effort has been made to search out alternative fiberglass cloth weaves or epoxy suppliers with acceptable alternatives. If you want to pursue this line, have at it. I'll be glad to offer my opinion of samples I receive for comment. I do believe that the materials supplied by Aircraft Spruce are of the best available quality and fairly priced, but it's the homebuilders prerogative to scrounge what he can.

Mead Engineering Company will offer canopy transparencies and landing gear springs directly. If enough interest exists, the hotwire and jig templates can be provided silkscreen printed onto]/8 inch masonite full size so all you need to do is saw them out.

ENGINES FOR ADVENTURE In Newsletter #2 (Nov. '79) the basic configurations of the "A" and "C" series continental engines were discussed. This is an expansion of that discussion into the various pitfalls that may await the unsuspecting homebuilder.

It is likely that most of us looking for engines will find that the best buys are in runout engines or partially runout engines removed for bigger replacements or from pranged airplanes. A runout engine isn't necessarily junk and an engine only 100 hours since major may well be just that. It is generally impossible to tell for certain until the engine is disassembled, but there are some indicators that may help to keep you clear of the worst.

Engines from damaged airplanes very often have suffered a "sudden stoppage" from the prop trying to dig a hole in the ground or hangar door. An idle power stoppage that splinters a wooden prop will seldom damage the engine. Medium to high power stoppages and bent metal props are a real gamble. A tapered shaft engine actually is more tolerant of stoppage than the flanged type. A stoppage that bends the flange on a flanged crankshaft is a thousand dollar blunder that on a tapered shaft type may result only in the loss of an $85.00 hub assembly. Fortunately, a bent crank can be identified without disassembling the engine and usually you can hire an A&P to check the prospective crank for you at small cost. The key way and hub assembly of the tapered shaft engines can be dye penetrant inspected easily also. If a prospective seller can't be bothered with letting you make these checks (or a guarantee instead) I'd back off from buying.

The engines that most of us find are veterans of several overhauls or partial overhauls. The engine log books should reveal most of the engines history of overhaul, total time, etc. The little Continentals have things called "service maximum" and "new parts" tolerances on their parts. "Service maximum" parts can technically be used in "overhauled" engines and in some cases won't last 100 hours before wearing out. Engines may have "standard", "oversize", or

"undersize" parts in a variety of places and all of these things can give you a clue to the potential for high dollar parts replacement being required.

The crankshaft, camshaft, and cylinders are your major items of concern. An engine which has been through two previous overhauls and has a crankshaft which is .010 undersize is a far bigger risk than an engine with a "standard" crank. Camshafts are similar to crankshafts in that they can be standard or .020 oversize. Cylinders may have a standard or .015 oversize bore. In all circumstances, standard parts are better than over or undersized parts in that you run less risk of having to scrap major components during overhaul. Remember, these parts were "standard" when the last overhaul was done. When your rebuild is complete they may well have to be ground undersize or replaced with oversize parts. A Continental crankshaft costs about $1,000 to replace with a new part.

Cylinders that were ground to .015 oversize at the last overhaul stand a good chance of requiring replacement or rebarreling on the next.

The old pros in the engine overhaul business seem to all believe that the "weak link" in these old engines is the "top" end or cylinder head/valve assembly. Even though the Continental "service maximum" limits are technically acceptable, in practice the valves, springs, valve guides, valve seats, pistons, rings and upper cylinder bore need to be dead on or you end up with a shorter overhaul life than advertised. Strangely enough, the crankshaft or "bottom" end of the engine seems to be fairly tolerant of "service maximum" parts.

When you start looking for an engine you should try to adhere to a few basic common sense principles. You engine will have to be equipped with two magnetos and a carburetor. Occasionally, you'll see engines for sale at what look like good prices without mags or carb. The facts of the matter are that if you try to buy the mags and carb separately, they may cost half again as much as the basic engine. Tapered shaft-type engines often go for sale without the propeller flange assembly that retails for about $85.00. Even minor items like spark plugs are a major dollar investment these days and it hurts if these items have to be added to the price of an engine. A new major overhauled C-85 priced at $1800 might look like a super buy. If you had to then buy magnetos, carburetor, prop hub, spark plugs, ignition harness, cover plates, and gaskets for unused accessory drive pads your super buy might turn out to be average or even below average. Also, bear in mind that your accessories have a limited life too. Just because the engine has had a quality overhaul doesn't automatically mean the carb and mags are serviceable.

