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March 7, 1972

T-18 NEWSLETTER NO. 36

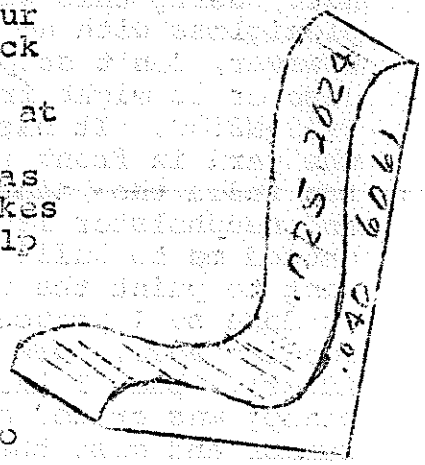
L.D. Sunderland, 5 Griffin Drive, Apalachin, N.Y., 13732

TUNNEL CRACKS AND PLEXIGLASS CUTTING - Lyle Fleming, Lancaster, Calif., 93534 -"Here are a couple of items for the T-18 Newsletter. I found during the last annual inspection that all four bolt holes in the top of the tunnel, where the quadrant for the flap bolts on, had a crack radiating out from each of the holes. I made up a saddle reinforcement piece of .063 over the top of the tunnel and extending down each side where I bolted it to the side of the tunnel. The plane had over 427 hours on it at that time. One of the easiest and nicest ways to cut plexiglass that I have found is to use an abrasive cutoff wheel. The wheel is about 1/32" thick and melts its way leaving a smooth edge. If you ever have a chance to use it you will never try a router or band saw. Enclosed is a drawing of a mandrel to be used with a .045 thick 3" abrasive cutting disc (not included, Ed). The Norton Company makes a disc for this part number A60 OBNA2 which should cost about a dollar. To make the mandrel take a 1/4" bolt and cut the head off. Braze on the large area washer at the end of the treads. Install the cutting disc with another large area washer and nut. Using this with a 1/4 portable electric hand drill you can cut plexiglass with no problem. The electric drill has plenty of speed. However, don't stop in the middle of a cut without first removing the disc or it might freeze in the plexiglass. Now for a run-down on my T-18-N252F. It has over 427 hours on it. It has been tied down in the yard in front of my house for the last three years. The desert sun faded the paint and ruined my upholstery so I decided to repaint and reupholster it at the annual inspection time in April. This caused me to build a new horizontal tail assembly because I didn't want to paint the old one then have to paint the new one when I got it done so I proceeded to make a new one with the weights inside the leading edge. New fairings were added to the wing roots (From Rudy Adler). Then I had to make a new canopy and canopy frame as the old canopy was crazed and cracked. This has caused me to be down all summer and miss the usual 11 or 12 fly-ins each summer."

COLORADO PROGRESS REPORT - Tom Gautier #493, 3775 Davidson Place, Boulder, Colo., 80303 - "I am a terrible correspondent, but not because I am unappreciative of your efforts in the T-18 cause. The Newsletters are so good I am awed, and the size of the stack is becoming monumental. My fuselage is about 80% complete. Tail feathers are essentially done. I have main gear and tailspring done. I have bought Industrial Dynamics wheels and axles. They seem to be very good. Dean Cochran wishes he had some instead of his Goodyears. I also have Gee Bee windshield and canopy but no work done on them. I bought a 150 hp Lycoming from Miller Aviation at San Antonio. It was supposed to have been running nicely when it was pulled from an Apache, but it had 1200 hours since a 1200 hour overhaul, so I did not get as nice an engine for $1000 as had been reported in the Newsletter about a year and a half ago. It did come with all accessories, constant speed prop and spinner, but the prop blades proved to have cracks at the hub, and was otherwise worn out and virtually worthless I have had the engine overhauled at Colorado Aero Tech (Jeffco Airport where the manager, Brad Davenport, is an EAAer and member of Chapter 43. They do not charge for labor, but the parts they put in (not including a crankshaft, which was not needed) came to $1439!

This was not exactly the economical way to go, but I do wind up with a certified 2000 hour engine. I have a flange forming trick to offer. This is for flanges on inside curves. I have bent all inside flanges to 90° with a small baseball bat, with absolutely no problems with cracks. Of course, I was careful to have the edge smooth before forming. The relatively large radius wooden bat works like a charm. I must say that somehow I have not had much luck getting 90° on outside curves, so I have taken to fluting, without any stretch forming. It is so easy, and again works like a charm. There are a few places, of course, where a flat flange is needed and flutes cannot be used. I figured out how to do the fin rib attach holes in the flat, so no jigging was required. It was quite easy. I have templates for the holes if anyone is interested.

