

My apologies, gents, for being so tardy in getting #51 cranked out. My wrist problem really got me behind this year, but I got it cleared up a few days before OSM. I guess old age might have been a very small factor, too, even tho' some doctors I know say that I'm young. Right after OSM I had the symptoms of a severe health problem pop up and by the time I went thru all the tests and got everything more or less under control again another 3 weeks went by. I was already playing "catch up" before all that and so I had to just do the best I could and take care of first things first. Anyway, I'll try to get some more stuff out before the first of the year, so be patient with old folks. We may be slow, but usually we get there.

THE ANNUAL DINNER, OSM 1982: It was really great to see so many of you there again and to meet some new T-18 friends. To no one's surprise, we were out-trottered by the Marines this year, but what we lacked in numbers we made up in fun, fellowship, and an almost fraternal camaraderie. Our T-18 dinner was again a ball out and a whopping success, due to people like John Walton and Jerry Rogers. Jerry even started a T-18 Annual dinner album, where everyone signed the guest book below the picture that was taken at each table. The T-18 Annual Dinner is really a great idea to get acquainted with our T-18 buddies and their wives (and kids, too). I don't know how to explain it, but I think we really have a super bunch of people in our group.

John Mann conducted the T-18 Forum and did an excellent job, too. Now that over 300 T-18s have been built and flown, and the total accumulated flight time is probably approaching 150,000 hours, we're accumulating a very large pool of experienced people. This means there is a great wealth of construction knowledge and pilot experience, and that means we don't have many unknowns. There are remarkably few "AIs" in the past 16 years of flight experience. No factory built could even come close to that record. I think the designer and the builders can be justly proud of that fact.

On Monday at noon it was "Cowling Off" time and about three fourths of those present very generously opened up their cowlings for a couple of hours. I'm sure the rest would have, but probably forgot about it or didn't know. Anyway, next year we'll have some printed reminders to give to plane owners as they arrive. The Nimitz people were all smiles at the sound of clicking cameras and the new builders were a happy bunch to see how the old pro's did things. A lot of the old pro's were very pleased to see how the other guy did it and I think everyone learned something, which was what it's all about.

A great many non-T-18 builders came by our area and were enthralled by the idea. Several said, "Wouldn't it be a great idea if everyone here would open up their cowlings?" It really would be great, wouldn't it? We should have done this long ago. Our hat's off to Gale Abels, whose idea it was originally. He wrote a letter to HQ a couple of years ago, suggesting it. It was published in the "Letters to the Editor" section of S.A., but as is often the case, inertia prevailed.

We spend a tremendous amount of time and effort in educating everyone about the minutest details of airframe construction, yet only the skimpiest info is available on what must be done from the instrument panel forward. One case in point: Should the intake air box for the carb be aligned with the plane of B.L. O or with the center line of the cowling, since the engine is offset? Observing a large number of T-18s, you'll not only find devotees of both schools of thought, but also some that just split the difference. Some even pointed the air scoop forward, but angled the intake box.

Other cases: On the front cylinders, what per cent of the cylinder barrel do you cover with the inlet baffle and what is the optimum shape? What is the ideal oil cooler location? Ditto the landing light location?

In the past two years I've received 40 or 50 letters from builders wanting info on the above subjects, especially baffles. I'm sorry to say that so far no one has volunteered baffle patterns. It would be so easy to make a set of cardboard or paper patterns while you were doing yours up, wouldn't it? Simply lay your flat layout on a piece of paper and trace it. Send it to me and I'll make up some duplicates to send out to the troops. Be sure to identify the engine and type of coil used, as there are some differences....PLEASE!

NEWS OF POWER: A considerable number of you have written about the possibility of using the Javelin Ford (Pinto) engine in the T-18. It's a little too heavy. However, the engineering concepts that have been thoroughly tested and explored in this engine have an exciting promise for the low budget builder. Hope is not only on the way, it's practically here.

DAVE BLANFON, the president of Javelin Aircraft, recently called me and asked me if I'd like to come up to Wichita and fly the Javelin Ford powered Oscura 17. Is the Pope Catholic? I hopped an early morning airplane the very next day. After a walk around pre-flight and quick briefing I got to fly this remarkable power plant, and to put it mildly, I was very impressed.

There was no point to comparing airplane performance with a standard 172, since the airframe has been altered by the addition of a belly scoop housing the radiator (for a specific engineering purpose only). It would be like comparing apples to oranges, but I certainly was interested in a number of things about the engine from an operational standpoint.

It starts on the very first blade, without the usual violent shaking. It's incredibly smooth at all rpm's. Warm up time was very short in the 95° heat. On T/O I could definitely notice the difference in initial acceleration the 220 hp made, even tho' the belly scoop was all but dragging in the high grass. It felt much like a C/S prop was on the nose. The sound is completely different, what there is of it. It is not only much quieter, but the sound is more nearly like a turboprop. You hear mostly prop noise, with some noise coming from the turbo and the belt reduction drive. When the engine is turning 3400 rpm for T/O the prop is turning 2700 and the turbo 110,000. The turbo is an excellent muffler of exhaust noise. When you come back to cruise power of 4600/2500 rpm the noise level drops drastically. On final it's almost ghostly.

Its throttle response is excellent. Severe yawing of the airplane produces no noise or vibration. The automotive carb gave no problem in a near vertical nose climb and positive or negative G's were completely uneventful. I was also a little surprised how much airframe noise one hears, power on and off, much like a car at highway speed. There was much less heat in the forward cabin area, too. Dave says the hot water heater works great and keeps the cabin toasty in even the coldest wx.

You've all read the Javelin Ford story in Sport Aviation, as well as the story of Dave's ultra-sophisticated dynamometer, how he took a stock 140 cc. in. Pinto engine and made an economical, dependable aviation engine of 220 hp. out of it. (Auto racers have gotten as much as 300 hp out of it for an entire season). Its weight compares favorably with an aircooled engine of like power and it burns 35% less fuel! (Now if fuel hits 12/gal. and it saves 2 gals./hr. that adds up to \$4000 for a 1000 period. Another way of saying it is, if you fly 150 hrs./yr. that \$4/hr. it saves would buy you a \$600 radio). The 250 is .30w per hp./hr, as compared to .57 for an aircooled engine. Still another bonus of a liquid cooled would be an increase in range of 32% on your tank's tankage.

