L.D. Sunderland, 5 Griffin Drive, Apalachin, N.Y. 13732

The First 20 Hours - The longer I fly my T-18, the more I enjoy it. Although the first few hours are filled with much thrill and excitment, the newness and the few little bugs keep you from really feeling that enjoyment you get after you have flown enough to make the airplane seem like a part of you. Now that I have 20 hours on it I can say I'm truly having fun. My performance is very encouraging, although I still do not have it checked out and calibrated. On a round trip to Ithaca, N.Y. one evening, a total distance of about 60 miles, I averaged a ground speed of 173 mph. Both legs of the trip were made within a half hour so the wind did not have a chance to change. At 5,000 feet my maximum rpm was 2600 so I held 2400 the whole way, about 75% power. My maximum indicated airspeed is 174 or a true airspeed of 181. My airspeed indicator was accurately calibrated off the airplane and when installed it seems to check closely with the ground speed although I have not made a close check. We do not have any nice measured courses around here so it isn't an easy task.

My first few hours were flown without the oil cooler connected. In 70° temperatures, the oil temperature got up to 210° but head temperatures were quite low. Now that I have my Corvair cooler and oil filter connected, the temperature stays about 200° cooler. It still gets up to 210 on a long climb. The cooler is mounted on the baffle above and aft of the left rear cylinder. The oil pressure line comes off the port on top of the oil screen housing, goes to the filter mounted on the firewall, through the cooler and then back into a fitting which is silver soldered to the plate which covers the hole where the fuel pump is normally mounted. All connecting hoses are high-pressure type. The fitting on the oil screen housing was made of brass. To make the bleed hole, it was silver soldered shut and then drilled out to .065". If cooling isn't sufficient, this hole can be enlarged to .090". The only limitation is that pressure be maintained during idle, at least 15 or 20 psi.

I have now landed at three different private sod strips, two of which are mighty rough. My full flaps cut the ground roll nicely and there was no problem.

The use of full flaps makes landings much easier. Due to a river bordering our airport on three sides, there is usually a severe downdraft off the end of each runway. Coming in low and flat without flaps, many times you must add power to get through this downdraft and then end up coming over the fence at a pretty good clip making the flare and ground run rather long. But with full flaps I can come over the river at 300 feet, come down at a steep angle without being affected by the downdraft, land and turnoff at the cross runway about 1000 feet from the downwind end.

As I mentioned before, for the first few landings, I did only three-point landings to get my head "used on early for good ground control. I found however that these were not complete small landings. When I got the feel of it a little more so I could hold it off until it started to shudder, the tail would hit first, even with half flaps. One sunny day when a nice thermal was rising off the center of the runway, if I would make a perfect three-point landing it would roll awhile in that attitude and then bounce back up a few feet. So under those conditions I found it best to make wheel landings. There is no problem of directional control if you keep on your toes and

don't start waving at spectators or enjoying the scenery until it stops rolling. But then what conventional gear airplane doesn't fall into that category. (Or should we tail draggers call ourselves "unconventional" now that we are probably outnumbered?)

My induction system seemed to be causing a little problem because at wide open throttle the highest RPM and the smoothest operation could be achieved when the carburetor heat butterfly valve was in the ½ open position. This position almost completely opens both the cool air and hot air ducts to the carburetor inlet. This seems to confirm John's contention that certain airframe manufacturer's induction boxes are pure junk. I solved this problem by removing the airoraft type filter and in flight using straight-in unfiltered air. On the ground I leave on carb heat which brings in air through the automative type filter.

I am quite happy with straight sticks. It isn't necessary to bend the sticks unless a center console is used between the panel and the tunnel. For maximum comfort, I strongly recommend against hanging anything under the panel except the throttle. The throttle does fit very nicely under the panel and I think it is much handier there than when located at the top of the panel.

At an early date I got the idea that the roll-over bar should be a bit higher for better visibility so I made the roll-over bar 3/4" higher than as shown in the plans. I am very happy with my visibility and my performance doesn't seem to be too bad. I am not sure how strongly I would recommend it unless you are on the tall side. I can only say I am satisfied with mine.

The left exhaust stack cracked, was repaired with a big patch, and then cracked again. So now I have added a diagonal brace from one of the fuel pump attachment bolts (I don't use a fuel pump) down to the left stack just forward of the point where it exits the cowling. So far, this seems to have done the job. I plan to also add a brace tying the two stacks together just before they exit the cowling. A friend's Swift with a 150 Lycoming engine and a cross-over exhaust system has no support for the stacks except for a tube tying the two together at the ends. He has had no problems. My right stack has caused me no problems, apparently because the hose connection from the heat muff and the air box is so short that it helps support it. Make the stacks long enough to clear the bottom skin by nearly an inch to prevent exhaust streaks on the fuselage.

