

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

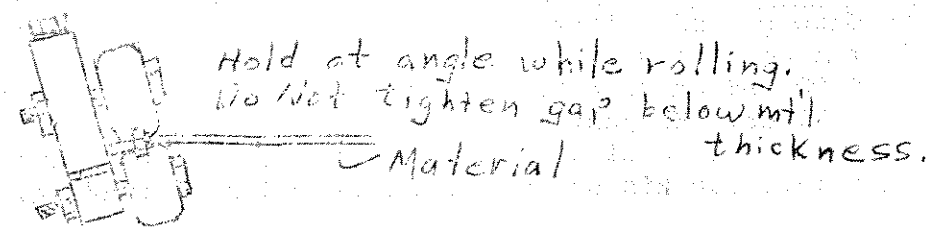
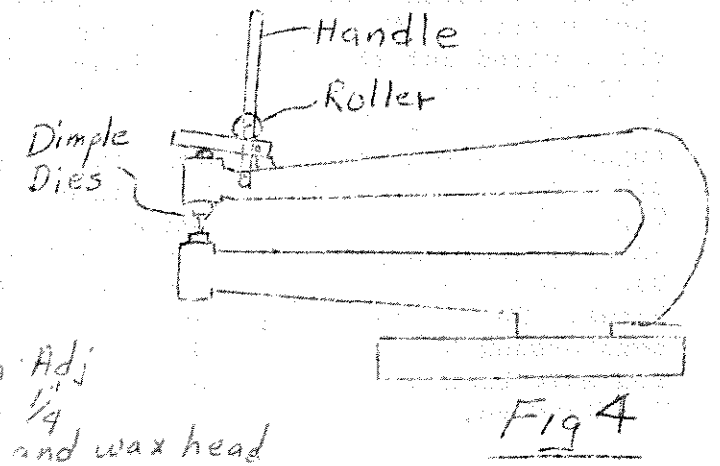
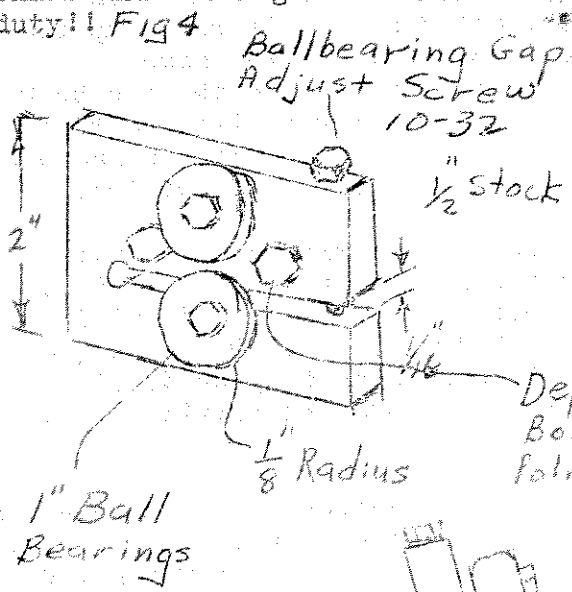
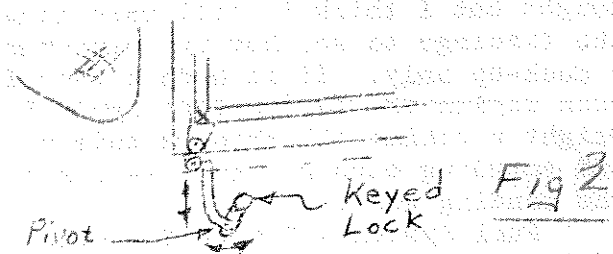
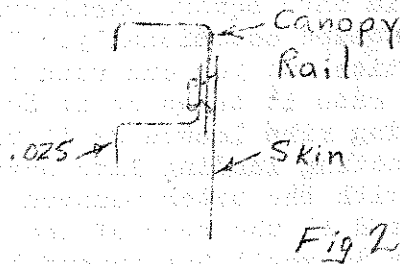
RETRACTABLE GEAR MODEL - Russell Basye, 4957 E. Nevada, Fresno, Calif., 93702

I just finished riveting up my fuselage and I am pleased the way it turned out - skins are nice and tight. I was concerned about any twist as all the holes were dimpled, but it turned out square and level. Along the top quarter panels I doubled the amount of rivets to prevent gaps between rivets. I made a roller and bent about  $3/32$ " down slightly along all the (Fig 1) edges to make the joints hug. This worked out fine. I also made a big roller to form the windshield flange. I spent about a week making the roller but the results were worth it. The flange is nice and smooth without any tool marks. I am putting my windshield inside of the flange. I'm using an aluminum windshield frame from Rudy Adler. Was thinking of using Teflon for canopy slides in place of ball bearings. At the side rails I put in a piece of .025 to receive upholstering. Fig 2

