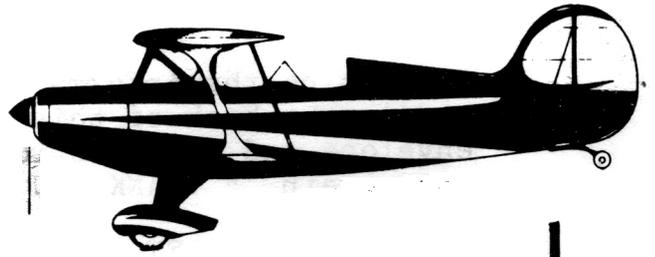


SKYBOLT NEWS

12026 SOUTH TOMI DRIVE
PHOENIX, ARIZONA 85044



NOVEMBER 1977

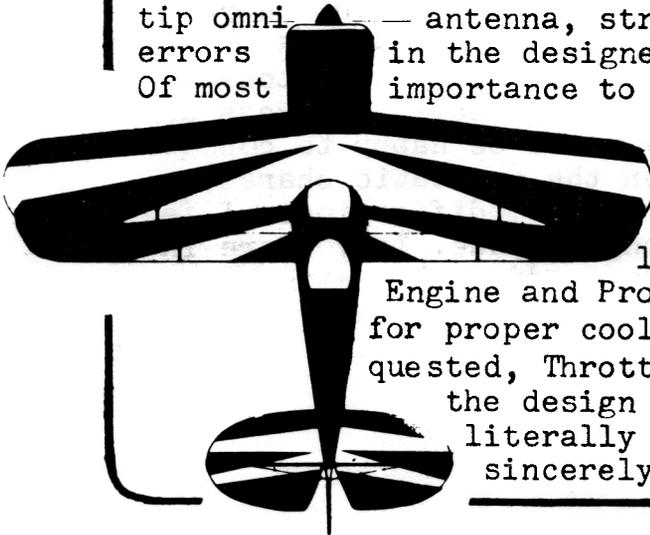
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IMPORTANT NOTICE :

With this issue of Skybolt News we have come to the end of the second series. Series #3 will start with the Dec. issue. There are still many important subjects to discuss. At this very moment I am building up a set of wings. This is nothing new for yours truly. However, I am extensively photographing the entire project in minute detail. There will be complete detail on the parts we have already covered (Photos) but more important there will be photo detail on landing light installation, the wing tip omni — antenna, strobe and nav light installation, the errors in the designers plans concerning the wings etc.

Of most importance to everyone will be the step by step construction procedure. We are preparing for the canopy installation which will be covered in Series#3 along with a complete engine installation. Also due in Series #3 will be

Engine and Prop combinations, Baffling the engine for proper cooling and a subject that many have requested, Throttle - Prop and Mixture Controls and the design and installation of same. There is literally a mountain of material to cover. I sincerely hope that you have found the Skybolt



News to be the informative manual that was promised. Enclosed in the back of this issue you will find a handy stamped envelope and subscription re-newal form for your convenience. Once again, " THANK YOU FOR YOUR PAST AND FUTURE PATRONAGE "

FIREBOLT AIRCRAFT, INC.

As of Nov. 1, 1977 I have purchased $\frac{1}{2}$ interest in Firebolt Aircraft Supply, Inc. The other majority stockholder is Mr. Martin Scott of Tempe, Az. We have changed the name to read Firebolt Aircraft, Inc. Firebolt will be strictly a supply firm dealing in the materials, hardware, covering supplies etc. Firebolt will not manufacture items such as airframes, fuel tanks, engine mounts etc. The address for Firebolt remains for the time being, P.O. Box 28321, Tempe, Az. 84282. My time will be devoted entirely to the operation of Starfire Aviation, Inc. You will receive in the very near future, a price list from Firebolt Aircraft, Inc. letting you know what is available. There are several new items coming that I know you are going to like. Above all else, we feel sure that you will find the pricing structure to your liking.