A number of people have ended up with fairly high friction in the horizontal tail pivot bearings. I also have some friction there although it doesn't bother me any. The reason is apparently not misalignment of the two fittings since the bolts slip in easily. Rather it is a slight binding between the 509 aluminum fittings and the 4130 steel fitting riveted to the frame. If you haven't made your bushings yet, I suggest that they be made on the high side of the tolerance in length. Otherwise, just a build-up of paint on the fittings may cause interference. Friction in the tail bearings decreases longitudinal stability. The higher the friction, the more forward the aft c.g. limit must be moved.

I strongly recommend that you design your cowling attachments so the entire cowling can be removed without removing the prop. After 10 hours of operation I discovered that my alternator belt was a bit loose so I had to remove the prop to get the cowling off. Much to my surprise, the loose belt was caused by a nice crack in the alternator

bracket which couldn't be seen without removing the nosepiece. I also found it very necessary to re-torque some of the nuts on the engine. After the first five hours of operation it would be wise to remove all cowling for a complete inspection.

The alternator attachment bracket was made of .093" 4130 and I thought it was rugged enough. Now I have added another reinforcement which is holding up all right. Alternator attachment brackets should be made of .125" 4130 or heavier. Make sure there is absolutely no flexure possible or the millions of cycles will soon cause a crack.

Bill Johnson - I've been in Seattle this week where I talked with Bill Johnson. He just added wheel pants to his T-18 and says it helped his cruise about 4 to 6 mph. He left for California in his ship to attend a couple of fly-ins. Sounds like a great way to spend a vacation.

Irvin Faur - The 200 hp fuel injected engine is now installed and flying in Irvin's T-18. He says he can't see much difference in speed over the 160, but the rate of climb and fuel consumption have gone up nicely. It will climb at 4000 feet/min. now instead of 2,000. Because the engine installation didn't allow room for an exhaust system, he cut 4 holes in the bottom cowling and stuck short stacks out. He made one other addition which he likes quite well. To keep out that hot Iowa sun, he painted the top of his canopy. (John Shinn is going to try a little variation of this by making an omni antenna out of aluminum tape and taping it inside the canopy. Don Carter has mounted his transmitting antenna back of the seat under the canopy.) I used to think I would like to cover the canopy with an opaque materiel for shade until I found how much fun it is looking down at the scenery through the top of my canopy.

Priming - Since my carburetor has an accelerator pump, I didn't install a primer. This seems to be a wise decision because I have had no trouble starting the engine even in the coldest weather. It sure saved a lot of trouble not having to gather up parts and install the primer.

On the subject of carburetors, John says the MA-4 works better than the MA-3 but the MA-4 only fits the O-320 oil pan.

Material Sources - Here is a list of sources for T-18 materials. If you know of other good sources, just let me know.

Canopies (one Piece)	M & R Supply P.O. Box 43 Wilmington, N. C. Glen Breitsprecher 18415 Second Ave., So. Seattle, Wash. 98148
Fiberglas Parts	Lee Hamlyn Odessa, Texas George Rabray Rt. 3 Afton Rd. Beloit, Wisconsin
Props	You're on your own. Write the prop shops that repair propellers.
Cleco Fasteners	Spencer Aircraft Dallas Avenue Seattle, Washington

Ribs & Aluminum Roll Over Bars	Rudy Adler 13503 Cheltenham Drive Sherman Oaks, California 91403
Steel Tubing	Machinecraft Troy, Ohio
Flaps and Tail Coil Springs	Spencer Aircraft
Aluminum Kits including Extrusions	Sport Aero 19 Crescent Sumter SC Merrill Jenkins Harbor City, California
Hardware, also rubber molding	All-Aircraft Parts 16673 Rascoe Blvd. Van Nuys, California 91406
Hardware	Stits Aircraft Riverside, California Spencer Aircraft 8710 Dallas Avenue Seattle, Washington 98108 B & F Oak Lawn, Illinois
Hardware, including Hi Shears and Pop Rivets	Sport Aero 19 Crescent Sumter, S.C.
Wheels & Brakes	Rosenhan 330 E. 6400 So. Midvale, Utah
Fiberglass Tanks	Floyd Naples 69 W. Bel-Air Blvd. Clarksville, Tenn. 37040
Engine Mounts	Melvin Miles 16341 Mahogany St. Fountain Valley, Calif. 92708
Spinners	John Tonzer 6658 Jumila Ave. Canoga Park, Calif. 91306
Prop Extensions	Ron Zimmerman 1915 McKinley St, N.E. Minneapolis, Minn. 55418 Merle Soule Box 20123 Dallas, Texas