FLIGHT DATA ON #63 - Stewart Schureman, Granada Hills, Calif. - "Initial rate of climb is 2500 FPM @ 120 MPH. Cruise at 700 ft. is 150 mph at 2400 rpm; 180 mph top speed. Maximum level flight RPM is 2700. Gross weight is 1390 lbs., empty weight is 868 lbs. Engine is 0320B 160 HP with a Sensenich fixed pitch prop. M76 EM 68 x 74 Model. Other than a cut down rear deck the ship is stock to prints. I designe and built some super light and comfortable seats for my T-18. The seat has flat sides made of .040 6061 aluminum. They have flanges formed over wooden form blocks to make a seat contour including both back and bottom. The seat back material is .025 2024 T-3 which is rivetted to the contoured flange. The seat is hinged at the front. I have been keeping my T-18 at home and have used a special trailer which was made by Rudy Adler and it works fine. It takes under an hour to load and unload with the help of two men. Mainly for lifting the wing and mounting it both on the trailer and on the plane. I chickened out and used nuts and bolts instead of the ball lock pins as it isn't that much trouble but gives me added peace of mind. Rudy's trailer is designed so that one man can load and unload but I usually have help and it goes much faster.



I have my wing sitting on a metal box which has wheels attached and it acts as a dolly. I then wheel the wing into the garage leading edge down and it fits nicely on one side of the garage out of the way. I park the fuselage in the backyard under my patio cover which keeps it out of the elements and is close at hand to work on."

FLIGHT REPORT - N. Seraphinoff -"I made the first flight in 426, July 16, 1971; as of this letter, I have flown four hours. The ship is powered with a O-290GH turning a 65 x 65 prop. I installed a O-290D2 cam shaft in the engine. The shaft with the narrow cams gives me a little more valve lift, seems to work ok. There has been much said about the subject so I thought I would experiment. The ship flies very well, has a 1970 Rottry cowel, static RPM 23.50, wide open level flight, 220 RPM, climbs approximately 1600 ft/min. Speeds - 110 mph at 2100 RPM. At 2000 ft. Alt. MSL 2500 RPM 20" Manifold 130 MPH - guage readings only. Wide open level flight. I let the speed build up to 165 at 2800 RPM. The ship is all flush-rivetted with most all screws counter-sunk. Will let you know more as I learn."