CHANGE OF ADDRESS

You will notice on the front cover of this issue, our new address for the Skybolt News. Skybolt News has growing pains and needs the additional room to scatter it's belongings.

SKYBOLT FLY-IN PROJECT

At the time of this writing I am in receipt of a letter from Marshall Freeman, Box 645, Diablo, CA. 94528, (Tel. 415-837-4563) who is trying to reach as many Skybolt owners as possible for a West Coast Fly-In of Skybolts. Marsh states that this is not a commercial venture but strictly a get together. He is serving as the chairman of the event. Anyone who knows of a flying Skybolt is urged to contact Marsh and let him know. He contemplates that the weekend get together would feature such things as exchanging rides and ideas as well as a forum which yours truly would be happy to conduct. Another forum could possibly be on the aerobatic characteristics and a review of all known plans modifications. I feel that a meeting such as this is long overdue. If you are interested, contact Marsh at the above address or give him a call (on your nickel only please). For more background info on Marsh, read " Crate 38 " page 54 in the July 1977 issue of Sport Aviation.

VENTING THE MAIN FUEL TANK SHOWN IN MAY 1977 ISSUE SKYBOLT NEWS

This short article is a review of the above so that everyone constructing the tank as shown in the July issue will be absolutely clear in their knowledge of the venting system. Most likely the confusion is my fault due to the quality of the drawings of the tank. Fig. 1 (This issue) shows how the vent lines are installed in the tank. DO NOT TRY TO USE THE TANK IF YOU HAVE CONSTRUCTED OR INSTALLED THE VENT LINES DIFFERENT THAN THOSE SHOWN IN FIG. #1. Gary Thompson of Racine, Wisconsin recently test flew his Skybolt. He was kind enough to write and tell me that the Special Inverted Main Tank performs perfectly. He purchased his from Starfire Aviation, Inc. but had many questions about it before he put it to use. The main points in this article are 1. the #40 anti-siphon holes in the top of the vent lines which are inside of the tank. If you forgot to drill them before you welded up the top portion of the tank it still isn't too late. In any event, THE ANTI-SIPHON HOLES MUST BE DRILLED . 2. The manner in which the vent lines are welded to the upper tank wrapper that separates the top portion of the tank from the sump.

Many readers want to know how the upper tank gets it's air (venting) for normal operation in the upright position. It's simple. The #40 anti-siphon holes provide all the venting that is necessary. The other question is "How do we prevent trapping of air in the sump during refueling operations. The answer is simply this. The air in the sump goes out the upright vent line where it is welded to the wrapper that separates the upper tank and the sump. The hole (I.D.) of the vent line is not welded closed where you attach it to the wrapper. You weld the outside of the line only.

Please review page 10. of the Aug.-Sept. (part 1) issue of the Skybolt News. It plainly shows in the Fuel System Schematic the way the vent lines are installed outside of the tank. DO NOT INSTALL THEM ANY OTHER WAY. While we are on the subject of vent lines, let me tell you the story of a recent Skybolt first flight and three subsequent flights. A firm in Riverside, Calif. who was helping a builder finish up his Skybolt decided in the interest of esthetics to run the vent line down the front landing gear leg (hidden under the cover and fairing) and exit the vent line pointing aft at the bottom of the Wheel pant. On the very first flight, while everyone was congratulating themselves, the engine quit after approx. 15 minutes of flight. Two things were fortunate. First, the pilot was a highly qualified test pilot and former Flying Tiger (the real ones) and Secondly, he was directly

