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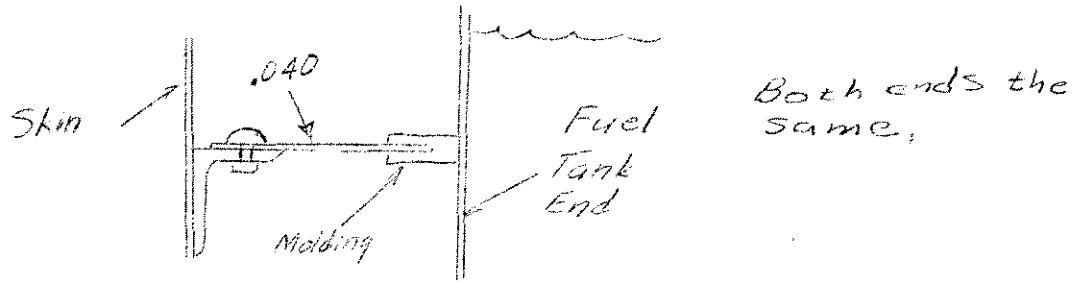
NEWS FROM THORP

Canopy Seal - John Thorp has a special die for the rubber canopy seal. He will have a new batch made and the details on how you can obtain some will appear in the next newsletter.

Tank Supports - John has riveted a strip of .040 2024T3 horizontally on the 3/4" angle at WL42 to keep the fuel tank from shifting sideways. It is padded with rubber. See sketch.



Modified T-18's - Questions are often asked about the possibilities of 65 or 85 hp T-18's. None are in the mill, to my knowledge, and Thorp strongly doesn't recommend it. Also, some have considered increasing the span to 25 feet to reduce landing speed. He says calculations indicate this would reduce the minimum speed 4 mph but would add about 25 lbs. Flaps should reduce it 5 mph.

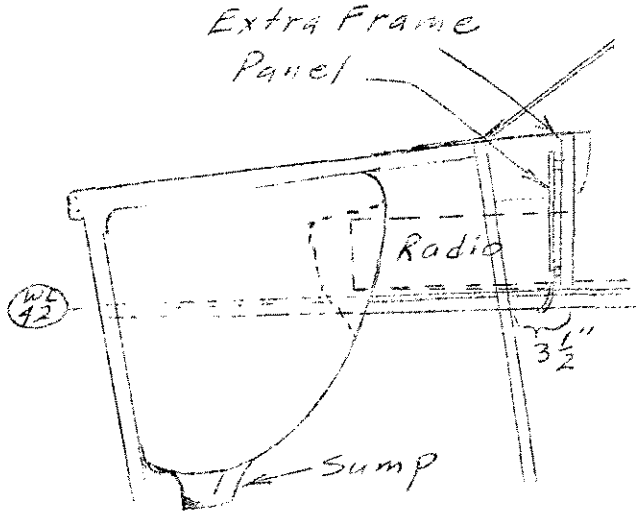
LET'S GO -- Another new year, and you have probably resolved to get busy on your project and finish your airplane this year, so we will expect to hear a lot of progress reports coming in. If you are wondering just how long it is going to take you to complete your project, I have figured out a very simple way for you to estimate your completion date. It is my guess that it will take about 2000 hours labor to complete a T-18. It took me about 2200 hours to complete a SkyCoupe and all indications are that it will take about the same amount of time on the T-18. Now just figure out how many hours per week you spend on your project. If you are really serious about your project you will probably be spending about 20 hours per week or 80 hours per month on it. At this rate, you would be spending 1000 hours per year and your project could be completed in two years. On the other hand, if your wife is really holding tight on the reins and won't let you spend much time in the workshop, you might be spending only about an hour a day or 30 hours per month. At this rate it will take you over 5 years to complete the project. Of course, the number of hours that it takes to complete a project is largely a function of the individual builder. It may take one individual twice as long as it takes another to do a given task, so, it might take some people 4000 hours to complete a T-18. It is quite unlikely, however, that you could complete one in less than 1000 hours.