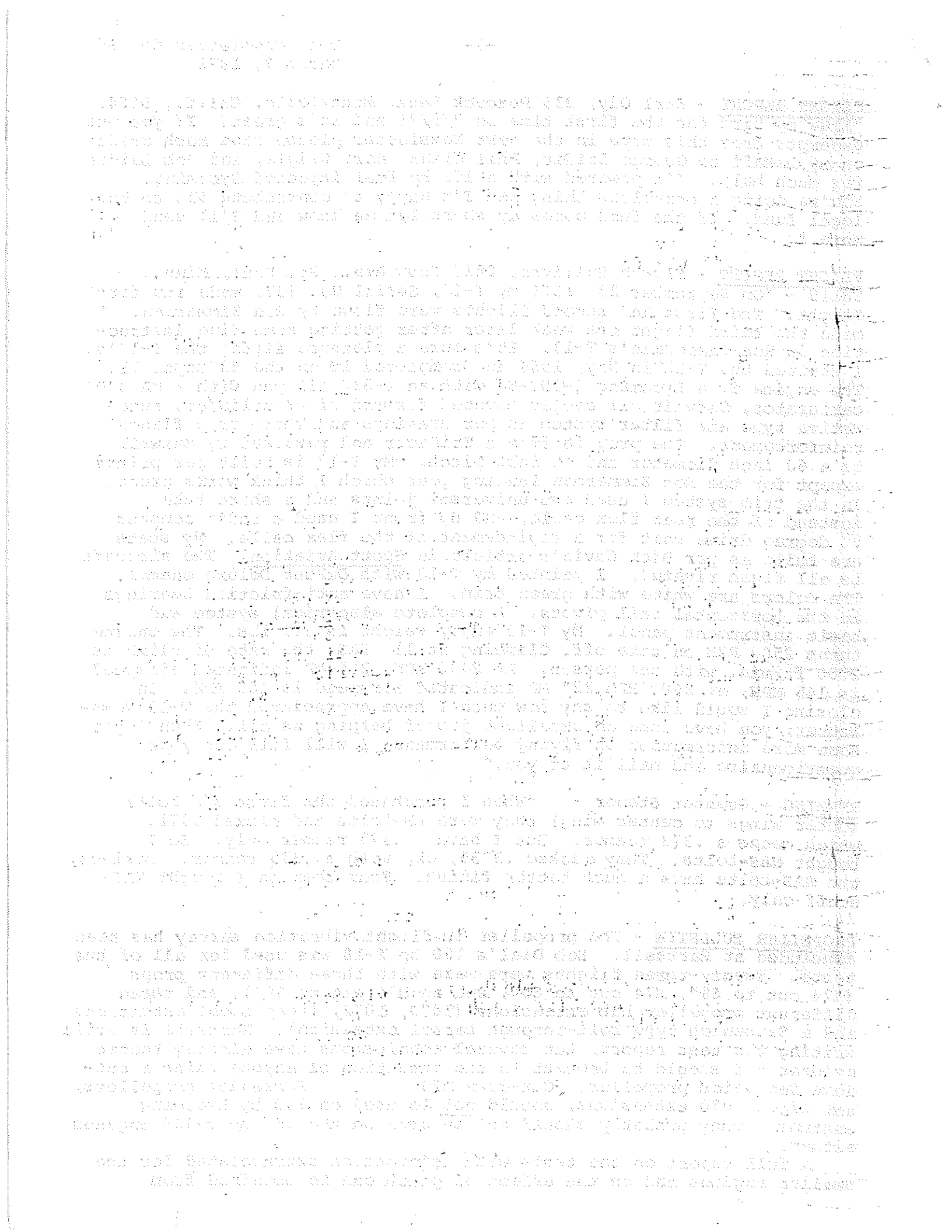
FLIGHT REPORT - Earl Ody, 219 Peacock Lane, Montebello, Calif., 90640 "Flew my bird for the first time on 7/9/71 and it's great. If you put excerpts from this note in the next Newsletter please give much credit on my behalf to George Leider, Phil Cline, Herb Weigle, and Bob Leider for much help. I'm powered with a 160 hp fuel injected Lycoming. You're doing a marvelous thing and I'm happy to contribute $20 to the legal fund. If the fund comes up short let me know and I'll send more."

FLIGHT REPORT - Floran Sullivan, 2410 Bush Ave., St. Paul, Minn., 55119 - "On September 23, 1971 my T-18, Serial No. 427, made its first flight. The first and second flights were flown by Ron Zimmerman. I made the third flight one week later after getting some fine instruction in Ron Zimmerman's T-18. It's sure a pleasure flying the T-18's. I started the T-18 in May, 1966 and completed it on the 23 Sept. 71. The engine is a Lycoming O-290-G4 with an O-320 oil pan, with a MA 4SPA carburator, Corvair oil cooler mounted forward of #2 cylinder, automotive type air filter system as per drawings and Thorp prop flange reinforcement. The prop is from a TriPacer and reworked by Maxwell to a 68 inch diameter and 66 inch pitch. My T-18 is built per prints except for the Ron Zimmerman landing gear which I think works great. In the trim system I used two universal joints and a short tube instead of the rear flex cable, and up front I used a radio compass 90 degree drive unit for a replacement of the flex cable. My seats are built as per Dick Cavin's article in Sport Aviation. The aircraft is all flush riveted. I painted my T-18 with DuPont Deluxe enamel. The colors are white with green trim. I have anti-friction bearings in the horizontal tail pivots. A complete electrical system and basic instrument panel. My T-18 empty weight is 843 lbs. The engine turns 2500 RPM on take off. Climbing at 110 IAS, the rate of climb is 2000 ft/min. with one person. At 2400 RPM, 20" MP indicated airspeed is 145 MPH, at 2600 RPM 22" MP indicated airspeed is 160 MPH. In closing I would like to say how much I have appreciated the T-18 Newsletter; you have done an excellent job of helping us all. When I get some more information on flying performance I will fill out your questionnaire and mail it to you."

REAMING - Guenter Steuer - "When I purchased the first 3/8 bolts (outer wings to center wing) they were AN-bolts and nicked .371, which means a .373 reamer. But I have a .375 reamer only. So I bought NAS-bolts. They micked .3735, ok, with a .375 reamer. Besides, the NAS-bolts have a much better finish. From then on I bought NAS-stuff only.