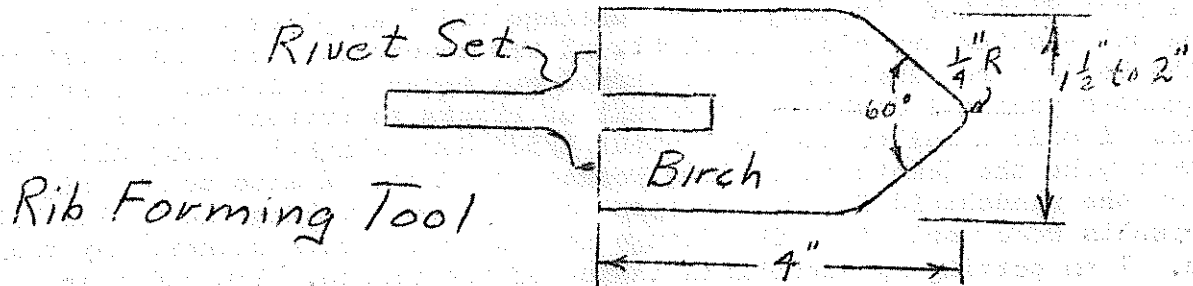
Also I put in a lock to hold canopy closed. It is a piece that pushes up just back of the ball bearings. Fig 3

I heat treated my rivets and put them on dry ice. The ice man said the dry ice would last 2 or 3 days - it thawed out overnight!! I used the rivets anyway and they seemed to be softer than before heat treating. I have anodized all my parts at home. I was thinking of writing an article on the process I use. What I like about doing it at home is that I can anodize the part and install it without any waiting. I made a dimpling tool from an old frame I found at a junkyard. It was

used to hold sheet metal to cut a circle. I made the mechanism for a plunger and it works fine on 025 and 032 - for 040 you have to smack it with a mallet to set the dimple good. With  $3/4$ " of throat it was a cinch for wing skins and fuselage skins. The thing weighs about 100 lbs. so it is heavy duty!! Fig 4



I used a rivet gun to form all my 6061 parts. It doesn't leave any hammer marks, your arm doesn't feel like it will drop off and it is much faster. I could form a wing nose rib in 15 minutes. This includes trimming also.



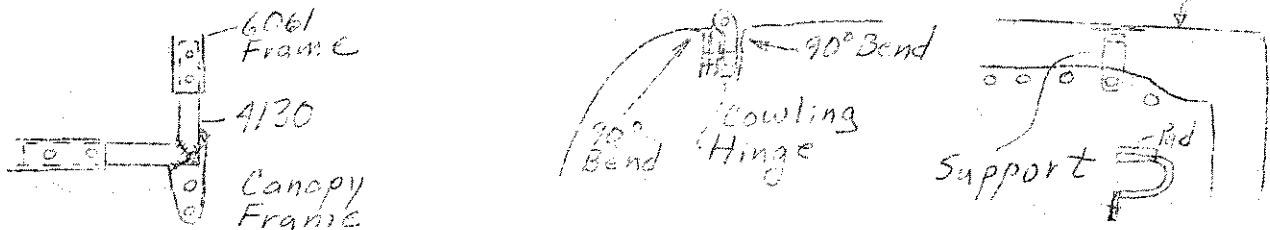
Use the rivet set with the birch just as you would a mallet. The rivet set should have square shoulders to prevent splitting the wood. The tip must be dressed occasionally. I use the fairly heavy gun. It takes a little practice but you can ruin a wing rib or two and be far ahead. For .040 wing ribs it takes about 80 lbs. of air. By the time I got 1/4 way through, my wing ribs looked as if they were stamped out! I'm using a Grimes 12 volt retracting landing lite motor for my flaps. I'm using the cables just as they are with the motor mounted just above bottom skin with the mounting bracket riveted to the rear of the tunnel and the 2 cross 3/4 x 3/4 angles. The motor is small but powerful. You have to cut a lot of brass off to reduce weight but I think it will work fine. I'm anxious to mount the wing on the fuselage to see how my retracting gear works. I've had it working in a mock-up only. If it hadn't been for that silly landing gear I would have been flying the T-18 a year ago! Having built a heavy skycoupe I've been weight watching all through this project - nipping off extra metal here and rounding corners there -- I hope I haven't picked up extra weight with the landing gear.