This engine has primarily been only a test bed for the newer, smaller Ford engine Dave has known about for several years and THIS is THE engine of the near future. It is the 96 C.I.D. you can see NOW in the Ford Escort or Liberty Lynx. Unaspirated, it put out 100 hp and weighs (complete) within 15 lbs. of

a Cont. 0-200 (1cc hp). In 1951 the CID will go to 110, will have a Porsche turbo as factory option, will put out 150 hp, and with coolant, radiators, etc. will be considerably less than a Lyc. 150 hp 0-320, and you can hang it in your airplane for less than \$2000! Moreover, you won't need a prop extension. It is also dimensionally small (20" w x 12" l x 22" tall), so it will not only go easily inside the present cowl and still have room for radiator(s).

Will it take prolonged running at high rpm? The answer is a resounding YES! Ford randomly ticks this engine off their production lines (in Europe, where the engine has been produced for several years) and runs them WISE OPEN for 3000 hours! All engines are balanced to perfection. If one of them has the slightest vibration they junk it, along with all accessories. (You'd have to experience it to believe how smooth the engine is. Like an electric motor. The secret as I've retained the flywheel and the turbo does the rest).

One of the things I learned was that turbocharging actually adds to engine life, contrary to popular opinion. Turbocharging GREATLY reduces reciprocating loads and thus gives longer life, as hundreds of thousands of turbocharged car owners already know. There are many thousands of turbocharged trucks that normally pull 25 lbs. of boost (21"), while Dave's engine operates at a very modest 8 lbs. boost (12" for 1/3). Sucking air into an engine accentuates the power on power off recip loads, while a turbo will almost "blow" a piston down.

Don't do the highlights, but if you want the complete story I'd suggest you get Leveler Aircraft's SP info pack, complete with 7 torque charts, as drawn by Dave's super dyno. It's really an education, I promise you. The address is P.O. Box 16187, Wichita, KS, 67218.

CONVERTING A NEWLY COPPER: I didn't get to fly my T-15 to OSH, as a volunteer "mechanic" accidentally knocked a bump out of my prop. Dean Cochran loaned me his extra Cassidy prop, but I ran out of time. While talking to Bill Cassidy about a new prop (and learning it takes about 6 months to get one) he told me of his plans to sell a prop "kit" to builders at a considerable price reduction. His prop kit is a prop blank, with a pre-drilled hub, and finish-profiled on the thrust side, with all but about 1/8" of wood removed on the other side. Using simple hand tools and a vibratory finish sander, the builder completes the profiling and finish sanding. The prop is then varnished, tipped with fiberglass, and balanced. He furnishes an excellent 21 page manual with the kit, that takes the builder step by step to the final balancing and it is profusely illustrated by drawings and photographs. It looks easy. All materials and several of the tools are supplied with his kit (for \$240).

I found the booklet an education and I'm looking forward to making a spare prop this coming winter. As I've said before, I'm really sold on Cassidy's Pacemaker prop on my 160 hp engine. It gives me a measured P.A.S. of 197 mph at 2725 rpm at 15000ft, with an OAT of 71° F, along with a quick T/O and climb. His prop was also on Kent Paser's Mustang II that clipped off 225 mph on 150 hp at OSH in '76 in the Fantasy Efficiency Contest.

While a wood prop is more easily damaged than a metal one, it's much lighter and I can have at least 2 (and maybe 3) of them for what a new metal prop would cost me. Above all else, I like the peace of mind that it gives me. A cut-down and retatched metal prop can be lethal if it isn't tested to define the rpms that can cause it to self-destruct, as most of you well know.

I'm not belittling other wood props. I have had experience with Cassidy's, so I'm simply guessing on my personal opinion. I'd like to publish other builder's findings with their props. Be sure your tach is accurate when taking data. I would suggest a minimum 5 mile course 9.0 to the wind for accurate timing. Also, make about 5 runs and then find the average speed. Use a common spot on the wing L.E. to start and stop the time. Also, if you'll fly the airplane loaded

well towards the aft CG limit for that little bit extra speed.

GROUNDING OF WIRE TO AIRFRAME: It's a very basic thing, but perhaps it's often neglected. My 160 hp engine is a high compression engine and requires a geared starter to take thru compression with authority. For the last several months it has been a pain to start (intermittent y). I took everything off the airplane and had it checked item by item. All to no avail. Eliminating these items pointed to a power deficiency problem, between the battery and the starter. The problem was finally tracked down as an inadequate ground between the engine and airframe. By adding a flat braided wire between the accessory case and the upper landing gear bolt the problem was eliminated.

When we had "cows open" at OSH I noticed that only 2 of the T-15s there had used any engine to airframe grounding wires. Discussing this with an old pro mechanic from the '20s and the '30s, he told me they really had trouble starting the big radials when they first came on the scene...until they tied things together with multiple braided grounding straps. He also said auto racers using magnetos could not get anywhere near top rpms without grounding to the frame. In fact, he said they found the trouble while running the engine in the dark and saw sparks jumping from the engine to the frame at high power, so maybe this really isn't a little thing. If any of you have any additional info on the subject, let me know, please.

OFFSET CONTROL SPECKS: This subject has been mentioned before, but I think it's worth repeating. I'd sure recommend the offset sticks if you're building a standard width T-15. Every time I get a big guy in the right seat and let him fly he nearly rolls us when he pulls the flap handle (even tho' I brief him in advance). If you are carrying any left aileron on approach it's a problem. It's a big help on the left side, too. If you are small you'll probably tell yourself you don't need it, but I guarantee that the first guy you'll have in there will be a giant. When and if you go to sell it it's a lead pipe since that the potential buyer will be 6'5" and weigh 260 lbs. The problem is really the tunnel on the left side and on the right it's the distance between the flap handle and the stick.

NEW AIRFOIL LAYOUT: On the following page you will note that we have a table of ordinates for the new airfoil. In case you go thru the complete table of wax yourself and make your own ribs, etc. I'd like to refresh you on a very basic, but significant point: If you will look at your nose rib drawing very closely you will see that the rib and the skin are shown. Remember that your form block must fit inside of the rib. The airfoil ordinates are given the form block side, so don't make the mistake of making your form blocks the size of the ordinate layout. Your ribs would be taller than the spar and also too long. Visualize the rib as being the exact size of an airfoil shaped door opening. It must fit that "door" snugly. That door opening is the wing skin. Now you must remove the rib thickness from the form block all around. So how in the world do you scribe a line either .025 or .032 in from the outer edge of your template? Here's one way.