PROPELLER BULLETIN - **The propeller in-flight vibration survey has been concluded at Hartzell. Bob Dial's 160 hp T-18 was used for all of the tests.** Twenty-three flights were made with three different props (M74 cut to 68", M74 cut to 69", and an M76 cut to 70"), and three different propeller hub extensions (1070, 1072, Thorp spool extensions and a Sensenich type bolt-through barrel extension). Hartzell is still writing the test report, but several conclusions have already become evident and should be brought to the attention of anyone using a cut-down Sensenich propeller. Cut-down M74 Sensenich propellers, and light 1070 extensions, should not be used on 160 hp Lycoming engines. They probably should not be used on the 150 hp O-320 engines either.

A full report on the tests with information extrapolated for the smaller engines and on the effect of pitch can be obtained from



Editor, T-18 Newsletter, 5 Griffin Drive, Apalachin, N.Y., 13732 by sending a donation of $5.00 or more to help pay for these tests. Twenty-seven persons have donated $575 to date to help pay for them but we need to raise about an additional $1500. The report will reveal some surprising things about propeller extensions, engine timing, and cut-down props which should be of interest to all homebuilders. A Tailwind with an o-290-D2 engine was recently found to have a bad resonance point right in the middle of his operating range.

PLANS LISTS -In the last Newsletter I mentioned that copies of T-18 plans lists arranged numerically and by assembly are available from PCR, 6441 Cornell Drive, Huntington Beach, California, 92647 for $.50. The only problem was that I had the wrong number -- 644 instead of 6441. So, if you want a very handy thing when hunting for a print, get a copy and also help out a needy family.

SHEET ALUMINUM - Dick Stinson, 2430 Sleepy Hollow Drive, Glendale, Calif., 91206 says that Eureka Metals in Los Angeles has a good supply of 5' x 15' .025 sheet. Dick now owns two T-18 projects.

DECIMAL SCALES - I have discovered some builders trying to struggle along without a scale marked off in decimal units rather than fractions. This doubles your layout work. I use an 18" scale, from a drafting machine, marked off in .020" increments. This serves the purpose quite well and I recommend it if you can't locate a decimal steel scale. If you don't have a drafting supply house, you can send $8.50 to Cahill and Barnard Co., 83 State Street, Binghamton, N.Y., 13902 and they will mail you one.

BEGINNER's CORNER -
1. How do I "fix" an extra 1/8" hole in exterior skin?
Ans. If the center of the erroneous hole is at least 1/4" away from another 1/8" hole, the hole can be plugged. Chamfer both sides of the hole, insert a punching made with a 1/8" Whitney Punch and "rivet" in place with a hammer and bucking bar.
2. Will an air gun available at automotive stores (for chiselling off mufflers, etc.) work as a rivet gun? Anybody tried one?
3. What wall thickness is required for the aluminum windshield frame?
Ans. .083 x 1-1/4 aluminum 2024.

FIRST FLIGHT RECORD - According to John's records, the following persons made first flights in the order shown. If anyone knows of errors in this record, please advise John and myself. Also, much of this record was received second hand. John would like to know of all first flights, even for those who do not have their own plans.

	SN			REG.	DATE
57	82	Al Patton (tri gear), Georgia		N3502	
58	401	Bob Dial		N11BD	19 Oct 70
59	227	Robert L. Young		N2377	31 Oct 70
60	547	Leon Rodecap		N2433	Oct 70
61	559	Fred Kracht	Canada		
62	19	Francis Richardson		J-7995-A	
63	618	Eric L. Williams	Australia	VH-ELW	
64	467	Ford Hendrix		N467JF	16 Jan 71
65	8	Gerd Ulrick, Salt Lake City, Utah		N2043	27 Aug 70
66	394	Art Wortz, Midlothian, Ill.		N6821	31 July 71
67	455	Don Taylor, Menet, Calif.		N455DT	24 May 71

	S/N		
82	474	John Kerr	29 Mar 72
83	488	Charles Borden	1 Apr 72
84	002	JOHN THORP, P.O. Box 516, Sun Valley, Calif 91352	5 Apr 72
85	198	Howard Culbertson, 3408 Gerald Dr, Newbury Park, Calif 91320	2 May 72
86	106	Lloyd Toll, Hazen, Ark	25 May 72
87	725	Len Edvinson, 2204 Camas Cir SE, Renton, Wash 98055	30 May 72

If your first flight hasn't been listed, please send both John and me the info.