over Fla-Bob Airport where he belonged. From that point it was merely a dead stick landing. After much checking of systems etc. a second flight was attempted.. This time was no different than the first except that the pilot was able to bring the aircraft out of the traffic pattern to a successful landing under power or partial power by using the wobble pump. The third flight was made by the owner of the Skybolt and was un-eventful only due to luck. The engine was not run on the ground for a very long time and the flight consisted of once around the patch. The next test to be made was to put a manometer on the wheel pant and check the area of the vent line for low pressure. Again after about 15 minutes of the flight, the engine started to quit. Oh, you're absolutely right. The manometer was telling them what they should have been suspicious of from the start. The vent line was pointing aft and in an area of low press. The main tank in that Skybolt was a simple plans built tank except that a mirror was installed on the floor to read the plastic fuel gage line. The ultimate remedy for the whole problem was to bring the vent lines out the belly of the aircraft as shown in the Aug.-Sept. (part 1) 1977 Skybolt News. To this date no further problems have reared their head and that particular Skybolt has now flown off it's 50 hours. That Skybolt had a 180HP. LYC. and a Hoffman fixed pitch prop. Empty weight ran 1050 lbs. I'll discuss the German made Hoffman Props in a future article. They are a beautiful prop but the fixed pitch version has some drawbacks due it's extremely light weight.

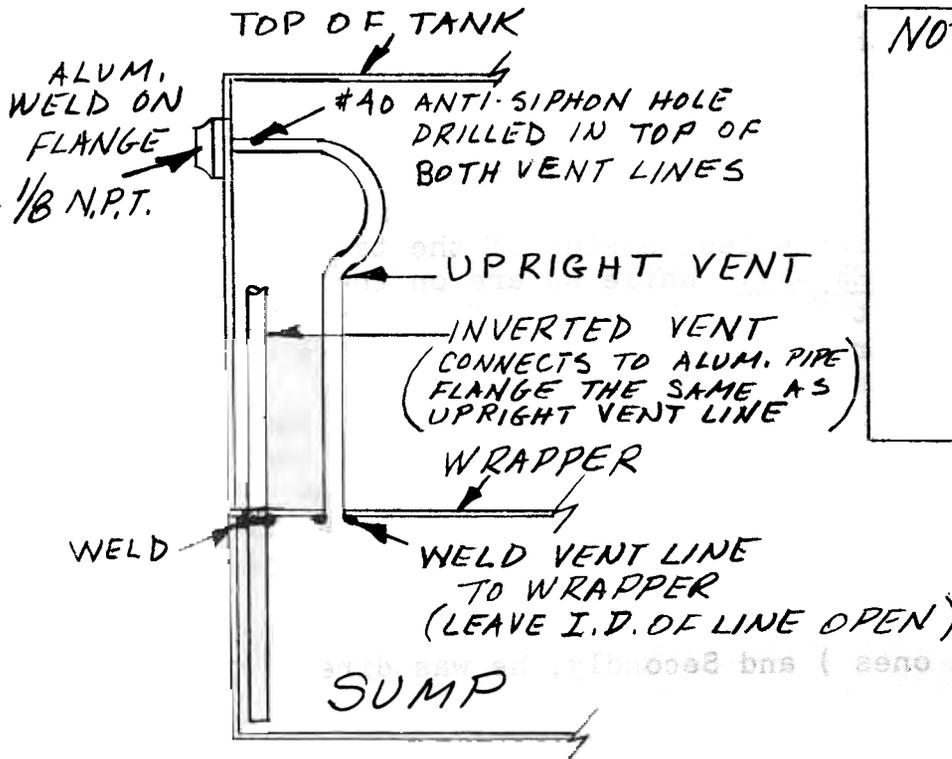


FIG. 1

NOTE: WELD BOTH VENT LINES TO THE 1/8" N.P.T. FLANGES THEN INSTALL IN THE TANK. TACK WELD THE ALUM. FLANGES IN POSITION. COMPLETE THE WELDING OF THE FLANGES AT ANY CONVENIENT TIME

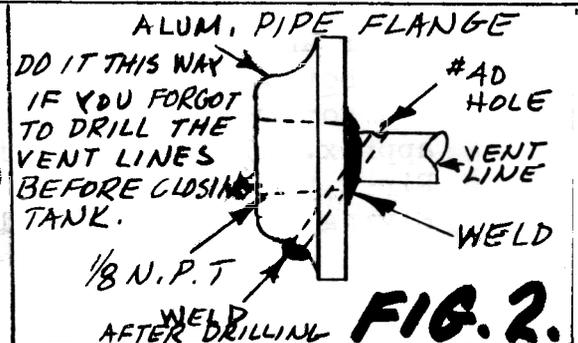


FIG. 2.