Fuel System - I have two wing tanks of 13 gal. each mounted in the outer wing panels. I have a nose tank of 13 gals. giving me 39 gals. The wing tanks are pumped with a Bendix fuel pump to the nose tank. From there gravity to the carb. All the tanks are fiberglass. I used mat and cloth in the wing tanks and they came out 10 lbs. each. The nose tank with 4 layers of cloth came out 5 lbs. so - no more mat for me! It soaks up too much resin. My rudder pedals are pivoted from above as the nose wheel wiped out the floor mounting. The biggest problem was the toe brakes. I finally worked this out by a rod pulling down on a lever attached to the brake cylinder. To finish my T-18 I have the following to do: engine mount, engine installation, cowling, canopy, instrument panel, seats, wiring, upholstery, and a lot of odds and ends.

Tips: Use corrugated cardboard on work table when working on aluminum sheets. The chips fall in the "valleys" and don't scratch the material. Use a layer of masking tape on flush rivet set when riveting dimpled rivet holes. This sets the thin outer edge of rivet down tight. Do not use on countersunk holes in .025 sheet. I really look forward to your Newsletters. You have been doing a lot of hard work building a T-18 and getting out the Newsletters.

FLIGHT REPORT - My trip to Seattle has been made complete with a stop-over in Chicago and a little side trip to Moline, Ill. where Irvin Faur met me. We talked T-18 until 1:30 a.m. which was rather late for Irvin who got up at 5:00 and emptied his nets. He is a commercial fisherman on the Mississippi River. He just catches fish and his wife cleans 'em, smokes 'em, and sells them in a little roadside store. Too bad this isn't a sporting magazine, for his story would make colorful reading.

After a tasty 7:00 a.m. breakfast of bacon and eggs we headed out to the airport to see his 6-month wonder. Irvin was quite apologetic about his "hurry-up" workmanship so I was prepared for the worst. But when he rolled back the hangar doors they uncovered a mightily nice looking little bird. Except for several little chipped spots in the paint and yet-unfinished upholstery, he had nothing to apologize for. Despite the sub-freezing conditions for painting, the finish wasn't bad. The cowling fit nicely and I liked his method of installing the piano hinges. A 90° 3/4" flange was bent down on the door and on the fixed skin. The hinge was riveted to these flanges with no rivets showing. This served the dual purpose of stiffening the hinge line and allowed the amount of exposed hinge to be adjusted as desired. The fiberglass nose cowling has a tendency to curl down with age. He held this up with a padded support mounted on the crankcase just like on a Mooney. This gives a nice straight line from the windshield to the spinner.



Since he had no way of getting his canopy frame heli-arc'd, he solved the problem by making joints and bearing attachments from 4130 and then slipping the aluminum tubing over these and pop riveting. The rear bearing support cross tube was 5/8" 4130. There's more than one way to skin a cat and weld aluminum. A simple and effective way was used to attach the windshield - he just used pop rivets. The two halves of the canopy were joined with two strips of aluminum and pop rivets. A nice instrument panel overlay was made with .025 aluminum finished off with black crackle finish paint. The cockpit didn't give my 6'2" frame much extra room but with a very thin seat back and my hip pocket about 2" below the top of the standard square tunnel I just cleared the canopy comfortably. If you are about 6' or over and have broad shoulders, I strongly recommend at least rounding off the tunnel and preferably lowering it an inch or more at the back like I did. The side of the airplane pushes your shoulder one way and the tunnel pushes the other way and is most uncomfortable. His ship handled very nicely and had lots of zip. It clinched at 2,000 fpm up to about 4,000 feet. It was really quiet and I was most impressed by the lack of any wind whistle around the windshield-canopy seal. The reason was that he didn't use a rubber seal. Instead, he just let the canopy underlap the .040 flange on the windshield. When the suction raised the canopy against the aluminum strip it made a good seal. Was interested to see how the 2° dihedral worked out. There was no noticeable difference in riding qualities but it did make it impossible to pick up a wing with the rudder. When left rudder alone was used to pick up the right wing, the ship would have a rather severe tuck under of the right wing giving a negative dihedral effect. My recommendation would be to leave the dihedral as is in the plans. I discovered how Irvin built his airplane in less than 6 months. He just plainworked hard at it like he does everything. He got his private license in less than one month.

- NEWS FROM JOHN THORP- My record of first flights is as follows:
1. Bill Warwick, Serial #01, N9675Z, May 13, 1964
  2. Earl Love, Serial #41, N2997, Nov. 3, 1964.
  3. Ralph Thenhaus, Serial #37, N-137RT, Nov. 7, 1964.