CLECOS AND LONG SHEETS - Don Thompsen, Box 424, Sewell, NJ has found a source for Clecos for $.25 each and 2024-T3 sheet of various thicknesses any length off the roll. Write to Airparts, 1430 South 33rd St, Kansas City, Kansas 66106.

Don also sent a sketch of a belt sander he made which clamps to the table of his radial arm saw. The drive pulley is mounted in a drill chuck of the saw.

NEW DRAWINGS - John Thorp has 26 additional drawings which he will sell for $25. Those who have paid for the extra drawings but have not received all 26, tell him how many they have and he will fill them in.

THORP'S T-18 - John says he missed on the weight estimate on his personal 100 hp T-18. He estimated 940 pounds but it weighed 938. But he hit the tail weight right on the button at 41 pounds. He now has over 50 hours on it and it is back home from Fox Field at Lancaster where he had to take it for flight testing. He is now installing a canopy latch for the canopy would come open at speeds over 172 mph. His only other problem was a broken tachometer shaft. Vaughn Parker told me (confidentially) that the standard panel location doesn't leave much room for instruments and it is really tough to change instruments. No performace data available yet.

CYLINDER HEAD TEMP GAUGE - John Spranger -Buy the VDO cylinder head temp gauge kit from J.C. Whitney ($17.95) The probes have 1/8" pipe threads but if you run a straight 3/8 die over the threads, they are a perfect fit for the Lycoming cylinder. It is electrically operated. Now check all your cylinders any time.

FLIGHT REPORT - Clive Canning, 7 Hillside Crescent, Blackburn, Vic. 3130, Australia - It is with pleasure that I can advise you that my Thorp T-18 aircraft has now flown and in fact has completed the whole of the flight test schedule as required by our Department of Civil Aviation and has been issued with the necessary certificate of airworthiness. Construction time was two years, 10 months. The assistance given by Mr. Thorp during the construction period highlights the character of the man and also his unbending enthusiasm for the amateur builder. It goes without question that the flying qualities of the T-18 are to my mind unequalled by any other aircraft that I have personally flown, and this includes a wide range of commercial aircraft manufactured by the well-known reputable organizations. For the purpose of your records I have enclosed a brief resume of the aircraft VH CNC on which I have now logged some 20 hours since its first flight on March 16th. You may be interested that during our first National Fly-In it was awarded the trophy presented by our U.L.A.A. for amateur constructed aircraft. I would also like to record that the T-18 Newsletters have always proved most interesting and certainly of great assistance during construction.

Initial Test Flight - Latrobe Valley Airfield
Engine - Lycoming O-320-H2A - 150 hp
Fixed Pitch Propeller - Sensenich 74" Dia - 60" Pitch

Empty Weight - 972 lbs.

Performance: All at 1355 lbs.
Stall clean 48 Kts. I.A.S.
Stall full flap 43 Kts. I.A.S.
Cruise 2450 RPM 130 Kts. T.A.S.
Full throttle level flight sea level 153 Kts. T.A.S.
Full throttle climb at 80 Kts. I.A.S. 1000 feet per minute.

Equipment: Engine driven dry vacuum pump providing suction for A/H and D.G.
Electric T & B - Electric Aux. fuel pump
King KX 170 with K 211 B Indicator including Glide Slope
Bendix T12D A.D.F.
Instrument lights - Navigation Light - Landing Light - Rotating Beacon

Modifications
Undercarriage lengthened 4-1/2" to comply with propeller clearance needs of Department of Civil Aviation, Australia.
Sump added to fuel tank to collect possible water contamination together with separate water drain pipe with fuel cock for external drainage aft of firewall (D.C.A. requirement).
Flaps restricted to "1-1/2 notches" and also interconnected (D.C.A. requirement).
Pitot-Static source moved to underside of port wing (D.C.A. requirement).
Full length Aileron Hinges (my own mod).
Ed Note: This is a fine flight report. If yours is not included somewhere in a back Newsletter, why not send me one? I see no mention was made of airspeed calibration. The high speed figures may be fairly accurate, but the stall speeds probably reflect the errors due to the under wing location of the pitot tube. Some located there have been dead near zero at stall.