Visit With John Thorp - 6/13/68 - John is in the process of thoroughly reviewing all T-18 design calculations and making the necessary changes to permit standard type certification at 1800 lbs. gross. The higher gross is being used since everyone is exceeding the 1300 lb. gross. The design is being made in accordance with all FAA STC requirements so that if the regulations should ever tighten up and require it, any T-18 built to the drawings, precisely, could obtain a standard certificate. Of course, this would require complete conformance down to the last rivet.

Bulletins - Two changes are being made. To increase the strength of the tie-in between the side skin and the 601 bulkhead, an .032 doubler will wrap around the outside of each corner at the ends of 601. This can and should be done on all T-18's intended for aerobatic maneuvers.

Secondly, the horizontal tail main spar is being changed to decrease its thickness near the ends and increase the thickness near the center. The spar will be made of 2" x .049" wall with a 34.84" long insert made from 2" x .125" wall turned down to fit inside the .049 tube. The heavy solid rib in the outer end of the 517 tab will be replaced with a bent up .025 sheet rib. Also, the -2 locator should be riveted to the end of the .049 spar. The 506 tip should be made as lightweight as possible--especially if it is made of fiberglas. Use only two layers of cloth. These changes increase the strength of the horizontal tail by 50% and increase its natural frequency by lowering the mass near the tips and stiffening the center portion. Although design calculations show that the original design is strong enough for operation under red-line speed, the changes will increase the safety margin. New drawings for these changes will be mailed out within several weeks.

I saw some of the drawings for the new air filter box. These drawings along with complete cowling drawings will be issued later. John says he can hardly get anything done for answering the phone so let's everyone let him alone so he can get some work done!!

Mod Problems - His biggest problem is still the person who wants free advice on a do-it-ycurself modification to the T-18. You can save yourself some money by not calling him about that subject because he won't approve modifications, period. If you had any idea of all the possible ramifications of the apparently most insignificant modification you would think twice before making any. For instance, what amatuer designer would think that using fiberglas tail tips instead of metal could raise the moment of inertia and lower the natural frequency affecting flutter susceptibility?

Roll Trim - If your airplane needs some additional roll trim, instead of adding a trim tab, first try bending the trailing edge of each aileron slightly. Of course you bend them the same direction that a tab would be bent. It really works great.

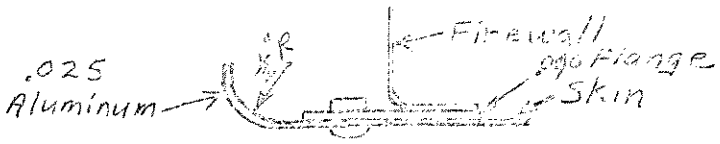
Jack Brightwell Flies #484 - You think we have troubles. Jack Brightwell of Australia has his T-18 flying and has had some interesting experiences with the authorities. They made him use a certified prop which naturally was quite long. Then they required 9" prop clearance with one flat tire. After building three sets of gear he finally got into the air. How about a full report, Jack?

Cowling - John's all-metal cowling looks very nice. Believe it or not, only the nose of each cheek requires stretching and welding. Everything else is made of simple bends. Leo Evelyn already made a copy of the nose pieces so can furnish fiberglas copies of them. The cowling has one very important feature, it is designed to be taken off in sections without removing the prop. This is an absolute must. He plans to use no screws, only camlocks, etc. Drawings will be eventually made for the cowling.

Horizontal Tail - Several people have made mistakes in positioning the 510 fitting on the horizontal tail spar. Check it carefully. If you goof, don't drill a new set of holes.

Tailwheel Steering - If you have especially stiff tail wheel springs and think the tailwheel steering is a bit too sensitive, you can drill new holes inboard about 1" on the rudder horns to attach the springs.

Cooling - For best cooling, the .080 flange should not be trimmed off along the sides of the firewall. Instead it should be used to attach .025" strips bent with about a ½" radius like this:



There are two sizes of Corvair oil coolers. One has about twice the cooling capacity of the other. The most common one is the small one. Use the big one for best results. I opened the bleed hole up to .090" but the oil temperature still got up to 230°F in 90° outside air. I'm going to try a larger hole to get the temperature under 200°F on a hot day although the red line is 245°F. The limiting item on the size of the bleed hole is not pressure at cruise rpm but rather pressure at idle. For best cooling, place the oil cooler in front of the left front cylinder.