4. Otto Zauner, Serial #34, N359Y, Sept., 1965
5. Bob Kaerrgard, Serial #79, N-12058, Oct. 10, 1965
6. Jack Park, Serial #85, N-2264-B, Sept. 24, 1966
7. Herman Rassler, Serial #24, N-4083B, Oct. 19, 1966
8. Ron Lee, Serial #196, N-167RI, Nov. 20, 1966
9. J.P. Ferco, Serial #62, N-3219-C, March 5, 1967
10. Irving Faur, Serial #145, N-1247, March 11, 1967
11. Stewart Schureman, Serial #68, N-1255, April 1, 1967
12. Bill Johnson, Serial #272, N-29, April, 1967
13. Callbie Wood, Serial #301, N-319W, May 3, 1967
14. John Tonzer, Serial #164, N-6651, May 14, 1967.

This listing will be good only if the builders keep me informed. I am sure sorry that Rassler lost his T-18, but am most thankful that he is able to build another. We are going to lose more on first flights with inexperienced non-current pilots if we don't do something to reverse the trend. I have no comment on flex, stainless tubing in exhaust systems. I wouldn't use it, but many have. I am interested in your comments on Irvin Faur's T-18. I am not surprised that you can't pick up a wing with the rudder. A T-18 out here is being built with 4° dihedral. This might be ok, but I wouldn't try less than 6°. I had a letter from Bill Johnson about his wing-fuselage juncture. I doubt that he has reduced the drag any. We now have a skoster type stall warning spoiler on Dick Hanson's T-18 which provides adequate stall warning by shaking the stick. It is in the opposite direction to Bill Johnson's mod, and doesn't hurt performance. With flaps down, Dick's T-18 will fly at 60 mph indicated power on. I now have the tooling to make Dynafocal engine mounts. I will make them for \$200. per copy although there is no profit in it. I have three in stock at the moment. I have sold six and have one on my T-18. Also, the Beech Travelair exhaust system fits a 180 hp T-18 with very little modification. Catch is the \$350 price tag. I have just finished a stroker (1/4") 308 GPU engine. It is necessary to use the O-340 rods as well as crank to get clearance. Also, it is necessary to machine 1/16" off the backside of the pistons to clear rods. This engine should put out 160 hp @ 3000 rpm. We need a surplus source of O-340 rods and cranks.

I am furnishing flap control system details to all who need them (27) to date. Don't have time to make any additional T-18 drawings in the foreseeable future. Piper has been keeping me quite busy. Rudy Phillips of All-Aircraft parts is retailing the T-18 seals and mouldings 744, 1188, and 1439. We can't get good delivery on anything out here now. It still may be a month or two before all the material is in Rudy's hands. I am too pressed for time to handle these. Exhaust stacks should clear the fuselage skin. No exhaust gas should impinge on any airplane surface. The exhaust should come out nearly parallel to the direction of flight.

#### Information For Using T-18 #1070 Propeller extension:

#1071 Drive Lug Installation - Grease and press in lugs with a smooth jaw vise (Fig. 1) or use bolt, nut, and washers (Fig. 2). Be sure to press in straight.

Information From John Thorp - "For the prop shaft extension the attaching hardware will vary with the engine. For the O-290G you will need 6-AN6H-13A bolts and 6-AN960-616 washers. On the O-290G it takes 6-AN6H-14A bolts and 6 or 12 AN96C-616 washers. On the O-320 engines many use 7/16" prop bolts so the engine side of the extension must be reamed to 7/16" and the bolts become AN7H-14A with AN960-716 washers. The prop side attaching hardware are AN-6A-46 bolts of appropriate length for the various hub thicknesses,

AN365-624 nuts, AN960-616 washers. In removing the extension from the shaft use 2 - 3/8" bolts as jacks (Fig. 3), otherwise both prop shaft and extension may be damaged."

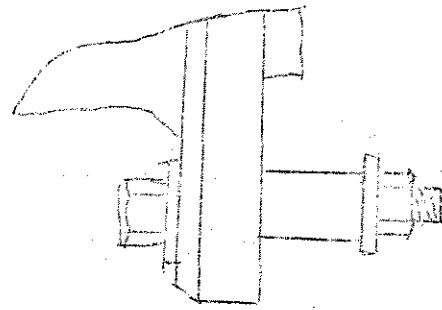
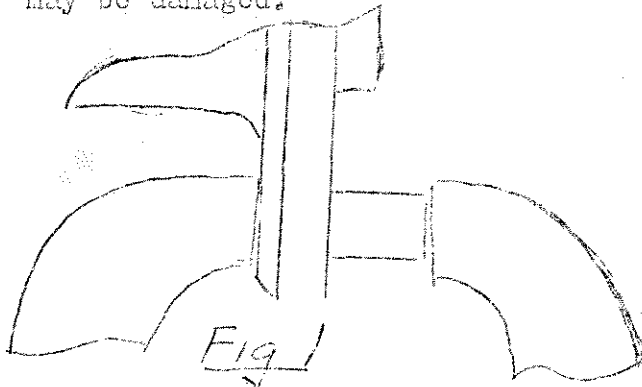


