T-18 NEWSLETTER

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HOW TO GET STARTED - Several persons have asked how they should get started on the T-18 if they have never before built a metal airplane. Well, I can't say that it makes much difference having seen projects started in various ways. One of the first things you should do, regardless of the part that you choose to build first, is obtain a few necessary tools and equipment. First, you will need a nice smooth work table. For this I built a simple framework with six 38" legs and bought a 4' x 12' piece of 3/4" thick chipboard for less than $10. to form a perfect table top. Don't expect good results with matched hole tooling if you do your transferring on a piece of bent cardboard on the uneven workshop floor.

The next thing is to start accumulating tools. Here is a list of essential tools, their cost and sources:

Whitney Junior Punch	$12.50	Whitney Tool & Die Co.
1 extra #30 punch	.50	Rockford, Illinois
Pop Riveter	3.50	Sears
Hand drill		Everywhere
Sheet Metal shears (straight and right or left-handed)		Everywhere
Scriber		Everywhere
Decimal scale (at least 18" long)		Sears
6 foot tape		Everywhere
Several C clamps		Everywhere
Sheet metal clamps (look like clothespins)	.40	Sears
Bucking bars		Junk yard
Rivet set		Junk yard
Dimpling tools		Make
Hacksaw, files, etc.		Everywhere
Stanley Sureform raspplane		Everywhere
Vise		Everywhere

In addition, these tools should be available at least on a loan basis, or are optional for convenience.

Band saw	Air compressor	Milling machine
Sabre saw	Drill press	Reamers, several sizes
Welder	Lathe	Belt sander
Rivet gun	Tube bender (hydraulic hickey)	Buffing wheel
Spray gun		

DIMPLING - After much experimentation with various dimpling tools and techniques, we have discovered how to make dimples which give a nice smooth finished job. Common dimpling problems are: (1) the area surrounding the dimple becomes recessed; (2) the dimpler scars the metal surrounding the dimple, or (3) the depth of the dimple is incorrect. The first two problems can be solved with proper shaping of the dimpling tools. The face of the female part should be dome shaped so the flange on the male tool cannot pinch the metal and cause an indented ring. It is necessary to have a generous flange on the male tool to force the surrounding metal down perfectly flat. Since there is some variation from one batch of rivets to the next, the best way to make sure the dimple has the proper depth for a flush fit is to make a test sample.

It is necessary to obtain the use of a lathe to make a dimpling set. It is preferable to use a steel which can be hardened, but I have made some from only mild steel and they seem to be holding up well. The male part is made from bar stock at least 7/8" diameter by 2" long or longer. One end is simply turned down to the exact dimensions of the rivet which will be used. The face of the flange should be perfectly flat with the outer corner rounded. Polish to prevent marking the material being dimpled. The only way we have been able to completely prevent marking the aluminum with the flange on the male tool is to cover it with a good grade of cloth tape. Adhesive tape will work well. At least a 1/2" hole should be made in the center of the tape so it does not affect the dimensions of the dimple. If the tool is not made with a flange extending well beyond the rivet head die, the area surrounding the dimple will be deformed and the surface smoothness will be disappointing. If a lathe is not available, a tape-covered hammer and a rivet can be used as a substitute for the male part of the die.

The female part of the die can be made by drilling a 1/8" hole in a piece of steel and countersinking until the rivet to be used fits perfectly flush in the hole. To prevent marking the aluminum with the flange on the male die, it is absolutely necessary to make the face of the female part dome-shaped. Approximately a 3/4" radius seems to do the job. You'll be able to make dimples that are almost as smooth as countersinks with this tool.

A very convenient way to save material on the female part if dies for rivets with several different angled heads are to be used (100° for AN rivets and 120° for Pops), is to make removable inserts as shown in Figure 1. Inserts can also be made to fit round and brazer head rivets for use in hand driving rivets without a gun.

Remember that it is important to polish all dimpling tools and rivet sets to prevent putting stress-rising scratches on rivets or the parts being joined.

The ideally installed flush rivet should be perfectly flush with the outer surface. Since it is not possible to be perfect in all cases, from the drag standpoint, it is better to be a little low than high. That is, it is better to over-dimple rather than under-dimple. Also, it is easier to fill in a recess with putty than to sand down a high rivet.

DRIVING RIVETS - Even if you plan to use Pop rivets you will probably want to use AN rivets in areas where it is convenient to drive them by hand on the bench. The main spar is a good example. Also, it is much cheaper to use AN rivets. Well, I've never seen the subject of hand driving rivets covered in a textbook, so if you are now at the sheetmetal business, you are probably wondering how to go about it.

The secret is to use a good heavy backup block - the heavier the better. I use a two-foot long piece of railroad rail on which I have a spot polished where I place the head of the flat-head rivets for driving. To drive round and brazer head rivets, I place the previously described 2"x2"x3" steel block on top of the rail with the appropriate insert to fit the particular rivet being driven.