Oil - In warm weather, use SAE 40 weight oil. If chrome rings are used, detergent oil can be used from the start. (The O-290-G ring set has a chrome top ring.) If standard rings are used, it may help to set the rings by using non-detergent oil for 25 hours.

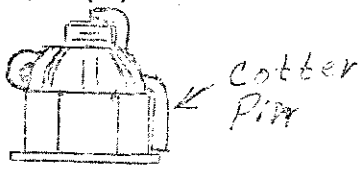
Break-in - John doesn't believe in a ground run-in for an aircraft engine. The dimensions of parts hardly change over many hours of operation. He simply assembles an engine, runs it enough to make sure it is working OK and then flies it at normal rpm.

Templates - I now have a complete set of templates for all skins on the T-18 except the rounded forward top fuselage skin. These templates were made from Thorp's. They include rudder, wings and tail. Since the rivet holes are already located on the skins, it is necessary to transfer hole patterns backwards to frame, spars and ribs. For instance, for wing rib rivet holes, a long transfer strip must be made from the wing skin pattern. Then this must be wrapped around the full-size tooling rib and holes punched into it. Then this full-size rib is placed inside the master overlay rib and holes punched in the overlay. Then you can insert the ribs in the overlay and punch the holes in them.

So now I have one set of fuselage templates and one set of templates for the entire airplane. The charge for use of the fuselage templates is $3 and for the complete set is $8. This is just enough to cover cost of replacement. Each user pays his own shipping to his location.

The only problem with the template deal is that only a limited number of people can use them due to the large amount of time consumed in shipment. To make the T-18 a real snap to build, perhaps the kit suppliers like Sport Aero and Merrill Jenkins should make a set of templates and then mark all skin kits before shipment. It would be worth a few bucks extra if this could be arranged. I am contacting both Sport Aero and Merrill Jenkins to see if this can be arranged.

Safetying - During a recent inspection of a beautiful homebuilt biplane in my capacity as Designee, I came upon a surprising error. All the cotter pins were turned sideways. Upon checking through CAM 18 I found that it did not even tell how to install cotter pins. Since some of you might be in the dark about this, here are some pointers. 1. Use only properly plated cotter pins. Hardware store variety will rust. (2) Use the proper size for the hole. (3) Bend one half up and around the end of the bolt. Cut off so it just comes to the bolt centerline. Bend the other half down and cut off so it just touches the washer. (4) Never re-use cotter pins or safety wire.



Safety wire should be installed where cotter pins can't be used like on prop bolts or studs in the oil pan. The wire should be tightly twisted between bolts and installed so that if the bolt tries to come unscrewed it will put tension on the wire rather than compression. Don't use rough j ed pliars to twist wire or it may become badly cut up. Either use a special tool or twist by hand. Don't safety all prop bolts with one continuous length of wire. Use stainless steel wire.

Washers - All nuts must have washers under them. Since bolts com in 1/8" incremental lengths, it might be necessary to use two washers--but no more. Also the bolt should be long enough so no threads bear against the material being joined.

Elastic or metal stop nuts are permitted on any bolt not transmitting a torque load. Make sure that at least one full thread is showing above the nut.

Hardware - Only AN hardware is permitted so don't buy any bolts or nuts from a local hardware. Send to an established aircraft supply house. Good sources are: All-Aircraft, Spencer Aircraft, Stits, B&F, and Sport Aero. Ads appear for all these in Sport Aviation.

Material Sources - Some time ago I received a letter from someone saying that he didn't know where to buy materials and "of course the newsletters were of no help". I wasn't aware that we didn't have a source listed in the back newsletters. There is no charge for ads so if you want anything included, just let me know.

Newsletters - Re-read your old newsletters once in a while to refresh your memory. Quite frequently I find people making mistakes that could have been avoided if they had remembered what they had read.

Zip Codes - Don't forget zip codes. The post office will not accept newsletters without them.

Visit With Thorp - 6/27/68 - Stall Spoilers - My T-18 had a decided habit of dropping off on the right wing in a stall. There was plenty of warning first with lots of buffeting; however, I decided to try the stall spoiler John suggested. About the only effect they had was to raise the speed that buffeting occurred, but didn't cure the wing

25

drop-off. John says that since every T-18 seems to stall differently (it takes only a tiny amount of wing twist to cause one wing to stall first) it is necessary to experiment with the spoilers using tufts of yarn to indicate what is going on. Just scotch tape 2" inch long piece of yarn to the wings in spanwise rows 6" apart with 6" spacing. In normal flight these should all be laying down smoothly, but as the stall occurs they will reverse direction.