Take a small piece of scrap of the same thickness of the rib stock. Take another piece of scrap of any thickness (but preferably much thicker than the rib stock. Now either rivet them together or use a small c clamp to hold them very tightly together. (second piece will be somewhat longer than the one that's the thickness of the rib stock). Now you have a simple little marking gauge. Just hold the longer piece tightly against the outer template edge as you slide it along and hold your scribe against the inner piece and you can make a good, sharp line to go by. Don't forget to lean the scribe at an angle, so you aren't marking more than you should. It's easier to do than tell about it.

OPTIONAL WING PROFILE

The following coordinates describe an airfoil which is a modification of the 63-212 used on the standard T-18. Only the nose rib portion has been changed by increasing the leading edge curve. The nose shape is nearly identical to the GAW-2. According to extensive NASA computer studies it should give improved stall performance and a slight reduction in drag at cruise. These coordinates can be substituted in place of the coordinates given on drawing 517. They are all given in inches for a 50 inch chord.

LDS-4-212 AIRFOIL COORDINATES

	X	Z _U	Z _L
1	0.0	.0661	+.0661
2	0.100	.4737	-.2742
3	0.250	.7290	-.4377
4	0.625	1.1364	-.6554
5	1.250	1.5750	-.8641
6	1.875	1.8881	-1.0125
7	2.500	2.1363	-1.1340
8	3.750	2.5242	-1.3305
9	5.000	2.8248	-1.4860
10	6.250	3.0693	-1.6130
11	7.500	3.270	-1.7124
12	8.750	3.440	-1.8060
13	10.000	3.583	-1.872
14	11.500	3.800	-1.968
15	13.00	3.938	-1.995
16	14.440	4.016	-1.9710
17	19.960	4.009	-1.8950
18	22.460	3.940	-1.7787
19	25.000	3.7871	-1.6294
20	27.515	3.5635	-1.4669
21	30.03	2.2814	-1.2963
22	32.54	2.9503	-1.1335
23	35.045	2.5793	-.9710
24	37.525	2.1808	-.8101
25	40.04	1.7539	-.6497
26	42.535	1.3176	-.4888
27	45.025	.8792	-.3268
28	47.51	.4456	-.1636
29	50.00	.0	-.0

To layout the airfoil, scribe a straight line 50 inches long on a piece of aluminum sheet. Mark off the stations (column X) along this line and draw perpendicular lines at each station. Z_U dimensions describe the upper surface and Z_L the lower. For convenience, stations for both upper and lower surfaces are the same. Note that this airfoil exactly fits the spars. Rib form blocks must be made smaller by the amount of rib thickness.

The wing incidence on the T-18 is +1 degree. For 160 and 180 hp installations, the incidence should be set at zero for minimum fuselage drag. This requires changing the spar angles and the rear spar fitting.

From Pete Beck, 5972 Jan Mar Rd., Falls Church, VA, 22041.

Dear Dick, I promised you a drawing of the gear Extension for the standard T-18 landing gear. The drawing is self explanatory. Note that it must be left-treated, else it will acquire a nice bow on landing. It is a cheap solution to the extension problem for those that built their ship with the short gear. It's well worth the GEAR LEG EXTENSION effort and minor expense. It achieves the same result that the long gear give

MAT'L: 4130 STEEL .375" PLATE

HEAT TREAT TO 150,000 PSI

MAKE TWO, L&R

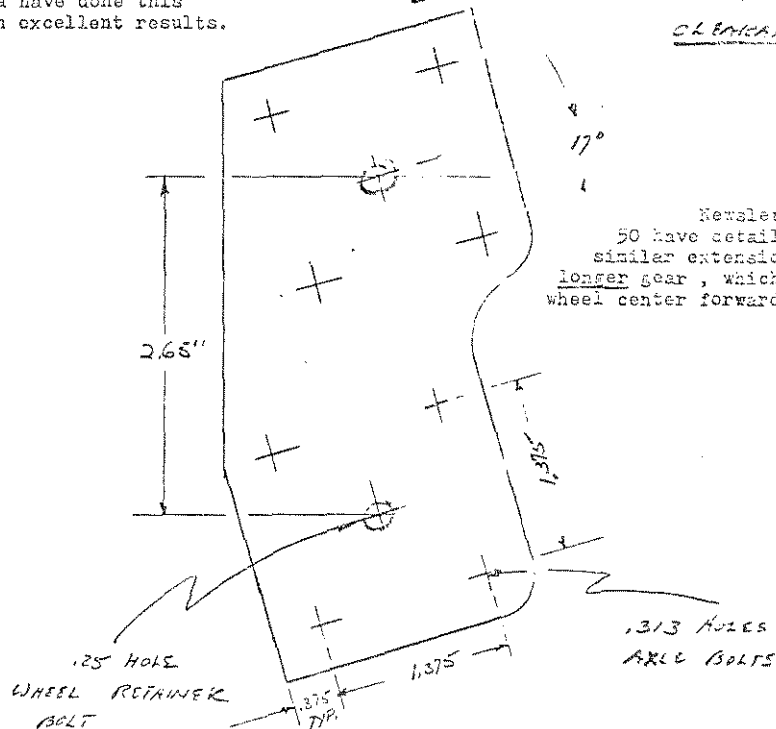
BREAK ALL CORNERS, ROUND CORNERS

SHOWN TO ASSURE CORNER CALIBER

CLEARANCE

Ed: Note that the ext'n moves wheel f'wd some, too.

Pete told me that several builders his area have done this with excellent results.



Newsletters 49 & 50 have details of a similar extension for the longer gear, which moves the wheel center forward, only.

Thanks Pete. At OSH a poll indicated that the longer gear was much more desirable. Several said with the short gear you could put the tail wheel on and fly clear across the airport with the main gear still off the ground without stalling the airplane. I feel landing deceleration is much more rapid with the longer gear and definitely improves short and ruff field performance.

NEWSLETTER INDEX OF SUBJECT MATTER IN ALPHABETICAL ORDER:

Feb. 5, 1980

Dear Dick,

Thank you for sending the newsletters out so fast, I really appreciate it. I have just made a quick index on the earlier N.L. and since I haven't started construction yet I'm not sure which of the items supercede older ones. If it's any help though here's a copy. By the way "x" refers to the cancelled N.L. of 1-12.

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ZZZZZ: whenever you can find time.

I'm sure I missed some other things that may be needed but anyone that is interested enough in building the T-18 will surely read all the N.L.s anyway.

Thanks again Dick and I hope to see you at Cshgosh 1980.



Bob Jaeger
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312-455-0787

You might want to photocopy these two Index pages and put them as page 1 and 2 of your bound volume of T-18 Newsletters. Note that the new newsletter series from #45 onward are not covered in this index (Ed.)

HOWDY PAID.