If you have a nice roomy workshop in which to build your T-18, you should feel quite fortunate. There are those who are working under much less favorable conditions such as Ray Remy who is building his in a real city environment on Long Island. He tells me he has aluminum scattered all over his apartment and is cutting out parts in the living room. After his work sessions, he has to straighten everything up and put all his parts away. Of course he is going to rent a garage to do the assembly work.

You'll find one of the biggest problems in your entire project, if you are a family man, is learning how to work the project into the family schedule. If your wife is agin you, you will have an uphill battle all the way. Those of us who have wives who cooperate are very fortunate. My 12-year-old daughter, Lisa, is even getting pretty good now on the bucking bar so I am beginning to get some help. Someone would probably do the Home-

builder's movement a great service if they would write an article for Sport Aviation on "Family Relations and the Homebuilder".

Fuel Tanks - Last month we had a fine article on building fiberglas fuel tanks but I forgot to include a sketch of the tank so it is being included this month. Following Don's instructions I have just built my fuel tank. With the recess for the radio included, the tank will hold three quarts less than the standard tank; however, since the tank has a sump it is possible to safely use up more of the fuel in the tank than if no sump were used. So, this is probably not such a bad arrangement. Don put an inverted system in his T-18. He obtained plans from Ray Stits for $15. for the inverted system. Ray included in the plans a number of alternate approaches to inverted systems. You can do aerobatics in your T-18 without an inverted system but of course it means that you cannot fly inverted for prolonged periods. Although I am looking forward to doing aerobatics, I have decided to not go to the extra weight and complexity of an inverted system. I am going to use a Volkswagon fuel gage although I am looking forward to the convenience of being able to visibly check the fuel level in the fiberglas tank, especially when the fuel gets down to a very low level. It might make those last few minutes when you are trying to stretch the fuel, a little more pleasant.



There are two problems that you should watch out for in building fiberglas tanks. First, you should make sure that you do not let the weight build up excessively. You can very easily double the weight of your tank with a few extra layers of cloth or mat. The second problem is that fuel tanks often leak. A leak may start at one point and follow a glass strand and come out eight inches away. Dick Cavin tells me that one way to eliminate this problem is to dump a cup of thin resin inside the tank after it is completed and tumble the tank thoroughly to coat the inside with a film of resin. Of course, one of the main advantages of a fiberglas tank is that it can be readily repaired in the aircraft. I once talked to someone who had a leak in a miniplane aluminum tank somewhere in Arizona on the way from California to Rockford, Ill. They weren't very happy about the repairability of an aluminum tank at that point. One way to determine whether your fiberglas tank is strong enough is to test it under pressure, not too much pressure of course. The tank should be installed in the fuselage and tested to 4 psi while filled with water. Dick also said that Bob Kaergaard's aluminum tank has become indented at the supports so some builders are flush riveting a 2" wide strip of .040 2024 to the support to give it a wider footprint.

Progress Report - Many of you have written to me asking how much progress I have made on my project. According to my log book, I started working on the T-18 December 7, 1963. I now have all of my riveting completed with the exception of the top of the fuselage which I am leaving open for FAA inspection. I have cut down the top deck underneath the canopy and have installed the canopy rails. John Thorp said that it would be perfectly alright to cut a hole in the top deck for the installation of a jump seat in the baggage compartment. However when the plans came out they showed the canopy rails extending too far forward for this. But since the aft rails are about 1.5 inches longer than the front rails I shortened them. Also I moved the rails in about 0.5" and back 1.5 inches. This made sufficient space for a jump

seat. I left at least 3 inches at the front and sides of the cut-out and bent down a 0.5 inch flange around the hole for stiffness. The tunnel will be extended through the luggage compartment. Since the cables for the flaps will pass through that area, a false floor may be required. Jack Park just wrote to me that he thinks the bending of the skin on the flap was the hardest part of the whole project. I really don't think this was too bad but I have a new candidate as the hardest thing to do in the whole project. I spent a complete day putting the flange on the top front skin where it joins the windshield. People had told me that you simply take a slotted stick and work it along the flange to bend it up, but I found this was easier said than done. It would take a book to describe how I went about doing it but the best way to sum it up is that I "worried" the flange up, using every tool at my disposal. It finally turned out fairly smooth so I plan to put my windshield on the inside as have some of the other builders.