They should also be used on the fuselage, especially along the wing-fuselage juncture to determine whether there is a good enough seal. John has found a need for a seal there where the flap butts against the fuselage.

Flight Tests Over - On June 21, I flew into Rochester Airport for my 50 hour inspection with 50:19 on my tach. I had really been putting on the time at a rate of one hour a day and, toward the end, over two hours. My wife says that I used up my whole year's gasoline allowance. They had assigned me a flight test area $\frac{1}{2}^{\circ}$ x 1° in size but it didn't quite include Rochester so they sent me a ferry permit to permit me to fly it in for inspection. I didn't want to wait for their regular visit to our airport.

Will Tetrault gave it a thorough inspection, the same as before first flight. When he crawled out he said "This is the nicest airplane I've seen--but don't tell Cessna or Piper I said that." I'm sure he was being extra generous since my workmanship isn't all that good but it's nice to hear someone say anyway. He changed my restrictions to read continental limits of the U.S., aerobatics and night VFR flights are permitted. I guess that means I can fly to Hawaii but not Canada.

On the subject of flight test time, he never mentioned anything over 50 hours--and of course, I didn't either. He said there is no firm rule on flight test hours. He could release the restrictions at 35 if he wanted, but 50 hours is the general rule. It is up to the local inspector, your workmanship, and how well-proven is the design.

On the 105 mile return trip, I averaged 194 mph ground speed at 7500 feet. The ground wind speed was very low but it must have been helping me a bit at altitude.

A Flying Saucer - J.P. Fay has come up with a real startling discovery. Listen to this for a first: Chalk up serial #6 as having made it's maiden voyage on the 17 June 1968. Was beautiful, partly cloudy day, 74°, and a very light breeze out of the South. I had racked up 4.5 hours of various taxi manuevers including lots of high speed taxi runs. Ground handling of the T-18 is superior to the light aircraft that I have come in contact with. I have a Lyc O-290 GPU with an O-320 oil pan and ma4-spa carb. I seem to have plenty of power and turn close to 2600 rpm with a 65-65 prop, on take off. Haven't any more figures to give you as yet on the performance because I was pretty busy just flying. On the third flight of the day, the canopy decided to leave the aircraft. No problem flying the aircraft, even with the cut down deck. You can imagine the open area. The only buffetting that was noticable was on the final approach using half flaps and nose high attitude. Even then it was no problem. The canopy sails very nicely and didn't even scratch the glass when it landed in an open plowed field. Evidently the canopy completely cleared the T-18 since the pitot tube on the vertical stabilizer wasn't bent. I don't know why the canopy came open but the forward rails are definitely too light. Also, a canopy latch would seem to be a must.

By the way, mine had left wing heaviness also and I plan to put a small tab on the aileron to correct the problem. Will write more when I get some figures!!"

Canopy Rails - According to John Thorp, the forward canopy rails should be secured to the windshield frame with a tab and a poprivet. He said he opened Rudy Adler's canopy the other day in flight and there was no problem. He has the tab installed.

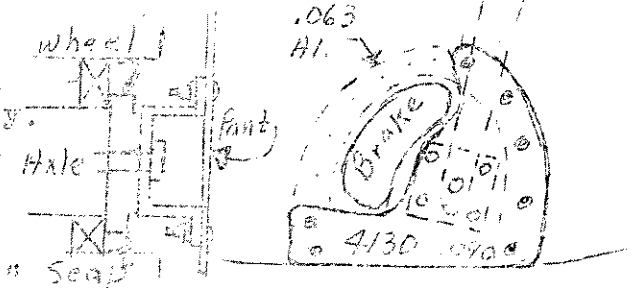
I have no tabs on mine, but I used .050" stainless for the rails. I did this because I was afraid the lighter rails would get bent by passengers crawling over them. The material was readily available at our junk yard. John says I lucked out!!

Canopy Latch - If you haven't installed a canopy latch that applies positive clamping pressure like the one shown in Newsletter 25, I strongly recommend you try one. When I release my latch, the wind noise nearly doubles. Other T-18's I have ridden in which didn't have good latches had high wind noise due to the seal problem.

There seems to be quite a bit of concern among some circles that a canopy latch should be accessible from the outside in case of an accident. Does anyone have a good solution? I thought of a sign reading, "In case of emergency, break glass".