The recess in the insert is made by grinding a drill with a radius on the end to approximately match the shape of the rivet head. Polishing is accomplished with a piece of emery cloth forced into the recess with a rounded wooden stick while the insert or stick is spun. It is preferable to make the radius of the recess slightly larger than the radius of the rivet head or the edge of the tool will mark the rivet head and deform the head in the wrong direction.

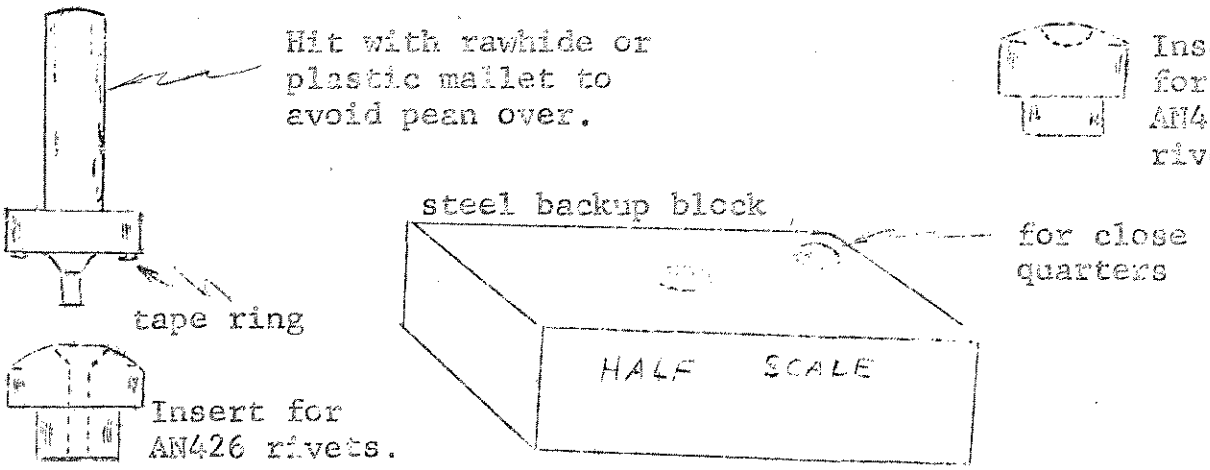
Hi SHEAR RIVETS - Since the last newsletter I have discovered two sources for Hi Shear Rivet kits. Rudy Adler, 13503 Cheltenhan Dr., Sherman Oaks, Calif., and Sport Aero, P.O. Box 1394, Brunswick, Ga. Both are handling the Hi Shears so I will not bother placing a large quantity order as I mentioned in the last newsletter. If you have written to me reserving a kit, please contact one of these sources.

MATERIAL SOURCES - Nearly every day I receive inquiries about a good source for extrusions or other materials. At least one source is now available for everything from extrusions to complete T-18 material kits. This is Sport Aero, P.O. Box 1394 Brunswick, Ga. He is also willing to build landing gear assemblies if there is enough interest. George Schiller, 736 Christianson Ave., Madison 14, Wisconsin has some of the extrusions at surplus prices and Merrill Jenkins, Harbor City, Calif. has a complete line of extrusions.

T-18 MANUAL - Dick Cavin is preparing an EAA Builder's Manual on the T-18. It will include the articles on Building the T-18 which appeared in Sport Aviation as well as selected articles from our Newsletter. Since these projects have a way of getting delayed, if you are anxious to start building and don't have the building instructions from Sport Aviation, I'll send you a set of reprints for $2.00. This is the actual reproduction cost quoted by a local shop.

NEWSLETTERS - We have run off some extra copies of the Newsletter so if you do not have all the issues and desire them, please send me a letter listing the ones you do have and we'll fill the orders while they last. To pay for publishing costs we have asked each builder to send us a couple of dollars.

CORRESPONDENCE - I am very happy to answer your letters regarding the T-18. However, due to the large volume of mail, I would appreciate receiving a stamped, self-addressed envelope with each letter requiring answers.



LANDING GEAR - Since very few heat treat facilities are able to handle the gear in one piece, I am making mine in 2 pieces. Simply replace the 1.5" tube with a 1.25 x .082 cross tube. Cut this tube at the fuselage centerline and insert a 5" piece of 1.125 x .120 tube turned down to fit inside. Bolt the splice together with four 5/16 bolts. Instead of welding one leg at the apex of the triangle, weld in a 4" piece of 1.5 x .120, insert the gear leg and secure with 2 bolts. To make the gear softer, cut a taper from the cross piece down to the axle on each leg. Taper the 1.5 tube down to .020 wall and the 1.25 tube from the end of the 1.5 tube down to .120 wall. John has approved this modification for publication. -16.0

GET EM FLYING!