I discovered that the easiest way to bend the flap skin was to make the larger radius bends first and then put in the sharp leading edge bends. My only trouble with the flaps was that they ended up with a slight amount of twist. This was caused mainly because of my assembly technique using AN rivets. When using AN rivets it is necessary to hold the trailing edge apart while you rivet the skin to the spar. During this operation it is difficult to insure that there is no twist getting built in. Had I used pop rivets I could have held the flap in perfect alignment while the entire assembly was pop riveted. There is a way of getting around this problem however, using AN rivets.. First, cleco the skin to the spar and also cleco the flap trailing edge; then, insert about a half dozen pop rivets in the skin and spar to hold the assembly tightly. Pop rivets will hold the skin much more firmly than will clecos. Then open up the trailing edge and rivet the skin to the spar with AN rivets. After this is complete if you do not want to leave the pop rivets in the assembly, they can be drilled out. Do this while the trailing edge is still open. You can hold the pop rivet from the inside with a pair of pliers while it is being drilled out. It is quite difficult to drill out pop rivets since they will invariably want to spin with the drill. With a little care they can be held with a sharp instrument from the outside however.

I am getting ready to hang my engine on the fuselage to begin working on the cowling. With the turtle deck now cut off I am toying with the idea of building a slide-on type head rest so the airplane can be flown open-cockpit in warm weather.

Exhaust Systems - I am presently welding up an exhaust system for the O290-G engine. I was fortunate enough to find, at a local salvage yard, enough 1-3/4" stainless steel tubing already bent to make a complete cross-over system as shown on the plans. Stainless steel is really a "doozie" to weld even with the proper flux and rod. If you are lucky enough to obtain the proper bends to make your exhaust system from stainless tubing I would recommend that you get an expert to show you how to weld it. I haven't heard of a source for prebent stainless tubing so if anyone knows of one please let me know. John Thorp recommends that homebuilders use regular automotive exhaust tubing that can be purchased prebent. It can be porcelainized for durability.

If anyone has built their exhaust system and would like to pass on their experiences, it would be greatly appreciated. For instance, has anyone made mufflers? Although most people feel mufflers don't appear to be needed on the T-18, some builders might like the added noise suppression.

I just noticed that Ralph Thenhaus made his cross-over system by crossing the front cylinder exhaust in front of the oil pan and crossing the rear tube behind the carburetor. This looks much simpler than the way shown in the plans with both crossovers in the front. The only problem would be that there would be no room for a muffler on one side if this were desired. Thorp says

it is ok to cross one tube over in the rear.

Material Kits for the Northeast - Our local aluminum distributor has just given us a quote on supplying aluminum sheet and tubing kits for the T-18. These kits will be shipped post-paid anywhere in the Northeast. This includes all of the states northeast of the western borders of Maryland and Pennsylvania. Those outside this area who are interested will have to pay shipping costs. These kits include the major requirements for sheet and tubing. Because of quantity prices and handling, kits will not include less than complete sheets (3' x 12' or 4' x 12') or single length tubing (12'). Because of this two priced kits are being offered: (1) The "partial kit" contains all sheet except for the .040 2024T3 and 6061, and contains tubing for the control push rods and canopy frame but not for the horizontal tail spar (2" x .083" x 6 ft). (2) The "complete kit" contains all of the partial kit material plus a sheet of .040 2024T3, a sheet of .040 6061T4 and a 12 ft length of 2" x .083 tubing.