Wheel Pants - After much figuring I came up with a means for attaching my wheel pants which seems to have worked out quite well. Since some people are having trouble keeping them attached, I though I'd pass on my design. First, I made my own pants which fit quite snugly. This is important if you expect to gain any speed from them. If they significantly increase cross section area, then the drag will not be reduced. That is one reason John designed only a half pant. The other reason is ease of tire inspection. My pant is 7" wide. This just clears the tire on the outside and is almost flush with the Cleveland brake unit on the inside. The brake unit protrudes a small amount through a clearance hole in the pant for better cooling of the brake.

To attach the pant to the end of the axle, I made a cup shaped part with a flange as shown in the sketch. Four plate nuts were attached to the flange to secure the pant.

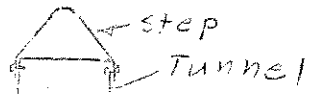


To obtain a seal, I took the wheel dimensions down to our bearing store and they found one that fit perfectly. A 4" diameter disc of .063" aluminum was riveted and bonded to the inside of the pant for reinforcement. On the inside of the wheel I attached the pant with a bracket made of .093" Seal 4130 steel. It also had nuts attached. It is shown in the accompanying sketch. The pant cut-out has a 1" wide .063" aluminum ring bonded and flush riveted for reinforcement. Make sure the clearance hole in the pant for the tire isn't too large. The tighter the fit, the lower the drag.

Visit to Lancaster, California - Rudy Adler has his T-18 flying now. I went out to see it at Fox field which sits in the desert just outside of Lancaster and not too far from the dry lake and Edwards AFB. The evening breeze was blowing at about 30 knots as I inspected it on the ramp. They tell me that is a daily occurrence. I was sure I would see the first T-18 fly while tethered, but only my camera case got airborne.

Rudy did a very nice job on his O-290-G powered model. It doesn't have the cutdown rear deck, but otherwise it is pretty standard. He didn't finish off the airplane in its final paint scheme. Instead he just sprayed the bare exterior surface with a light coat of white laquer. After the flight test period he plans to strip it all off and put on the final finish.

He has installed the automotive air filter about like shown on the new plans. He has put an elevated step on top of the tunnel between the seats like this:

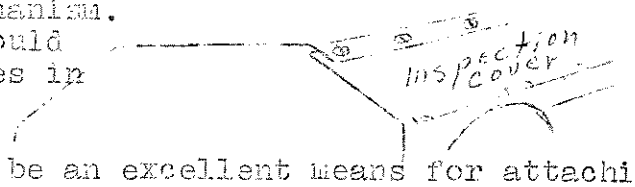


This keeps the shoes off the seats.
John recently flew Rudy's T-18 and reports that it handles very nicely with a perfectly straight ahead stall. With no electrical system or other extras, it is quite light. Climb was an indicated 2100 fpm. With his 65 x 65 prop turning at 2800 rpm the maximum indicated speed at 6500 feet was 156 mph. These figures are all uncalibrated. The stall with full flaps was close to 40 so something must have been a little off. John opened the canopy in flight with no problem.

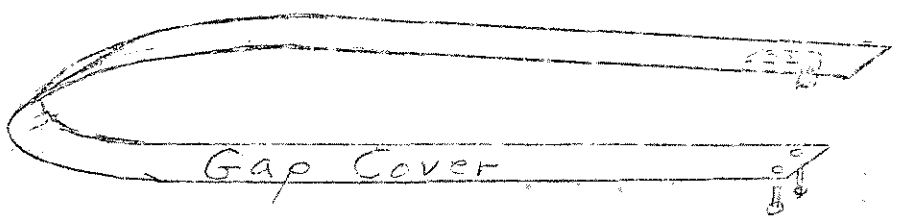
Then I went across town to see Lyle Flemings 180 hp T-18 which he keeps in his front yard. It now has 70 hours on it with all restrictions lifted. It has the deck cutdown, gear leg fairings but no pants. With a fixed pitch prop, two radios and some extra tanks, the empty weight is 940 lbs. In addition to the standard tank, he put in 3 extra 6 gallon tanks. One is in the baggage compartment in front of the battery and there is one under each seat. The filler neck for these is through the side skin aft of the right seat. A 3/8" tube connects the three tanks. It takes too long to fill these extra tanks becuase fuel must drain from the aft tank into the underseat tanks thrcugh this small tube. An engine driven fuel pump takes fuel out of either the main tank or the auxiliary tanks as determined by a selector valve. All take offs are on the main tank. A bypass around the fuel pump has a check valve which permits fuel under gravity pressure to bypass the pump in case of failure.