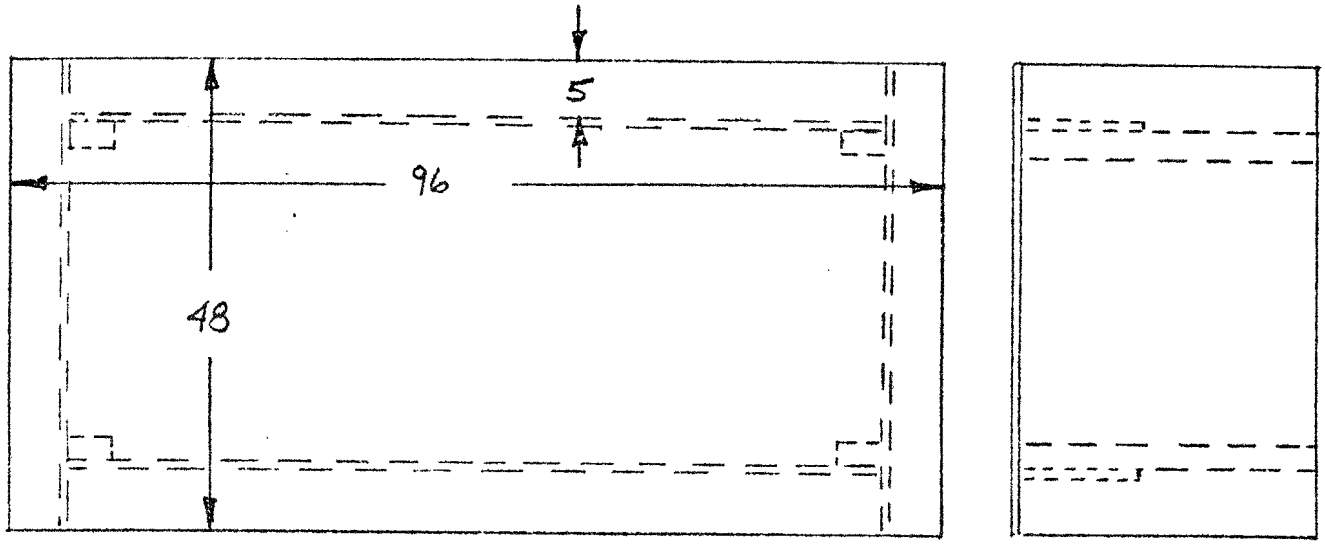
You won't get to be an engine expert by reading the Adventure Newsletter and the less you know about engines the more trust you have to place with the judgement of others. The best insurance you can get of a good engine is to buy it from someone you trust. At the very least find someone knowledgable to help you evaluate an engine before you buy. Even if you have to hire commercial advice, it's money well spent. If you are in the market for advice on small Continental engine or are looking for trustworthy overhaul services, send a letter to Earl Burnette - Burnette Aero Services, Airmen Acres RR3, Collinsville, Oklahoma. If you are seeking advice or service, be sure to include a stamped, self-addressed envelope for a reply. Please remember that Earl's a businessman, not Dear Abby, so don't waste his time.

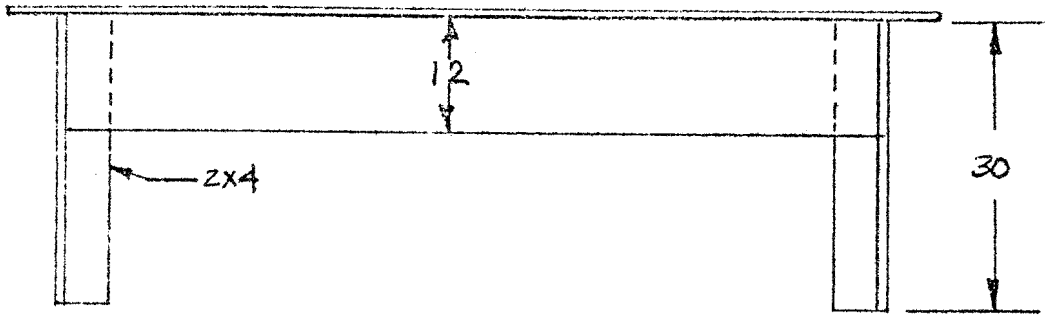
THE PROTOTYPE'S ENGINE A number of compromises were made when the proto's engine was purchased to try and save some dollars as well as squeeze a little more service from old engines. The prototype's crankshaft is technically junk because it has been ground .020 inches undersize. Continental allowed only .010 for civilian engines. Back during World War II, the Army Air Corps was allowed .020 and oversized bearings were manufactured to match. Structurally the difference in strength and stiffness of a standard crankshaft (1.936 inch diameter at crankpins and 1.872 at the jornals) and my .020 undersized (on the diameter) shaft is about four percent. For small diameter wooden props like the Adventure's, I feel confident that the four percent loss of strength is an acceptable compromise. The bearings are available from ElReno Aviation, who sell them to airboat enthusiasts. These ElReno troops are liability conscious so don't mention airplanes if you don't want a lot of flack. The front main bearing isn't available .020 oversize so if you are entertaining similar thoughts, you need a crank with a good (.010 under or standard) front main journal.