FIG. #2 shows what to do if you forgot to drill the vent lines before you installed them in the tank and then went ahead and welded the tank closed. You merely drill the #40 hole at an angle through the alum flange and then weld the hole shut on the flange.

WING COVERING (PART 3)

Since a tremendous amount of wet sanding is necessary during the covering of an airplane and the painting of same, we often wind up the job with fingers and hands that are painfully tender due to the handling of so much sandpaper. On top of all this is the high price of wet or dry sandpaper. There is a new product on the market that you might like to try. It is called "Quick-Sand". It is a die formed block of a composite material that has a wet or dry sanding surface on all sides. They are conveniently sized blocks about 1" thick x 3" x 4". The Med./Fine block is the one to get. It has a Med. grit on one side (aprox. #180) and a Fine grit on the other side (aprox. #320). In other words, it is a sanding block and sandpaper all in one. The price is about .72¢ each but the life expectancy is good which cuts the price down to an acceptable level. In the U.S.A. they are available at Standard Brands Paint Stores. The product is made in England.

While we are on the subject of sanding, I am sure that all of our readers are aware that this is the key to that "Super Smooth" finish. The entire sanding operation is very boring. It requires a super amount of patience on the part of the builder. To get that "Grand Champion" finish we must start the sanding operation just prior to the first coat of silver and between every coat there after. If you sand between every coat you will find that it takes less effort because we have a thinner paint film to contend with. The imperfections due to the previous coat are smaller and easier to remove. If you don't sand between each spray coat, you are building up the imperfections with each pass of the spray gun. Ultimately you wind up with one hell of a tough sanding job. To help you in keeping the imperfections to their lowest level, you must use a tack rag just prior to each spray coat. REMEMBER, THE FINAL FINISH WILL ONLY BE AS GOOD AS THE SURFACE ON WHICH IT IS SPRAYED.

The spray painting of an airplane or any other object requires the utmost in sanitary conditions from the moisture trapping of the compressor to the floor of the spraying area and the clothing of the operator. Lint free wiping rags are a must. A shop coat worn by the painter is a great asset. Damp mop-

ping of the paint booth floor just prior to spraying will greatly help in keeping flying dust to a minimum. Those of you who are forced to do their painting outdoors have my deepest sympathy. Most homebuilders do their spraying in their garage but the wise builder will construct a spray booth out of plastic sheeting first. This means a plastic sheet ceiling as well as the walls of the booth. Two or three 16" x 20" x 1" air conditioner or furnace filters taped in the sidewalls of the booth are a must. The ventilation fan that is employed should be of the squirrel cage type. Paddle blade fans do very little to suck out the paint spray and fumes. The floor of the garage should be sealed with a concrete sealer. You have been wanting to do that job ever since you bought the house so why not do it now. Simple things like wearing a hat or cap while spraying will aid in keeping dust off the spraying surfaces. Ever try to wash your hair after spraying? Not so easy is it? Of course there are some lucky guys who need only a wax job on their dome and they are home free.

I'm willing to bet money that every builder, including yours truly, has laid awake nights thinking and planning the ultimate paint scheme and trim lines. Most of us can't see the forrest because of the trees. To get the aid of a commercial artist costs bucks so how about this idea? Make up some three view drawings of the Skybolt and make extra copies on a copier. Now, proceed to the local high schools or college art departments and offer a prize to the student who comes up with the winning paint scheme. Tell them what you're favorite color combinations are and sit back and let the students go to work. Even if the results are not what you totally like, I'll bet that you will have the selection of many excellent ideas. The best advice I can give regarding color selection is, " Stay away from the Bleeding Reds". They may look beautiful when the project is first completed but what about a subsequent fabric repair job?