THAT YOU MITE USE THIS IN THE NEWSLETTER,
LOTS OF FOLKS THINKS ITS A BIT SILLY BUT IF
YOU HAVE EVER SEEN WHAT LOSING A CHANGE OF
PROP CAN DO, YOU'D BELIEVE IN IT. I HAVE,
AND I DO.

THE BOYS IN THE PRPA CAME UP WITH THIS
A FEW YEARS AGO AND ITS MANDATORY ON ALL
THE FORMULA ONE'S + BIPLANE RACERS.

THE MAIN IDEA IS TO GIVE THE ENGINE
ROOM TO THRASH ABOUT UNTIL IT GROANS WITHOUT
BREAKING THE CABLE, SO DON'T SNUG IT UP
TOO TITE. ALL IT HAS TO DO IS KEEP THE
ENGINE FROM FALLING OUT.

BE SURE THE LUGS ARE BOLTED TO THE
LANDING GEAR ATTACH + NOT THE ENGINE MOUNT.

I'VE HAD MINE IN FOR YEARS NOW. GIVES
WONDERFUL PEACE OF MIND + CHEAP INSURANCE.



BOUGHT A CHUTE OF ARIZONA, GOT A
3000' HARD TOP RUNWAY, GOUNA START
BUILDING HOUSE + HANGAR, SOON AS I CAN.
ITS CALLED "EAGLE'S ROOST" IN AGUILA ARIZ.

LOVE IT!

SEE YOU IN CHANDO

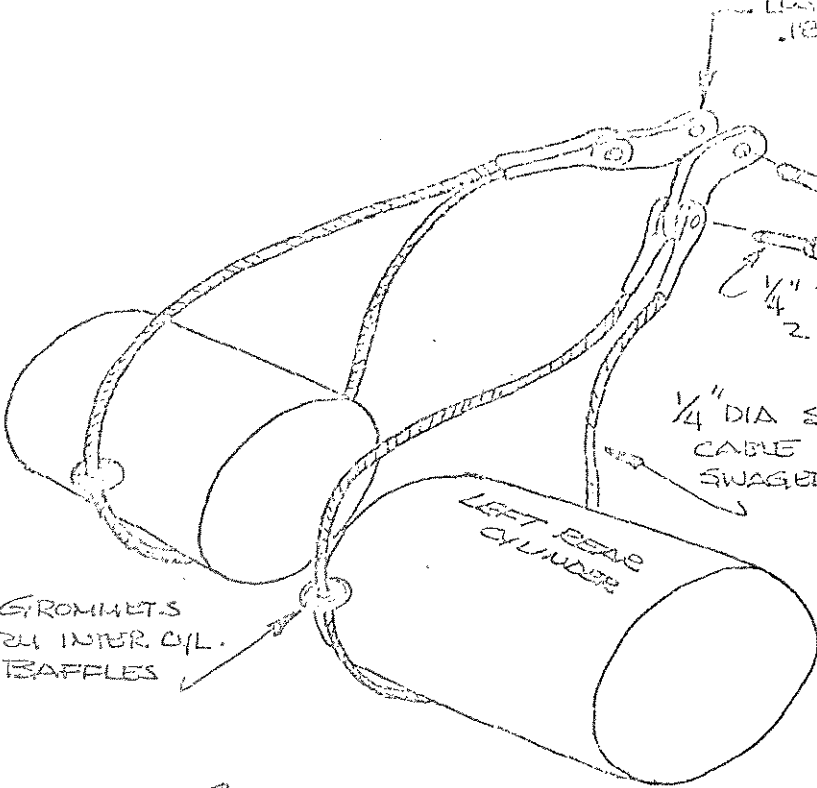
Bill Warwick

P.S. IN 3 MOS. OL TIGER WILL BE 16 YRS OLD!

IMAGINE THAT!

Thanks, Bill, for some very important advice. I lost a good friend from this
very cause several years ago. He "planned" to put the restrainer on when he
got back from the XC and had more time. He never made it. When the prop let
go it shook engine, prop, and cowling completely out of the airplane and it pitched
up into a stall and sugered in. It also shook one aileron off and the windshield
as well.

GROMMETS
THRU INTER. CYL.
WAPPLES



LESS 2 (REQD)
187 C.M. OR STNLS.

1/4" DIA STNLS AIRCRAFT
CABLE WITH GOOD QUALITY
SWAGED ENDS.

NO NICOPRESS



CUT SEVERAL
PIECES OF WIPER
HOSE TO SUP OVER
CABLE ANY PLACE IT
RUBS ON ANYTHING

RECENTLY WE RECEIVED FROM: Glenn and Ethel Young, 705 Park Ave., Larchfield, Kent, Ohio, and their T-18 at CBR again this year and shortly after they got their T-18's were downing a small crowd of T-18 builders around their yard. They were accompanied there by a small crowd of attack indicators that was described as "the best of the best" of the T-18 builders. They are still exhibiting in the area and they are taking care they are beginning to have confidence in it and they think it will be a very valuable tool in its final form. They have the air-raid siren that was mounted on a short boom out near the left wing tip. I believe they think he had used a damping device in the boom transmitter to eliminate siren sensitivity and that the whole package was very inexpensive. Around W-2, I think as I said. Anyway, he said they will soon write a report for the W-8 A's. An article of attack indicator can be a very valuable instrument for precisely determining minimum safe speed on final approach. Several T-18s that I've flown have been able to stall warning buffet, especially if you gradually "unsink" into the stall. I think on final and were a little careless about setting too slow. I have had a number of incidents and some accidents when some of the low T-18's flew too high or flared too rapidly. Some lean too far the other way and some lean with much too much excess speed and floor, so far down the runway that they "use up" all the runway and hang their neck or break on the last min-ute.

It also might be tied into the circuit and this could be used to give the pilot an audible warning on approach or flare when his attention is diverted. Present type of stall warnings are inadequate, as they don't give the pilot the time of closure with the critical angle. They only tell him that they are close. I once flew a research airplane of Prof. Saper's that had a stall warning that went up in frequency as you increased the angle of attack. I think that may not be able to carry a tune, but they can certainly give you a warning between musical notes. As the notes go up the scale, even one degree change in A of A is very evident.

Such an A of A indicator is also valuable for selecting the proper climb angle for speed control in turns. It might even save your life if you had a power failure and needed to maintain the best L/D without approaching an inadvertent stall, which is almost 100% fatal at low altitude. It might well be the best S/S any of us ever spent, especially if your T-18 is one of those with zero stall warning. I plan to put one on mine, not only for the above reasons, but also for what I will be teaching in cruising flight.