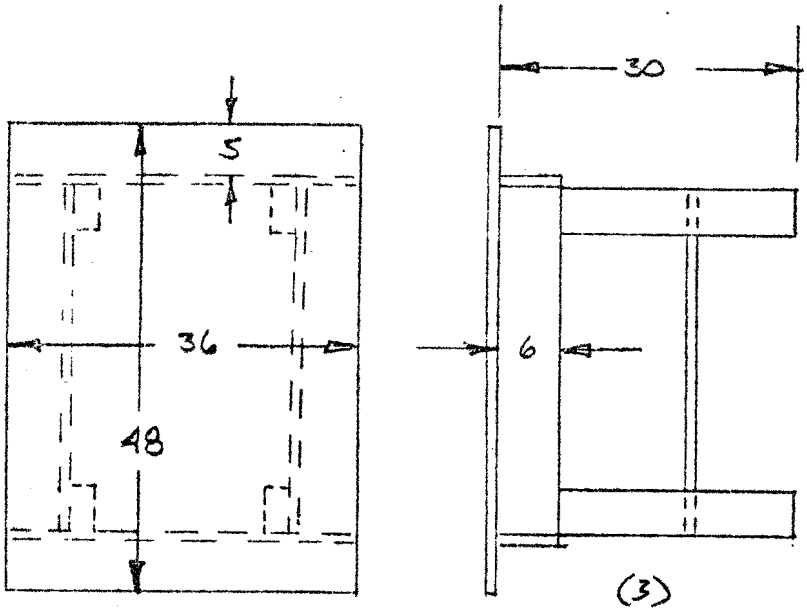
By using a "scrap" crankshaft in my engine, I was able to save about $600 bucks (the cost of another used crank). The proto's engine also has .015 oversize cylinders. The quality of workmanship, techniques, and materials used in the proto's overhaul were all to aircraft standards with the exception of the .020 undersize crankshaft. This allowed me to buy a new

overhauled aircraft engine for the price of a "standard" runout and about half the price of a commercially converted Volkswagon engine (which I am still not convinced is reliable).

WORK BENCHES The work benches used on the prototype worked out very nicely without costing an arm and a leg and they were easy to build. The objective is simply to get a flat, level working surface. Sheets of 4 x 8, 3/4 particle board, 2 x 4's and particle board shelving were used to make the tables shown below. Epoxy and flocked cotton (flox) were used to bond everything together. These benches were assembled up-side-down on a flat level floor, the parts spread with flox, then clamped in position to cure. For the prototype, one 48 x 96 bench and two 36 x 48 were made. An intermediate shelf was added between the 2 x 4 legs of the small benches for rigidity and extra storage. One of the small benches and one large one will do the job if your shop space is limited.







MATERIALS SUBSTITUTIONS The Adventure plans specify the use of MS21042 reduced dimension locknuts throughout. I have discovered that since the prototype materials were bought, these cute little all metal locknuts have increased in price about threefold. There are about 150 MS21042-3 nuts called for in the plans and only about 40 places need the small size. You can substitute AN363-1032 or AN365-1032 nuts for the other 110 and save about $6.60. All of the MS21042-4 nuts may be replaced with AN363-428 or AN365-428.

You guys who love scrounging to save a buck can spend your time looking for a local source of styrofoam. Aircraft Spruce does a super job on foam fhipments, but due to the bulk involved, it all has to go by truck. The shipping charges can rival the cost of the foam if you are a long way from California. Most moderate sized towns will have a Dow styrofoam insulation distributor. You may have good luck finding the 4 x 24 x 96 and 1/2 x 24 x 96 slabs of brand I.B. styrofoam. The 7 x 14 cross-section blocks are not in common use and it may be found only in major Dow distribution centers. The 7 x 14 size is called brand F.B. and is used primarily as pipeline insulation.