Fig 2

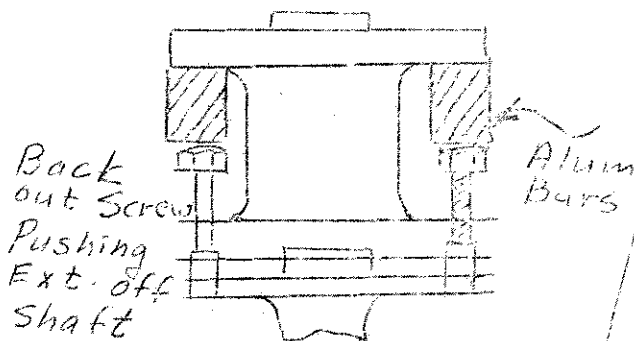
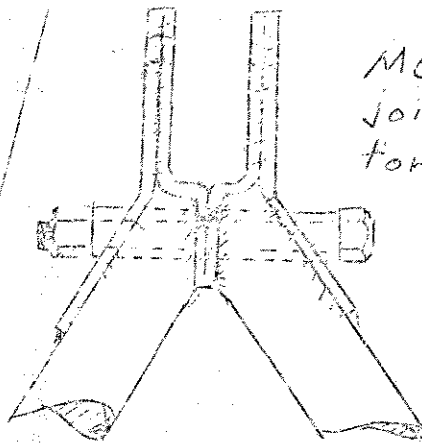


Fig 3



Method for joining A frame for Split gear

by Dean Cockrane  
Broomfield Colo

O-290-G CONVERSION AND OVERHAUL (Cont'd From Last Newsletter) - L.D. Sunderland

Conversion is very simple. (1) Cut off the generator attachment flange by drilling a row of holes, breaking the flange off and filing smooth. This is a necessity for use with a standard ring gear and, in any case, is strongly recommended since it is a relatively simple way to save some weight. (2) The oil pan should be replaced with an aircraft type. It is possible to cut off the old one, plate up the back and use an external spider and intake tubes but this doesn't allow a nice clean profile cowling. (3) Add a second mag and set of plugs. (4) The oil pressure relief valve may have to be replaced with a standard Lycoming part to get the oil pressure up to an acceptable level for aircraft use. The big question you will ask is, should I disassemble the engine completely or wait until next winter? If the engine shows signs of a recent overhaul, the latter will be especially tempting. However, complete disassembly is an absolute MUST! You see, the Air Force has probably been cooperating with the anti-poverty program (since Lycoming is in a depressed area) and therefore tried to wear out the engines as fast as possible by using a thick mixture of mud for break-in oil. If you think I am kidding, wait until you remove your sludge tubes from the crankshaft. Overhaul of the engine is not difficult if you obtain an O-290-G engine - overhaul manual from the government printing office, Wash., DC for \$2.50. Even if you have an O-290-D manual it is necessary to have the G also since dimensions and tolerances differ slightly on some critical parts like the crankshaft journals. The manuals show several special tools which are a must even for disassembly. First you need offset wrenches to remove the cylinder hold down nuts. These can easily be made in a shape similar to the pictures by cutting away the handle from a box end wrench and welding on a bent-up steel rod extension.

A somewhat simpler wrench could be made for disassembly, but for proper torquing after assembly, the torque wrench drive should be directly over the nut. Banks Maxwell has the special wrenches and overhaul parts. See SPORT AVIATION ad. Tag all parts so the cylinders can be put back together with their original parts. If you are wondering whether or not you should use a GPU engine, remember that the O-290-G engine is nearly identical to the O-290-D certified engine, both use the same cylinders, rods, and pistons. The crankcase only differs in the generator flange which you cut off. The G crankshaft is the same except that it has larger oil passages to help prevent clogging in the more contaminated ground environment. The O-290-G engine is a real bargain so get one while they are still available.