If you don't have a copy of the Sept '75 S.A. and can't get the from IAA HQ, I understand that Professor will photocopy specific articles for 20¢ per page. Write to me who puts out indexes for Sport Aviation, I advertise in S.A.

RECENTLY WE RECEIVED FROM: As we have had several hundred new builders and their T-18's come into our group in the past few years, perhaps it's time to start setting the score, intent, and purposes of the newsletters.

First of all, the W-18 N.A.S. newsletters are an information exchange only. We don't want to make random builder's experiences, methods, criticisms, and suggestions and then pass on to the group. Then it's up to the individual if he chooses to use or not use the information. When circumstances warrant, we will directly write to the person involved. If it involves the CW, otherwise, please keep in mind that our material is in the "clearway" condition.

In the past we've made typographic errors and hopefully we've caught all of 'em and corrected them. Since the writing, editing, printing, collating, folding, addressing, and mailing of several hundred newsletters each time is a one man operation, there all of you will be tolerant of our irregularities.

In the cases of Gram's corrections, or recommended modifications from the design-



We'll not publish the information until our written copy is cross checked for accuracy, even tho' it incurs a delay. Time is a stressful factor in my writing the newsletter and I have to do some of the writing in the few hours when it's done. I write about 30 lines each month for our current newsletter and edit it. I also send out a few lines to various newsstand magazines. Mainly mine my own T-18 and building some T-18 concepts up now and then takes up about all the rest of my regular time. My old friend, Orly Sigelgig, is prodding me to write a book on building metal aircraft. If I do that I'll need to get a hobby to take up the rest of my time.

In light of the above and to summarize, please consider the newsletter in the light of good friends and fellow builders exchanging experiences and technical opinions. Don't see it in the light of an unimpeachable authority dispensing engraved sterling silver tablets of instruction, that is the way I view it. I don't see it as a source of information. He'd probably deny it, but I've never seen him even hesitate when someone asks him a question about airplanes. He's the right answer right off the top of his head, as far as I'm concerned, he knows the right way to solve any of the problems we face and others have the same high opinion of him that I do.

NOTE ON RECENTLY WE RECEIVED FROM: In the last W-18, we discussed one of the ways of assembling the front spars and we mentioned using a large cabinet veneer caliper to maintain the exact distance from outside to outside of the spar caps. Get an extra locking "handle" for your combination square, since it or the blade and you've got a super caliper that will stay put where you set it. When you have the distance set, check the height of your spars against your own height with your new caliper. They should be EXACTLY the same or you'll have humps and bumps where the skin crosses the spar...and that's a big NO-NO.

To prevent another cabinet: Be sure and check and re-check the angle (15°) seats been extracted on the spar cap. It is NOT a right angle, but it is backslant. It has happened. In case of doubt, label every thing so it front a back, etc.

NOTE ON THE ANGLE OF ATTACK INDICATOR: As I was writing the article on the Clear Young A of A indicator I was trying to recall where I had read something else on the subject. It finally came to me. It was in the July 1970 issue of S.A. ago in the July 1970 issue. It was by Jerry Givoni and was entitled "Faces and and well illustrated. It illustrated a non-aerobic type of instrument and the article dealt with all the various uses of it. I'd probably not have access to that issue of S.A., unless you are the noble one type that are that I am. I never throw an Aero mag away. Anyway, I think the article is so informative that I'll reproduce it and the other S.A. article in next issue.

PROBLEMS ON SERVICE AND MAINTENANCE: Now, while you are building is the time to fix ahead on service items. Here are a few of those things to consider:

WHEELS AND BRAKES: Had you considered how and where to place a jack if you need to change a tire or work on brakes? I carry a little jerry rig by W-18 at all times for that very purpose...just in case I have a flat or some such out in the bushes. It's a portion of a piece of 1 1/2" tubing (probably more than 4' of the tubing circumference) that fits the landing gear leg assembly snugly. It has a piece of flat 4130 about an inch wide welded to it. The flat piece is about 2" long and is bent in the shape of a V...only the V is turned over on its side. The part of the V that is horizontal is where the jack is placed. Both ends of the V are welded to the tube segment. Works fine. Of course I have to take the gear leg fairings off to use it, which is a little time consuming the way mine's made. Maybe there's an easier way to do it. How does your co do it? Just take an auto, you don't want your jack point too high up for fear it will fall off the jack.



Feb, 20, 1980

Dear Dick,

Sorry to be so long getting a letter to you.

The 100 engine making exhaust kits & systems and have been doing quite a few for all kinds of airplanes. Just completed development work with the Pitts factory on a new crossover system to meet the new noise reg's and am currently supplying their V-10 systems for the S-2.

The 100 has kept me from anything but basic maintenance on my T-18. It still looks the same as it did at Oshkosh. I'd like to get gear fairings & upholstery before this year's flight. This winter forced me into a cabin heater. It's only 2 1/2" square by 5" long held onto one tailpipe by an aero clamp. It works about like an old VW heater- warm enough under cover but cools quickly on letdown.

The airplane performs quite well here in the Buryer area. When Rogers stopped here on his way home to Australia from his last year, he reckoned it didn't perform as well as his T-18 but when he worked it out on a computer the density alt was 1000' that morning.

It's a great pilot (does airshows in Aus. with his bird) and says he'd like to fly it. He's rolled, say's it feels like he's in maneuvers. He'd like it over the hump to the western slope several times as our school is attending a flying college at Rangely, CO.

Heading back a few years trying to nurse a Luscombe or P-10 up over that same rockpile there is just no comparison. A little fuel, some baggage, the wife & I can leave Jerico, climb at about 1000', go right up over the top and still be climbing 2000' at 13,000 ft. The 200 mi trip takes an hour and 15 minutes.

Heading to the 100 P-10's Cassidy 6x400 prop. still is making up a 65X60 for me now as I think I can still get respectable climb with better economy. Being from the old school, I can't bring myself to let an engine run very long above 2500. The current prop kinds close to 2800 giving a true of 195 (calibrated by running with 2 Bonanza's).

Heading back over this letter it sounds boastful, I don't mean it to be as I am just T-18ized and do think I was pretty clever to have picked an airplane 17 years ago that still suits me today. Bill Cassidy said it was the only plane ever testflown in the age hardened condition.

Good to see the great job on the newsletter.