If you buy a "complete kit" you will have 6 ft of tail spar left over and more than a half a sheet of each type of .040. This is worth about $30 to $40. The best deal is for two builders to go together and order one "complete kit" and one "Partial kit" between them. One of the builders would have to take care of cutting and shipping to the other. If you don't have a partner to share the surplus send a check for the "complete kit" and tell us you want a partner. We'll try to match up pairs. If we're successful you'll get a refund.

We have obtained prices for individual kits and kits in groups of 5. The cut off date for this offer is April 15, 1966. If we recieve enough orders we will get the 5 quantity prices, otherwise the single kit prices will be charged.

Kits and prices are as follows:

A. Partial Kit

1 sheet .020 (or .016) 2024T3 alclad 36 x 144
1 sheet .025, 6061T4 36 x 144
9 sheets .025, 2024T3 alclad 48 x 144
1 sheet .032, 2024T3 alclad 48 x 144
1 sheet .032 6061T4 48 x 144

36 ft (3 lengths) 3/4" x .035, 6061T6
24 ft (2 lengths) 1/2" x .035, 2024T3
12 ft (1 length) 1" x .035, 6061T6
12 ft (1 length) 2 x .049, 2024T3

Single Kit price ea $241.00
5 kit quant. price ea $195.00

B. Complete Kit

Same as above plus the following:
1 sheet .040, 2024T3 alclad, 48 x 144
1 sheet .040, 6061T4, 48 x 144
12 ft (1 length) 2" x .083 tubing 2024T3

Single kit price ea $305.00
5 kit quant. price ea $247.00

Please send certified checks or money order payable to: Whitehead Metals, Inc. Send orders to L.D. Sunderland for above kits.

Tubing-D. Cavin also has just received a quotation from a distributor for aluminum tubing kits. The price given is for a minimum order of 20 kits. Send your order to Dick Cavin, 10529 Somerton, Dallas, Texas and he will place the order when the required number is received. Make checks payable to "R.K. Cavin, Special Acc't." for the following kits.

Control Kit - $23.74 each

6 ft 2024T3 2" x .083 wall
12 ft 2024T3 2" x .049
12 ft 6061T6 1" x .035
4 ft 6061T6 0.5" x .035

Canopy Kit - $7.41 each

30 ft 6061T6 .75" x .035
1 ft 6061T6 7/8" x .065
2 ft 5052-0 3/8" x .035

Alternators - If you want to save a few pounds on your electrical system installation, use an ac alternator rather than a dc generator. They are now used quite universally on new automobiles so you shouldn't have any trouble picking one up at a junk yard. There are only two problems, cost and size. I obtained a 1965 corvair alternator for $10. from a friend, but you might have to pay a little more. List price new is about $62. The diameter is 5.5 inches, an inch larger than a generator but it weighs only 10.5 lbs. Power output is more than adequate at 37 amps. Some other makes are larger and weigh more and you might have trouble fitting them neatly under the cowling.

Windshields - A windshield can be formed very easily if you can find a large enough oven to heat an 18 by 60 inch piece of plexiglas. The form is made of two plywood formers and a piece of .025 sheet aluminum. One former is the exact shape of the rollover bar windshield frame and the other is the shape of a section through the fuselage at the front edge of the windshield. These two formers are nailed to a wooden base, then they are covered with a piece of .025 aluminum which is tacked in place. Make sure that the tack heads are countersunk and preferrably are located outside the outline of the windshield. The aluminum is then covered with ordinary outing flannel which is tacked to the wooden framework. Presto! you have a windshield form.

Now all you have to do is obtain a 18 x 60" piece of plexiglas and an oven big enough for it. I found a local sign shop which uses a pizza oven for this purpose. He has a piece of 1/4" hardboard inserted in the oven with holes cut in it. The plexiglas is placed on this. Even though it is oriented horizontally, it caused no markoff on my windshield. If you get stuck for an oven, why not try the local pizza shop.