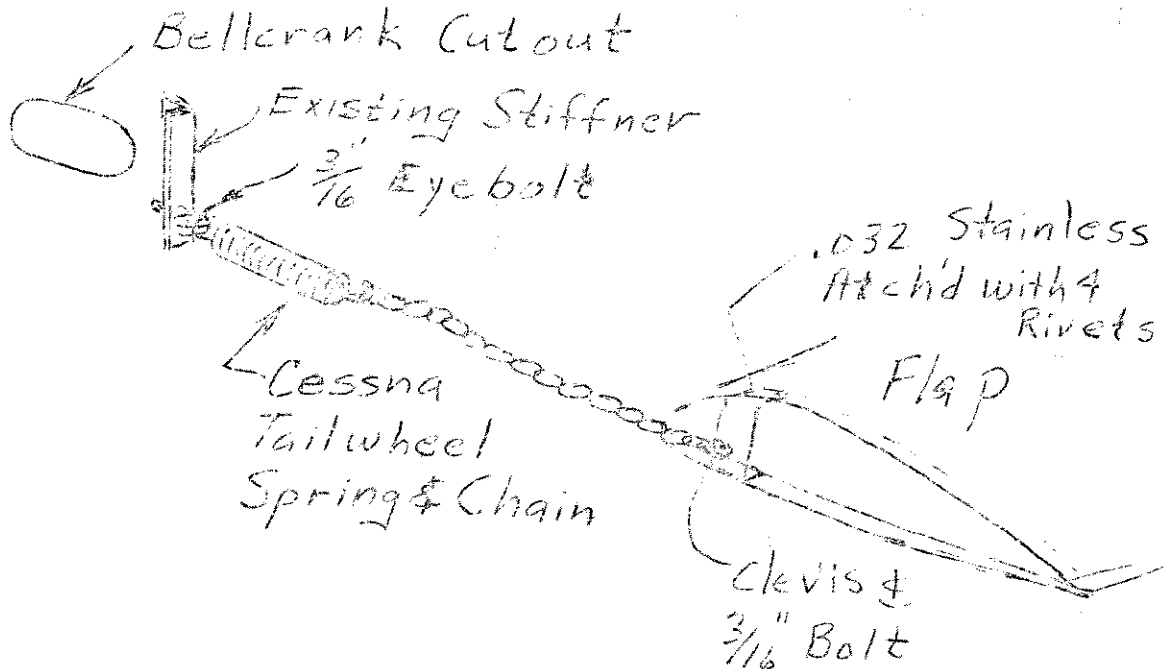
Oops - WATCH THAT LINE BOY - Herman Rassler, 98 Constitution, Henderson, Nevada

I don't know just how to start this letter but May 21st I added another chapter to T-18 history. Returning from a trip to Lake Tahoe, I stopped at Bishop to refuel and the attendant left the oil plug off after checking the oil supply without my notice. I made an emergency landing at Lone Pine, California and overshot on the rather short runway. I applied power to make a go-around and got no response from the throttle. As there was a new ditch across the end of the runway, I tried to save as much speed as possible to jump the ditch. The gear hit the top of the far bank and this started the disintegration of #24. About twenty feet beyond the right wing hit a mound of earth and she started cart-wheeling and tumbling from tip to tip. After the dust settled, my wife and I crawled out of the wreckage with only minor scratches and bruises (for the damage done). The engine, gear, fuel tank, instrument panel, and floor boards were laying inverted about twenty feet beyond the mound and the tail cone with the wing attached by one rear spar bolt was another twenty feet away inverted and reversed. The roll bar with one attached channel still on it and the canopy were between the main parts. Both the shoulder belts and the high back on the tail cone share the credit for the minor injuries in this case. None of the panels survived with no damage but most of the tail cone and one horizontal tail panel are repairable. On any other bird it would be declared a total loss but to a home builder I can see plenty of fitting which can be salvaged by carefully removing rivets. The engine appears OK except for the crank and the engine mounts. Not a fin broke. That marvelous prop is just scratched and repairable. John Thorp called the next day to find out what happened and made the generous offer of any tooling I need to get her flying again and Lee Hanlin has offered me another set of glass to help. Sure makes me proud to associate with people like that although I always have been one to go it alone. This time I think I'll accept all the help I can get. Even the wife says she will help more this time. I don't think she ever really comprehended what I was building until it was nearly done. A few trips over areas where we had spent days driving convinced her we really had something that would go for us. Hope this hasn't spoiled your day but be assured she will be rebuilt better than before.