Best Regards,

Dean Cochran

Dean

They say that when it rains it pours. I guess that's true. After years of drouth trying to get some of our members to make up a good index for plans and also a subject index on N.L. topics, we got in a lurch. I had received one from Paul Heflinger of the N.L. Annex and was in the process of copying it and typing it up when others came in. First was the one by Bob Jaeger, closely followed by the very complete one by Jim Wall. Both of these are in this issue. I had received one from Elmer Hyman and still another from one (whose name I lost). It had a notation at the top which began "not in file at time of typing" and was dated 3/1/78. I apologize for losing your name and if you'll send me a card and identify, I'd like to give you credit. I usually scribble the donor's name on the back of articles, etc., and letters and articles frequently get separated in the pile of T-18 stuff on my desk. Lowell had sent me a couple of electric system schematics some time ago. I published one of them, but the other got "lost" in the area of my desk for several months, but I'll have it in #52. Anyway, guys, I do thank you for your time and trouble in compiling the lists. They are really a big help in researching a subject or finding a particular drawing.

FILING PLANS: For years I've kept my plans in a filing cabinet in my shop. I keep them in numerical order, with the drawing number on the upper left corner as I face the cabinet. The number is inverted of course, but this is no problem when I stand alongside the cabinet and look down. I've seen others use this method, using a box they'd built out of scrap plywood for that purpose. Now that you have some good indexes to refer to it'll be a snap to get a drawing out in jig time. *****NEEDED*****

Another item we need very badly is an up to date material list. If some of you that aren't engaged in building your T-18 right now for one reason or another would go thru each drawing and list the raw material or parts needed for that particular sheet it would really help. As a suggestion, in figuring sheet steel requirements, don't forget to allow for flanges, etc., and to figure to the nearest rectangle size. Where there are several identical parts (i.e. flap hinges) it may be possible to save a little material by some dovetailing of irregularly shaped parts. If there are material options (i.e. side skin thickness), so state.

By the way, I still get questions about Hi-Shear rivets from some of the new builders. Yes, it IS okay to substitute aircraft bolts for Hi-Shears. If you have the tools and can get the Hi-Shears, sure, go ahead and use them. They are time savers, which is primarily why factories like 'em.

Anyway, if you've got some extra time right now to spend on the material list problem, it'll not only be greatly appreciated, but it's also a most excellent way to become familiar with the drawings, where the parts go, what sequence is used in assembly, part numbers, what tools are needed, etc. If you'd like to volunteer for some of this, please write me and I'll coordinate on who does what drawings. In that way it won't be too big a burden for any one person.

Torque wrench use: Bolt torque is important on almost all aircraft applications. An experienced mechanic can make a pretty close guess by feel, but if you are not really experienced it'd be a pretty good investment to buy a torque wrench. If you have a mechanic buddy perhaps you can borrow one. Example: Do you know how much to torque the prop bolts on installing a wooden prop? Torque 'em too much and you'll crush the wood fibers. Too little and it'll slip and char the wood where it's in contact with the prop flange. The answer given in the mechanics handbook is 200-225 in./lbs., depending on density of wood used in the prop.

Cover picture this N.L. is Glenn and Ethel Young's T-18. I hope to have N.L. #52 in the mail in about a month. Adios.

10301 Colsonet St
P.O. Box 3128
Burbank, Ca 91504

- PAGE 8 -
T-18 N.L. # 51

T 18 N.L. # 51

PAGE 8A

Case to: Mr. Harold Streater
From: Tom Taylor
Transcribed: August 19, 1979

***FLASH... press time Tom Taylor had made it ok to Hawaii & was enroute to the next stop on his round trip flight from U.S. to Australia & return !!!!!!!!!!!!!

SUBJECT: PUTTING FUEL IN THE WINGS:

Hi, Harold. I remember our very pleasant visit at OshKosh, and I have your letter of 2 August. Thanks a lot for writing. I think I will go over your letter first and give you the name of the people and then I've got some remarks. It's so much trouble to put all this on paper that I thought I'd let you have this paper--it would be a lot easier for me, if you don't mind. I've been having a little trouble with this recorder; I'm going to play this little first segment back and see how it is. Okay, it seems pretty good, Harold.

The gentleman you met from Arkansas was probably Lloyd Toll, an old time aviator, a builder from way back, a heck of a nice guy. He sure had a lot of pretty good suggestions--a real nice type.

Oh, the Dealer. I've dealt with these people only by phone, so I don't have the address but I have the phone number and the company so I will give you that. It's PRC. It's called PRC--that's the product. And I got it the Aircraft Tank Service Company, Burbank, California. My contact was Mr. W. J. Fuller Area Code 213-875-0686. I understand the company has been sold but I am sure it is still in business because it's a good little company and I am sure whoever bought it is going to work it. I would suggest you tell them what you are doing and ask them for exact instructions, but just in case they don't tell you this, you seal with their compounds only places that will leak, such as rivet holes. If it is solid metal, just leave it alone. Start with the metal as clean as you can get it. I think I cleaned it with NEK or something like that. Anyway, ask them how to clean the metal so that their material will stick. Now where you have a solid sheet of metal, it's a solid sheet that obviously will not leak. Don't do anything to it. Just leave it the bare metal. Some people have been very carefully using PRC and then when it's all through they pour on a half-gallon or gallon or so of this NEK slushing compound to finish the job off. This is absolutely wrong. The two do not mix and then you have problems. Just use their sealant and where you don't use their sealant you just have clean metal. It's inside the tank--it won't rust. And if they forget to tell you this, it's very important.

---NOISE FOR A LONG TIME
ON THE TAPE

... is right in the same area and it comes out of the top of the rib with an L-shaped fitting, down with a plastic tube and out the bottom of the tip another L-shaped fitting that points forward into the wind (wind). I think it gives you a tiny bit of pressure and the hole size is only 1/8" --it's not very big. And that's how I vented the outside leading edge.

Then I went to the inside rib nearest the fuselage. I took that and at the very bottom of it--staying out of the radius, of course-- I put an outlet there. It goes straight through. That goes to a hose which goes across the gap to the inner panel which is No. 532. It doesn't go straight through. There is a fitting in the way. If I remember right, there is a sort of a U-shaped loop... I used Hercon tubing from Ryan Hercon in Burbank. It's extremely good tubing and it's been in four years and it's fuel resistant/cold resistant. I'll get you their address in just a minute in case you want to use some of their tubing. I believe it's 3/8" diameter (inside).

CRANK

Now on the print 532 which is the assembly, center wing, John took the main spar and out about 15 rivets--that is from the fuselage out, that's where the spar is thickest--we doubled the rivets up. Now somebody told me since then John had said "Don't taper the spar until you get almost down to the fitting--the bell-tank ? fitting on the outer rib --that's rib 535-- don't taper until you get almost out there and then just cut a circular corner out of it. And then double those rivets all the way up. Now I'm pretty sure that somebody told me John says to do that now. I didn't, and my wing's been okay.