APPLYING NUMBERS - Robert Cumberford, Tuxedo Park, N.Y., 10987 - I had extremely good luck putting numbers on my Bolkow Junior using 3M Scotchkrite reflective tape, 2 inches wide. As this is the legal minimum stroke width for 12-inch high numbers, it was convenient. I laid out the angle of letters I wanted full size on drafting velumn, then just used scissors to cut off pieces of tape that would fit. I then taped those onto the velum, and took the whole works to the airplane. Taping the whole assembly of layout, tape bits, etc., to the fuselage sides, I was able to use a water-based Flair pocket pen to mark the ends of letters. Then I just put the reflective tape bits on one at a time, peeling the back and sticking the tape down with a lubricant of household detergent and water. (3M gives instructions on the method with the tape, as well as supplying the squeegee). This material is used on airliners (and NY Telephone trucks, now) and won't be disturbed by high speed if properly applied. However, there is an Aircraft Edge Sealer, a kind of industrialized nail polish, that can take all risk out of the situation I used it. The whole job, layout, installation, and burnishing down, took about 4-5 hours. I could do it more quickly now, but others not used to graphic arts work might take a bit longer. There was almost no waste, which is good since the roll of tape cost $28.00. There should be plenty for several airplanes in one roll. I also used some on the l.e. of the stabilator and wing (gold tape on Corvette red-

orange paint).

CANOPIES - by Gee Bee - 13415 - 2nd Ave. S., Seattle, Wash., 98148 Here's something you might mention in your next T-18 Newsletter -- T-18 canopies are going up a little in price. The price of plex is going up again. I absorbed the last two price increases but just can't afford to absorb any more. The new prices will be: Canopy and windshield - $150., Canopy only - $135., Windshield only - $20., Shipping carton - $13.50. Colors: Clear, green, lt. gray. I'll honor the old prices until August 1, 1972. Phone 206-CH2-0332 (6:00 to 7:00 pm Pacific time).

SPORT AERO ADDRESS - 44-48 Carrol Drive., Sumpter, South Carolina, 29150 - I haven't heard from Lucius Bigelow for a long time but I understand he is still in business handling most of the T-18 materials He's a contractor and Sport Aero is only a part-time endeavor. I understand there is sometimes a long delay in filling orders.

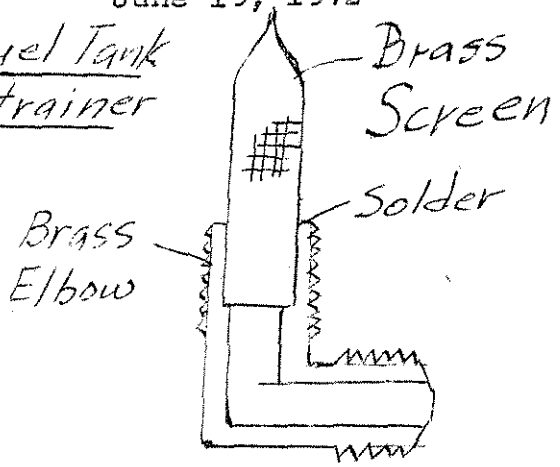
CLECOS - Earl's Supply Co., PO Box 265, Lawndale, Calif., 90260 - We can supply 3/32, 1/8, 5/32 or 3/16 at a price of $27.00 per hundred. We also sell a cleco kit which sells for $12.50 and consists of 40 clecos and 1 pair cleco pliers. OK to assort sizes.

FUEL SYSTEM (L.D. Sunderland) - After Jack Park and several others reported that they got power interruptions with several gallons of fuel in the tank, John recommended that a fuel pump be put on all T-18's. However, many of us don't use pumps and have no problems, even with 180 hp engines. Before Bill Warwick flew the first T-18 he ran a full power test with the nose elevated and there was no problem using up all fuel in the tank.

So, what could cause fuel flow problems in some T-18's? Three possibilities - vent clogged or creating negative pressure, clogged fuel strainer or wrong carburetor float valve. If the vent tube faces forward into the wind getting full ram air, the pressure increase is equivalent to that if the fuel level in the tank were 7-2 inches higher. On the other hand, if the vent tube faces aft pulling a suction, it will be like lowering the fuel level. Depending on the amount of negative pressure differential, it could prevent fuel flow. What is wrong with facing the vent forward? It collects dirt. So it should have a screen to keep out contamination and perhaps more importantly mud wasps. An alternate inlet should be made inside the fuselage just in case the main inlet becomes clogged. Drill a 1/16" hole in the tube for the alternate inlet.