The oven is heated to 375°F. This is the temperature at which Piper Aircraft had their oven set when we visited there and I found it works fine. At least two people are needed to remove the plexiglas from the oven. Soft cotton gloves should be used. Simply drop the plexiglas over the mold and hold down the edges until it cools. Plexiglas has the nice quality that it will return to shape after being reheated. So if you have trouble just put it back in the oven and start over. The windshield should not be trimmed to size until it is formed. If you don't follow these simple instructions you are likely to end up with a crazed windshield.

Canopies - Just had the opportunity to examine a canopy and windshield made by Norman Brodersen Co., 1031 W. Alondra Blvd., Compton, Calif. They were made over the same mold that Warwick's, Hansen's, and Thenhaus' were made on. They are large enough for the present design per the plans. They look very nice. Thorp is using one. The price for a green tinted windshield and canopy is $100. and for untinted is $90.

Bob Gaede, 1702 Orlando Rd., Baltimore, Md., 21234, an old ball turret maker for Martin, says his canopies will be ready in several weeks. He recommends that the canopy be shipped in two pieces and later cemented together.

MORE ON COWLINGS - Since I am starting on a mold for my cowling, I asked Merle Soule of 3236 Camelot, Dallas, Texas some questions about his. He sent me some photos of it and it looks real neat.

1. Is your cowling all fiberglas?

Answer: "I made up a complete female mold and later gave it to Lee Hamlyn who is going into production on them. I made a complete fiberglas cowl

since I had the mold, but the top and sides could easily be made of .025 2024T3 since the male pattern was metal in these areas and they have simple curves. You will be able to buy any or all of the 3 parts (top and sides, nose, or bottom). Personally I would recommend buying the nose and bottom since they are very difficult to make." (Ed. note: His bottom cowl really makes a snug fit so if you have any unusual bulges like an alternator or a not-too-neat crossover exhaust system, you might have to make your own.)

2. What provisions are made for access?

Answer: "The cheeks are hinged for access, each at the top. The bottom row of Dzuz fasteners are low enough (on each cheek) not to be too noticeable. All eight plugs are accessable but a door will have to be cut for the dip stick. The cowl is set up for a 4" prop extension and will fit everything up to an O-360. A 180 hp which is about 1.5" wider, will not fit since the present cowl fits very tight on the 150 which I have."

3. Your cowl appears to have no opening for carb air intake. How will that be arranged?

Answer: I plan on using bleed air from the left air intake for carb use and right intake bleed air for oil cooler air. This creates less aerodynamic drag on the cowl. The mold I gave to Lee did not have a cutout for carb air. Since most builders will have different ideas, they can cut their own holes. A Falcon carb automotive air filter can be used (with the case partially protruding.)"

4. Now that you've made your cowl, are there any changes you would recommend?

Answer: "It would be difficult to make a cowl more streamlined unless you use a longer prop extension. As it is now, there is room for a crossover exhaust system, starter and alternator.

Lee made a cowl from the molds I sent him and tried it on Jack Park's plan and it fit real well. Thorp said it was very similar to what he had in mind and didn't recommend any changes so it ought to work. It will be early summer before I check mine out." (Ed. note: I just visited Lee Hamlyn and saw his cowl. It's really nice and I've ordered one. Lee also has new wing tip molds which are nice and smooth. More on this next month.)

Countersink for pop rivets - Marson Corp, Revere 51, Mass. has a countersink drill for use with countersunk K pop rivets. It drills and countersinks in one operation and is double ended. Bill Baugher, #13, says it works fine.
Question: Does Butt Line (BL) mean something just below the Waist Line(WL)?
Answer: Sometimes.

T-18 Newsletter Policy - This is a "for fun" publication as an exclusive service to T-18 builders. Any builder who donates $2. will be put on the mailing list and receive all back issues except 1 and 5. (Where are they Dick?) All donations are used to pay printing and mailing costs. When we run out of money we'll ask for more but we still have enough for a few more newsletters.