Now on my center wing only the 3 bays forward of the spar are wet. That gives me about 12 to 12 1/2 gallons of which about 10 is useable. Now in this, also, he had every rib go up to the next size larger. For instance, for an 025 rib, go to an 032. Now if a rib is 040, leave it alone. It's okay. And we didn't go from any 032 to any 040 ribs. But that makes that stronger there. Now the skin here is also 032 instead of 025. In this case the inlet which faces the 8 degree outer panel we just talked about, in the bottom of it, forward of the fitting, which is the high point of an airplane that's flying--that's the highest point-- I mean the lowest point--so the fuel can flow across to the bottom of this tank --that, the aluminum fitting--staying out of the radius--is just off the bottom there. It comes in from the outer panel to the (back??) Now there is no filler cap in my inner panel so the problem was how to get the air out of it. If I didn't have an outlet, a vent, the tank would never really fill, and that means that the --in the center sections, the panel is formed by the inside ribs--these are the 544 ribs--it would never vent properly and the tank would never fill all the way.

So what I did was come out--I'm talking now about the inside rib forward of the spar, it's a 544 rib--Again, everything is figured for the plane to feed fuel in level flight. It has to fill with the tail down, but it flows in level flight. So in talking now about the 544 rib next to the fuselage in the leading edge, my outlet is in the bottom of that. It's a straight through bulkhead type fitting. Of course it's sealed off on the inside with the PRC. And then go straight through and then I cut a hole in the fuselage and that goes to the Christiansen valve that sits down between my feet. And it's the same on both sides. And then I put hose across where they meet the Christiansen valve and then from there I came around the outlet of the Christiansen valve --that's a single outlet-- it comes up in a U-shape with a one-way valve in it just so the main will never feed back into the wing-- and it goes to a T fitting.

Now this T fitting--I come out of the main down to the T, and one part of the T--top T--goes back to these wing Tanks? I'm talking about. But it can't flow because of that one-way flow valve. And the other side of the T goes right on from there through the fire wall to the main fuel (Stack). Now that's now I did it.

Now the question came up of how to vent these leading edge tanks on this inside section--this 532 section. Off the top of it I made another outlet straight through another bulkhead fitting. It's on the inside rib, forward of the spar, nearest the fuselage just above the outlet. From there I ran another line (this is nothing but a vent line) through into the cockpit. I think there might be another way to do this. You asked about this in your drawing... I went back to your letter. It says "Another suggestion in Oshgosh was that if you were going to seal the area forward of the beam and between the two most innerboard ribs," Yes, I did that. "If you were to include an additional rib an inch or so from the fuselage to give room for air vent into the cockpit." This is a possible suggestion. I can't really tell you how to vent this section. Well, this all goes back to one thing. What are you going to wet? If you are only going to wet the center section, leading and forward of the spar, then you've got to have a vent in there. Okay, now, here's one suggestion. Why not just come up--there's about a

of overlap skin from the inside rib next to the goes right to the fuselage where the rubber seal is. Why not just take a fitting straight through --a 90° fitting, rather--forward of the spar and that inside rib and turn it up and just come out the top of the skin somewhere. Now that piece of skin has got no stretcher in it. It's simply overlapping a rib and getting next to the fuselage to seal it. Anyway... anyway you want. What I did on mine was, I went--you don't want to do this probably--I went into the cockpit around to the panel that as I sit there is on my right side (I forget the name of the tube) but back through that and I went aft and I brought it up to the top of the fuselage behind me and then down in a big U-shaped bend with my plastic tubing again and out the bottom.

---NOISE-----
ON TAPE AGAIN

...539 that you don't wet the back of the spar. This puts a lot of strain on the fittings and John doesn't recommend this. If you wet only the center section, you get an additional 10 on each side --20 gallons total. If you wet the whole leading edge, then you should get 10, 10, 10 and 10. That's 40 extra gallons. I don't know what this will do to your CG because, like I say, I have my outer panel aft wet. But don't do this, it's way too much. I'm not sure how much extra fuel you wanted. Let's see. That gives you some idea of what I did.

Oh, let me run through some miscellaneous stuff. I'm back to print 532. The 544 ribs from the spar forward, they are also on the bottom. I had put in between every rivet that's on the print another rivet. I doubled the rivets on the leading edge

coming clear on up almost to the nose. It's too hard to do them right around the nose radius, but from there on down to the bottom they are all double riveted. Now to construct these I also cut a hole--a 3" hole--with a back-up plate and I can take the inspection plate off each of the bays, there are three bays for fuel in the leading edge on this 532 print. Now this was for construction. You have to seal the PRC from the inside of the tank, not the outside. When you start laying the skin around the top of the main spar, as you rivet you are going to come to a place where you can't put the sealant in before you rivet. It's impossible unless you have these three construction holes. I hope you looked under the bottom of my wing because each of the panels that I wet--that's on one side it would be 3 in the leading edge, inboard, 3 in the edge outboard and 3 in the back of the outer panel--that's 9 inspection holes on each side--because each panel has an inspection hole for construction. It looks like hell, but if you take your time and make the back-up plates right and flush them, I haven't had any trouble with these either. But like I say, John suggests nobody wet the full wing like I did because when I fill the thing with that's 48k gallons on each side, it's extremely heavy on takeoff and could cause a lot of trouble and there is no need for it unless you want to go over 1,000 or 1,200 miles. Of course I have the regular main tank too, also.

Part of that tape had a bad spot in it and I can't remember what I said there so I will quickly review.

When I suggested putting that wing vent between the innermost rib and the fuselage pointing up, be careful that you don't get it in a fire hazard area. It's going to have gasoline vapors there. It might be a bad place for it. Maybe you ought to run it through the fuselage and then aft back clear through the... somewhere back aft so you can get rid of the vapors away from the engine. Mine are way back in the aft and are no problem so be careful with that suggestion I just gave you. It might not be too good. See the point is, you have to vent ... if you are going to wet the outer panel, you've got to vent it in such a

way that the vent is much higher than the tip to get the damn thing out and its got to be from the inside...from the inner panel too.

I've gone over your drawing and you have an extra rib showing in there. I don't see anything wrong with it. I didn't do it. I don't think it is necessary to put the extra rib in there. But it's possible if you put it too close to the fuselage if there is any bending at that point in the main spar for any reason, then it might hit the fuselage and wreck the skin a little bit. By the way, my fuselage skin is 032 also. In other words, the airplane has been beefed up all the way around. I think this is a good idea.