My vent tube is made of 3/8" aluminum. It comes through the .040 floor board near the fuselage centerline and extends out about 1/2". The end is cut off at a 45° angle with the opening facing fwd. Peen the tip forward making a small pocket to insure getting positive ram pressure. Air in the vent tube is virtually stagnant except between the end and the alternate hole where water or dust will be purged by the airflow. I've purposely run my tank very low (it's fiberglas so I can observe the fuel level inflight) and I've been unable to cause the engine to even hesitate in a steep climb.

If a filter or tank strainer is clogged, the solution is obvious. Someone has already had engine failure because of not having a screen finger strainer in the outlet of the tank. If your airplane doesn't have one, ground it until you instal one. If you can't find a shut-off valve with a finger strainer, you can make one easily as shown in



the sketch. The fitting which screws into the tank should be made of brass. Drill out the center hole about .080 oversize. Then make a 2" long sleeve from brass or copper screen. The sleeve ID should be at least as large as the original ID of the fitting. To secure the screen until it can be soldered, bend several wires into hooks. Tin the end of the sleeve with solder, tin the fitting, insert the sleeve and solder in place. Inspect to ascertain that the sleeve ID is as large as the original fitting ID so there is no restriction, crimp the sleeve end and solder. If all homebuilders had done the above, there would be alot more nice shiny airplanes around.

I've been told that carburetors have different float valves when designed for use with a fuel pump. Still haven't been able to verify that but John Thorp tells me that there were some surplus carburetors available after the war which didn't cause a problem because the engine wouldn't even run without a fuel pump.

What are the disadvantages of a fuel pump? If your fuel system configuration is such that a pump is not required, then its use decreases powerplant reliability. (Al Hennteruffel says his fuel pump failed on takeoff on his first flight. Luckily he made a safe landing back on the airport.) A pump by-pass with check valves can and should be added when a pump is used, but it all adds up to more things which can go wrong. A part can have no higher reliability than when it is not used.

While on the subject of fuel systems, I've heard of two T-18's that have run out of fuel, one in rugged terrain resulted in a fatal accident. We don't need anymore of those, so why not try making an extra fuel stop if you don't have a one hour reserve?

CUSTOM PARTS - Vaughn Parker, 1617 N. Naomi St, Burbank, Calif 91505 will make about any part for the T-18 for the cost of labor and materials. He works part-time for John so has access to all his tooling. Write for quotations.

AIR PROGRESS WORLD'S GREAT AIRCRAFT - If you didn't get a copy of this special $2.00 edition that had my article on my T-18, send $2.25 to Peterson Publishing Co, 8490 Sunset Blvd, Los Angeles, Calif 90069. It was an immediate sellout.

OSHKOSH T-18 FORUM - It is scheduled for Wed Aug 2 - 10:30 to 12:00. See you there. I've been asked to coordinate the continuous T-18 demonstration. We will need alot of volunteers, so if you will be there and can help out even for just a half day, please write and let me know. You don't have to be an expert since in past years, some novices have learned some of the metal working techniques there and then continued to show others what they learned. We plan continuous demonstrations on rivetting, transferring and dimpling, rib forming and answering questions. Hope to have it better organized. Anyone like to come equipped to take over one area?

PROPELLERS - Bob Dial will be there and conduct a forum on props Tues morn, I think. We still haven't gotten the bill from Hartzell, but expect it to be around $2,000. They are going to charge us only for the engineering labor which shouldn't exceed this - if we are lucky. Don't forget to send in your donation. We'll send you a copy of the report as soon as it is available from Hartzell.

METAL COWLING - John Thorp is having dies made to form his metal cowlings. He also can supply landing gear and engine mounts. Now, head for the shop and get going!

T-18 NEWSLETTER
Luther D. Sunderland
5 Griffin Drive
Apalachin, N.Y. 13732

BINGHAMTON
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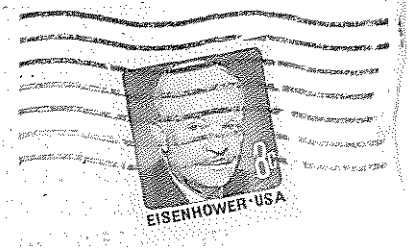
JUL 1
1972
N.Y.



Wood Jr.
705 N. Cross
Robinson, Ill.
62454