#272 FLIES - William R. Johnson, 23321 106th Ave., SE, Kent, Washington, 98031

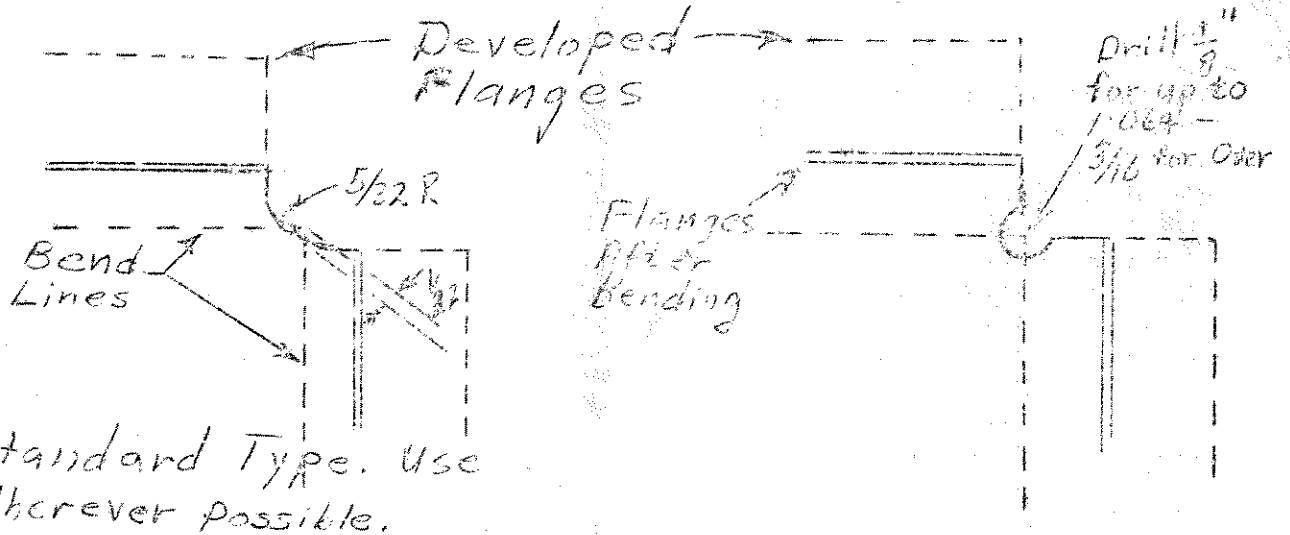
T-18 Serial No. 272, first flown April 29, 1967 has two modifications which make the Tiger act like a pussycat as far as ground handling and stalls are concerned. These modifications are swept forward wing root and a 4-1/2" landing gear extension. Although the wing root was modified to reduce parasitic drag, a major improvement in stall characteristics was also realized. Various conditions of power and flaps straight ahead

and power off in turns have been tried. In each case a positive buffet occurs before stall followed by a pitchdown straight ahead as the stall is entered. Recovery is initiated by releasing back pressure. Altitude loss is about 50 feet. No tendency to roll was noticed. One pilot inadvertently stalled the ship about 10 feet off the runway, it just mushed in like an Ercoupe and bounced less than a foot. The landing gear change was necessitated by the desire to use a 72" constant speed propellor. This is 9" more than the plans call for so after a stress check to assure it would work the gear was built 4-1/2" longer than plans. The extension increases the tread by 3" and moves the contact point back about 2" (deflected). Ground handling is much like a Cessna 140. Both takeoff run and landing roll are reduced by the increased pitch attitude. The ship also lands nicely on the sod with 500-5 wheels. A disadvantage is the increased tendency to nose over at low speed when the brakes are applied. The forward CG limit must be moved back to Sta. 63 to allow a little safety for runway and taxi purposes; actually with the wing mod. the plane flies well with the CG as far forward as Sta. 61. Some performance data was obtained at almost standard day conditions (OAT 17°C Alt. setting 29.96). With an actual weight of 1520 lbs. the best rate of climb was 2,200 fpm at 100 mph. At altitude the TAS was 172 with power at 2,500 rpm. At an actual weight of 1300 lbs slow flight at 60 mph is possible with power and flaps. The wing modification was done by extending the root nose rib in the ratio of 2.75/2, and retaining the same leading edge radius. The new skin goes out to the second nose rib and back to the main spar caps picking up existing rivet locations. The control sticks have to be removed in order to remove and install the wing. Making the fillets in the form of removable fiberglass gloves would be an improvement if the ease of removing the wing is desired. Here is the lashup used for retracting the flaps:



BENDING TIPS - Horn Ressler

I've noticed the club is having trouble with short flanges and cracks developing from bend relief holes. The following sketches are from my sheet metal bible. I now have 95 hrs with no sign of cracks yet.



The minimum bend radii for our metals as listed, for hand formed parts it should be slightly more,

Thickness	2024-0	2024-3	6061-T4	6061-T6	7075-0	7075-T6	4130 Steel
.016	1/32	1/16			1/16	1/8	
.020	1/32	1/16			1/16	1/8	1/16
.025	1/16	1/16	1/32	1/16	1/16	1/8	1/16
.032	1/16	3/32	1/32	1/16	1/16	1/8	3/32
.040	1/16	3/32	1/16	3/32	1/16	3/16	1/8
.051	1/16	1/8	1/16	3/32	3/32	1/4	1/8
.064	3/32	5/32	3/32	1/8	3/32	5/16	1/8
.090	1/8	9/32	3/16	7/32	1/4	1/2	3/16
.125	3/16	7/16	1/4	9/32	11/32	3/4	1/4
.188	11/32	27/32	3/8	15/32	9/16	1-1/8	3/8
.250	15/32	1-1/4	1/2	5/8	3/4	1-1/2	1/2

MORE TIPS - Dave Hendrick, Box 17290, Star Rt. A., Anchorage, Alaska

Just got through a rivet buckener week-end in the garage. Got quite a bit out of the last Newsletter. Got wild and ended up with a combination of ideas.