I think in the bad spot my wife said that it was the name of the tubing company. This is plastic tank tubing. You can get any kind you want, just specify what you want and how you want

airplane and it had to be flexible. I would like to see through it and use it as a sight gauge and it had to resist 100 octane fuel. They sell it by the foot in any size you want and it is tremendous stuff. I've had it in there for about somewhere over 6 years now. My contact was John R. Bernier. The company is Ryan-Hercos Products Corporation, 1311 West Magnolia, Burbank, California 91506. The phone is area 213- 849-1143.

-PAGE
13-

The tape's been a little bit better. Here's some more rough ideas and comments.

I tipped the wing upside down on two padded sawhorses, sealing as I riveted. Now what I did was I started at the back beam and riveted the bottom around ... came on around as I did it. I used regular 2X rivets for this because they seemed to seal better. John told me don't cut any holes in the main spars or any of the spars. Now, he said it might weaken the spars. It's possible if you cut a hole in a spar and put a big back-up plate on it it will do the job, but I don't have any holes in my spar ---none. The way I get the fuel, there are no big holes in my ribs--they are solid ribs. I drilled enough small holes in them so actually the fuel just leaks through from one bay to the other. It's a little bit slow. I wish I would have put a few more holes in it. But they are spaced so that at any level the fuel will run through from the outer panel into the inner panel.

When I tested the tank, I used water. I used 2-2½ pounds of water and if I remember right, my hose was up 6 or 7 feet. Something like that. I did it so the wing skin started to bulge slightly and there were no leaks. By the way, I used water because it was safer. When I did one panel the first time with gasoline, I had a leak and it ran all over the garage floor--scared the heck out of me. And I also had to go back through these inspection holes---probably twice on each one at least. On one I know I went back three times trying to get all of the little holes sealed.

Also, where your ribs go in, the way the drawing of the ribs are, they are not meant to be sealed. You have gaps on both ends. Anywhere on a rib that goes to , say a main spar, especially the outer rib and the inner rib, because it has to be sealed off, I made little metal plug inserts and put in there, and things like that. You're going to have to be a little clever about sealing. Sealing material is not meant to seal big holes, so if you have a big hole, put something in there, some kind of material in. If it's round, I put an aluminum rivet or I put an aluminum plug or something like that. You'll see where she's going to leak. It's quite apparent.

Well, I got over your letter and I think that these are some ideas. Sure not all of them by any means. And if you can meet any body else who has sealed the ~~outer~~ wing, it would be good to talk to them too. I had good luck with mine, and I don't think I would change anything I did, or I wouldn't do it any other way. That's probably the best recommendation I can give you. If you have any more questions or problems or whatnot, just write me another letter or give me a call. I hope this has helped a little bit. So, good luck. We'll see you later.

By the way, this is the end of the tape and there is nothing on the other side. Hope it's clear enough and it will help you out. Hope to see you in Oshkosh again later. Good luck. Let me know how your wing comes out.

T-18 MUTUAL AID SOCIETY
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THORP T-18, CONVERTIBLE WING, WIDE BODY

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LP-117H 0-290 GPU KEN MORGAN, 439 LOUELLA DR., HUNST, TEXAS

A great deal of information is available on the 0-290G power plant. Most agree that it is a reliable engine, if properly overhauled and maintained. Recently, less interest has been shown in the engine due to its scarcity and the availability of spare parts. Some T-18 builders may have GPU engines planned for installation in their aircraft. If so, the following information may be of some value.

I just completed a top overhaul on a GPU engine installed in my Starduster 2-place. The engine had about 160 hours total time since new. The compression check was good; however, oil fouling of the bottom plugs on #1 and #2 cylinders prevented proper operation of the power plant. Disassembly of the cylinders revealed excessive valve stem to valve guide clearance. Don't believe the GPU manual on the clearance that is acceptable. Refer to the Lycoming overhaul manual for guide to stem clearance specified for the 0-290D. The search for replacement parts (intake and exhaust valves, guides, rings, and top gasket set) went from the typical aircraft distributor to the salvage yards that once sold GPU engines and spare parts. Gentlemen, inflation is definitely with us. However, after some extensive shopping the following sources of supply were used. All furnished airworthy components, at the most reasonable price.

1. Rings and top gasket set was purchased from Mr. Carl F. Baker, 14807 Aetna St., Van Nuys, Ca. 91411, Phone 213-786-3120. Service was excellent with same day shipment of parts, even C.O.D. Mr. Baker also has standard aircraft components if desired.
2. The prop reinforcement flange is available from Aircraft Spruce and Specialty. This is a bargain for about \$ 30.00, and possibly the cheapest insurance you will ever buy. They also have the longer driving lugs required if the flange is used.
3. Valves and valve guides were purchased from El Reno Aviation, El Reno, Oklahoma. These are original GPU valves and perfectly suited to aircraft use. John Thorp has indicated these valves were, in his opinion, equal to aircraft quality valves. El Reno has most any other part required to convert and/or overhaul the GPU. This includes items such as the accessory case, mags, pistons, rods and bearings, and other misc. components required for GPU conversion.

I recently made a business trip to San Francisco and had the opportunity to visit with John and Kay Thorp. I am happy to report they are doing very well and John is still busy tending to T-18 inquiries. This visit was a dream come true for me as I had wanted to personally meet this fine gentleman and thank him for the great aircraft he has given to us. During our conversation, Mr. Thorp related his experience with the GPU having personally overhauled approximately 35 to 40 engines. His opinion has always been, and still is, that the GPU makes an outstanding aircraft power plant, if properly overhauled and maintained. With the cost of certified engines going up daily, it may be time to dust off the old GPU.

My T-18 project has been on the back burner for almost a year as I have spent this time on the restoration of an early Starduster 2-place biplane. This work has been completed and the T-18 fever is abuilding once again. Present project status is: Fuselage riveted and on gear. Vertical fin and rudder complete. Horizontal tail ready to assemble. Electric trim in place. 0-379-B2B high compression 160 HP engine in crate with 1176 hrs. Will go folding wing, but no components or material in work. I vote YES for national T-18 Fly In.

Thanks, Ken, for the 0-290 Deep.

When and if we get a complete bill of materials, and if there is sufficient interest, I'll do all the indexes and list full size in a separate mailing. If only a few request it I'll send you the list photocopied full size. Allow 12¢/sheet, plus about \$1.25 for postage and envelope.

TEXT
ASSY

NUMBER

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