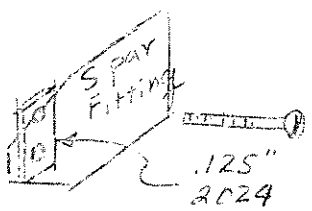
Tanks

He split the 580- cover over the horizontal tail pivot bearings to permit inspection of the trim mechanism. If this is done, enough screws should be used to carry the shear stresses in that area.



Lyle came up with what appears to be an excellent means for attaching the gap covers between the wing panels. Each cover is attached with three screws:





Two screws attach it to the bottom aft edge of the wing and the other applies tension to the top aft edge. This makes the tightest possible fit and prevents air leakage. I highly recommend it.

He had some excitement on a trip crossing Idaho. The main bearing seal came out causing smoke in the cockpit. He landed on a highway for an inspection and found the oil level at 6 quarts and not losing anymore so he flew it to the local airport where they put in a new seal. They said this happens quite often and that the oil level will not go down much below 6 quarts. After that, he modified the cowling so the nose piece could be removed without removing the prop. Another incident occurred while landing on his 5th flight. While straightening the rug around the rudder pedals with his feet, he accidentally got a parking brake locked. You can imagine what happened on touchdown. The resulting ground loop bent one gear leg so he replaced the gear. Now he has disconnected the parking brakes.

He has a 2500' dirt strip a short distance down his country road. He lands on it and just taxies up the road and parks in the front yard. Some guys have it made!!

His canopy latch has a car door type handle in the center at the aft of the canopy. The sliding pin that it engages can be pulled with a cable operated from the cockpit to permit opening the canopy from the inside. The canopy latch can thus be closed or opened from the outside by turning the handle which also has a key lock or operated from the inside by pulling the pin.

Red Line - John says that to make the FAA happy he will have to keep the red line speed at 180 mhen the tail mod is made. Then it will be raised to 200 and eventually back to the original 228. There is still no evidence that the original design is not strong enough even for 1500 lbs. gross. He thinks the failure was due to high gust loads while traveling at excessively high speed.

Take Home Feature - John says that Stewart Schureman is the only one he knows about who removes his wings and keeps his T-18 at home. How about some infor on how it works out, Stew?

Dimpling Sheet Metal - When using a countersunk rivet as the male dimpling die, place the female die in the usual position and back it with a bucking bar. Place the rivet of the required type into the hole and strike the rivet head with a pneumatic riveting hammer. This method of countersinking is often called "coin pressing" and should be used only when the regular male die is broken or not available. Coin pressing has a distinct disadvantage in that the rivet hole must be drilled to correct rivet size before the dimpling operation is accomplished, and since the metal stretches during the dimpling operation is accomplished, and since the metal stretches during the dimpling operation, the hole becomes enlarged and the rivet must be swelled slightly before driving to provide a close fit. Since the rivet head will cause slight distortions in the process, which are characteristic to that particular rivet head only, it is wise to drive the same rivet that was used as the male die during the dimpling process. Do not substitute another rivet, either of the same size or one size larger.

The methods of driving solid shank rivets may be classified into two types depending on whether the riveting equipment is portable or stationary. Since stationary riveting equipment is seldom

used in ariplane repair work, only portable equipment used in hand, pneumatic, and squeezer methods, is discussed here.

Before driving any rivets, be sure all holes line up perfectly, all shavings and burrs have been removed, and the parts to be riveted are fastened securely together. Two men, a "gunner" and a "bucker", usually work as a team when installing rivets. However, there are some jobs during which the riveter holds a bucking bar with one hand and operates a riveting gun with the other. When doing riveting, an efficient signal system can be employed to develop the necessary teamwork. The code usually consists of tapping the bucking bar against the work; one tap may mean "not fully seated, hit it again"; two taps may mean "good rivet"; three taps may mean "bad rivet, remove and drive another", and so on.

Bucking - Selection of the appropriate bucking bar is one of the most important factors in bucking rivets. If the bar does not have the correct shape, it will deform the rivet head; if the bar is too light, it will not give the necessary bucking weight and the material may become bulged toward the shop head; and if the bar is too heavy, weght (and the bucking force) may cause the material to bulge away from the shop head. Weights of bucking bars may range from a few ounces to 8 or 10 lbs., depending upon the nature of the work. A bucking bar for 1/8" rivets should weigh 3 to 4 lbs.

Always hold the face of the bucking bar at right angles to the rivet shank. Failure to do this will cause the rivet shank to bend with the first blows of the rivet gun and the material to become marred with the final blows. The bucker must hold the bucking bar in place until the rivet is completely driven. If the bucking bar is removed while the gun is in operation, the rivet set may be driven through the material. Do not bear down too heavily on the shank of the rivet. Allow the weight of the bucking bar to do most of the work while your hands merely guide the bar and supply the necessary tension and rebound action.