Pending the printing of a T-18 Builder's Manual by EAA, reprints of the T-18 Building Instructions which appeared in SPORT AVIATION are available from me for $2. The T-18 Newsletter has no connection with any commercial suppliers although information on material sources is printed free. John Thorp does not necessarily endorse all material but the editor keeps in close contact with him. Any published design information or assembly procedures which he does endorse are so labeled. Articles and tips from T-18 builders are heartily solicited. Material is printed to give you ideas on what others are doing but does not necessarily represent a recommendation by the editor.

This month we welcome builders from serial numbers 350 through 400.

T-18 Survey - As a result of a second mailing of questionnaires to those who didn't answer the first one, we received many more replies. There aren't as many "dropouts" as first appeared. A big problem seems to be keeping up with people who move or sell their plans. Please keep me posted if you move or sell your plans.

Bill of Materials - Many people write to me for a Bill of Materials. I don't handle one. Send a quarter to A.D. Ishoy, 215 Shephard St., Hartford, Mich., 49057, and he'll send you one.

News From the Questionnaires - Herman Rassler, 98 Constitution, Henderson, Nevada has about everything up to the firewall completed and expects to fly in '66 for a cost of $2300. He says, "I riveted the fuselage skins on the flat and am very pleased with the tight skins. The only real problem I have had was in the layout of the rudder skin. (We all say Amen, Ed.) I spent two nights trying to engineer it and still wound up an eighth inch off on one corner of the mockup. Regarding the horizontal tail beam, I plan to use plumb lines on each end to hit center top and bottom. File a notch top and bottom and stretch piano wire tight to the beam with a turnbuckle. Then spray primer. The wire should leave a fine line top, and later on the bottom. The other holes can be picked up with the templates. I moved the instrument panel back 3 inches past the bulkhead. This is easier to reach and does away with the center column by putting the radio in the panel and controls on an angle across 42 longeron which supports the bottom of the panel.

Bernard Thalman, Wilmette, Ill. has a way to hand make and straighten flanges. "Here's a tip on bending flanges on parts like the rear wing spars without a brake. A 1 x 4 x 48 piece of hard wood was cut 22° and a radius cut on the high side. The blank with all holes punched is keyed to the hard wood with two 1/8" rivets. A 2x4 makes a good back-up block, then the flange is turned slowly using a rubber mallet. Remove the rivets. The piece will have a slight bow of about 1/2" in the middle. This bow can be easily removed by putting the blank back on the form block, without keying, and instead of placing the back up block right next to the blank hold it away with two 3/4" blocks at the ends. When this setup is held in a vise the flange will be bent backwards dependent on vise pressure. The flange is then slapped with a lead bar using the bar the long ways against the flange. The 3/4" blocks may have to be moved to take the bow out towards the ends. This method of back bending the flange has been used successfully on all beams, ribs, and bulkheads. It makes clean ribs for gluing as compaired to pleating."

Bill Davis, 206 Grady Place, Langollen, New Castle, Del. tells how to grind the axle pads on the main gear. "The landing gear was tough for me, I would buy the next one. FAA man said that dye check is ok to use on welded joints in lieu of magnaflux inspection. Metal Supply Co., "G" & Luzerne St., Philadelphia, Pa. is a good place in this area to buy aluminum plate and sheet. (also tubing). They will cut to any size you want. Plate runs about $1. a pound. My Delta sander-grinder (same as a Meade Band Sander) has turned out to be indispensable. I used this to grind the axle pads on the main gear by blocking the gear up to the proper height on rollers (rest the gear on a large board and rest the board on rollers such as paint cans; rest the rollers on your table saw). One axle pad rests lightly on the sander grinder table (no rollers here). The gear is then moved back and forth across the belt. A little cut and try is necessary to get the proper angle but it isn't difficult and worked out fine. The same trick tried out on a disk sander did not work. I could not get a flat surface on the pad."

Spinners - The spinners have been shipped to me from Calif. so as soon as they can be re-packed, I'll mail them out. They're really nice. The price is now $45., but still a bargain.

Next month: - Just returned from Los Angeles where I picked up all sorts of good info, but it will have to wait until next issue.