1. With the cut down deck there is no compound curve on the upper rear fuselage skin. Have cut the top of all formers off and added the rounded ones.

2. Wing Tips - Have a set of tips designed by Jerry Lawhorn, local homebuilder. (His Kee Bird appears in the April issue of AIR PROGRESS.) The tip is Jerry's own design yet he doesn't lay any claim to it as an original. But they are installed on several Cessna 180's and Super Cubs. The 180's belong to the Fish and Wildlife Service where Jerry is employed. The FAA ok'd them as standard installation after evaluation with the comment "had no adverse effect on flight characteristic". In reality they lowered stall speed by 5 knots and increased airspeed from 7 to 10 knots. I'll have molds for anyone that wants to use them in about 30 days.

3. Mr. Herman Rossler says that to drop the windshield down to WL42 for better downward vision. Why not the same for the canopy - I'm trying it.



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Tid Bits - I hear the T-18 spins nicely - even inverted when you stall on the top of an inside loop. Jack Parks reportedly flies upside down as much as the other way. John reports that Ron Lee's canopy stays closed even without the latch. Jack mounted rear of tail spring on rubber pad and rubber bushed bolt holes. Works nicely. John recommends also trimming spring down about 1/8" each side and double tapering it.

Just finished forming my canopy and am quite happy with it. It is the first one built to the lifting drawings and fits well. I'll give all the details later. If you want a fiberglass copy of the mold, come and make one. Did you ever consider a fiberglass canopy with windows? It would look much better than a boxy metal one.

Fly In - Just returned from the Paris Air Show and I can assure you that it is quite tame compared to your EAA Fly-In. If you haven't been to Rockford you don't know what fun is.

Paul would like very much to see the EAA T-18 completed. What he needs is for someone to volunteer to take over the project for it could take 10 years if only worked on at the Fly-In. If you get a ride in a T-18, the owner won't want to take any money but a little donation for gas would certainly be in order. See you at the Fly-In! Let's have a T-18 Forum Friday. Check at T-18 tent.

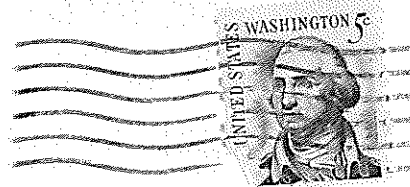
Panel Mounts - Spencer Aircraft - Dallas Ave., Seattle, Washington has good supply of shock mounts for the instrument panel for 20¢ ea. They are better than those specified since they have a square base to aid in installation. They also have new nylon shoulder harness for \$6.50. It can be dyed. The ends are fabric loops covered with leather. With the leather removed and a few threads of stitching removed they fit nicely over a standard civilian belt. Tell them you are building a T-18.

Bulletin - After about 100 hours, cracks have developed in the horizontal tail tab skin at the inboard front corners. A 3/4" wide 0.032 doubler should be wrapped around the inboard end of the tab to carry stresses from the inboard rib to the hinge.

First Flights - Lee Hamlin is very concerned about the near crack-ups on first flights. He's writing an article for next issue. In the meantime, before that first flight or even taxi tests: (1) DO get practice wheel landings at 70 mph in something like a Swift or Luscombe. (2) DO check your airspeed indicator on another airplane or even auto. Two have been off about 50 mph nearly causing catastrophe - not static problems either. (3) DO fly around for an hour and practice stalls before first landing - especially if first take-off is unintentional and even illegal. (4) DO use power on first landing. (5) DON'T use any flaps. (6) DO check accurately control stops for proper surface travel. Failure to observe each of the above has already nearly caused crashes on first flights.

T-18 Fly-In - John wishes to thank the 175 T-18 builders who donated toward the plaque presented to him at the T-18 Chino Fly-In, June 25, '67 which was organized by Ron Lee. The weather didn't cooperate but there were five T-18's there. John was very pleasantly surprised. When I visited him the next evening he and Kay were sitting in the living room reading over the names on the plaque.

Cowling - I saw John's all-metal cowling taking shape. It requires no stretching. It wraps around very snug with no nose piece. The cheeks will also be metal. He says, don't use the O-290-G baffle between the cylinders. The hold-down clip puts pressure on cylinder walls and causes noticeable wear. Copy a Lycoming 140 hp engine baffle, Part No. 72150.



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