Allow the bucking bar to vibrate in unison with the gun set. This process is called coordinated bucking. Coordinated bucking can be developed through pressure and stiffness applied at the wrists, and with experience, a high degree of deftness can be obtained. Should you fail to vibrate the bar at gun-set speed, you will cause the material to kink into a "depression".

Lack of proper vibrating action, the use of a bucking bar that is too light or too heavy, and failure to hold the bucking bar at right angles to the rivet will cause defective rivet heads. A rivet "going "clubhead" can be corrected by rapidly moving the bucking bar across the rivet head in a direction opposite to the direction of clubhead travel. This corrective action can be accomplished only while the gun is in action and the rivet is partly driven. If a rivet shank bends at the beginning of the bucking operation, place the bar in the corrective position only long enough to straighten the shank.

Hand Driving - Under certain conditions, you may have to do all your aircraft riveting by hand driving. You may use either of two methods of hand riveting, depending upon the location and accessibility of the work. In the one method, you drive from the manufactured head-end of the rivet with a hand set and hammer, and buck the shank-end by use of a suitable bucking bar. In the other method, you drive from the

shank-end of the rivet with a hand set and a hammer, and buck the manufactured head with a hand set held in a vise or a bottle bar (a special bucking bar recessed to hold a rivet set). This method is known as reverse riveting. It is commonly used in hand riveting but is not considered good practice in pneumatic riveting.

Engine Mounts - Melvin O. Miller, 16944 Mahogahy Str, Fountain Valley, California, 92708. "I have purchased Jim Swick's T-18 engine mount jig and have made two mounts thus far. I am also making walking beams and rudder pedals. All parts have been approved by John Thorp. All parts are magnafluxed, inspected by an inspection agency and tagged, sand blasted, glass blasted and painted with a protective coat. The mounts are for non-dynafocal mounted engines. Presently engine mounts and parts are on a first come, first serve basis with 60 to 90 days for delivery.

Present price list will be sent on request. T-18 builders who buy the engine mount, walking beam and rudder pedals together, (for a limited initial 20 orders) may have all remaining welded parts they have cut out welded free for the cost of postage both ways. The exception will be that I will not weld landing gears. Final exterior finish and tube oil or linnoil are left to the discretion of the builder for the internal preservation of the tubing.

I am a professional welder and A&P mechanic with 20 years experience. I am also building my own T-18 (slowly)--Serial No. 134."

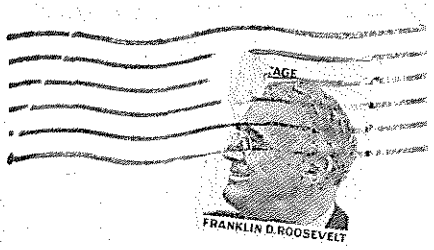
Wing Fit - Don't expect your wing and fuselage to mate properly unless you locate the 601 frame only after measuring the rear to front spar dimensions on the completed wing. A number of people are having trouble with tight fits--especially if they use Rudy Adler's ribs which were all made over one form blocking making the .040 rib is a little oversize.

Another One Flies - Bernard J. Thalman, 2912 Old Glenview Road, Wilmette, Illinois -"Mark up one more T-18 that broke the bounds of earth. Yesterday, June 3, No. 86 made its maiden flight and it was great. After reading all the articles on how tricky the first flights are, I found just the opposite to be true. It tracks straight and is a pleasure on take offs and landings. Since there is only 2 hours flying time, I can't quote any facts and figures, but it does fly nice. Those news letters have been a great help. See you at Rockford."

Rockford - If all goes well and the weather cooperates, I expect to have my t-18 at Rockford at least the last part of the week. John has donated some more parts so we have more work to do on the EAA T-18. Just got a letter from Paul who is anxious to get it completed.

Wing Removal - Just took my wing off and brought my ship home to do a little work on it before going to Rockford. With the aid of a little tool which I made to pull the main spar bal-locks (a sliding weight on a rod with a hook on the end) I was able to get everything ready and hooked up to the car in about five minutes with the help of one other guy. It sure is nice to be able to work on your airplane at home.

Stall Spoilers - Have completed tuft tests to locate the stall spoilers. I covered the whole wing like shown in the Aug 68 issue of Airways mag. I had to locate the spoilers just outboard of the gap covers. Work great



407. J.R. Wood Jr.
705 N Cross
Robinson, Ill.
62454