SAFETY FIRST

If you are spray painting in you're garage please be certain that the paint fumes are not going to leak into the furnace area where a pilot light can set off an explosion. Many homes have water heaters in the garage. What about your own personal safety regarding the breathing of paint fumes? Are you going to jepoardize the health and safety of other members of the family? Spraying and working with dope is bad enough but the spraying of the various polyurethanes presents serious health problems. By all means wear a breathing mask and better yet, wear oxygen breathing equipment if at all possible. If you smoke, get the heck out of the garage for that cigarette break.

COVERING TEST PANEL

A simple 12" x 12" x 1" wooden frame covered with a scrap piece of fabric makes an excellent control for the doping and finishing operation. Apply the same finishes to it as you do the wings or fuselage. When sanding, do the test frame also. While spraying the silver coats it will tell you when you have applied enough to hide the fabric from sunlight. Spray the test panel first before going to the aircraft with any spray coat. If there is water in the air line or the paint is not properly thinned you will know it immediately instead of after a wing or fuselage panel has been started. In fact, it is a good idea to make up 2 or 3 test panels. Just in case you goof the first one.

TEST FLYING THE AIRCRAFT AFTER THE SILVER COATS.

This is something that I strongly disagree with. Nothing in the world is more difficult than to try and spray paint a biplane that is fully assembled. To do it properly, the aircraft should be dis-assembled again. I can't see the point in doing the job twice. I guess that I was born lazy. Look at it this way. As long as the silver coats are finished, doesn't it make sense to spray the color coats while all wing panels are easy to handle? Even the fuselage is easier to handle. Trim lines are easier to mask off. If you test fly your Skybolt while it is in silver what is going to be the clean up job to rid the surfaces of dead bugs on the leading edges and the chemicals from wiping rags used to get rid of the engine oil smears and the oil itself. You are absolutely heading down the road to despair and frustration to try to do a super paint job on top of all of this. Paint and trim your Skybolt before test flight assembly. It will pay rewards. Patience helps to build quality.

SEAT BELT AND SHOULDER HARNESS INSTALLATION

Most aerobatic pilots that I know prefer Double Seat Belts and a Crotch Strap or 3 point Seat Belt as they are called. We all know that they should be fastened to brackets that are welded to the primary structure of the airframe and I am not going to put too much ink on this subject. Fig. #3 will cover it pretty well. However, the Shoulder Harness is a cat of another color. Being that most of our engineers and designers are not doctors or surgeons, they fail us in the design of the Shoulder Harness attachment. The main purpose of the Shoulder Harness is to keep the upper part of the body from

being thrown forward in an accident. Therefore, the attachment points for the Shoulder Harness should be such as to be on nearly a straight line with the shoulders. This results in a straight pull on the shoulders. If the attach points are down behind the seat and the belt goes up and over a piece of tubing in the structure the possible results are that a person will suffer compression injuries to the spinal column in the event of an accident. FIG.#4 shows the proper location of the Shoulder Harness Attachment Points for the rear seat. The front seat presents a different problem since it is difficult to mount the attach points or brackets on a level plane with the front seat occupants shoulders due to the rear instrument panel being located so close to the seat back of the front cockpit. Consequently, we are forced to resort to a poor location for the Shoulder Harness attach points for the front seat as shown in FIG.#5

If you are installing a rigid attachment of the Shoulder Harness Tail Strap the most important consideration to make is, be sure that when you are completely buckled up, you can reach all controls, switches, levers etc., and in particular, the fuel selector valve.

Last, but of utmost importance, when you are sitting in either seat and are buckled up with seatbelts and shoulder harness, IS IT POSSIBLE TO BEND FORWARD AND TOUCH THE INSTRUMENT PANEL OR THE FORWARD EDGE OF THE COAMING WITH YOUR HEAD? If your fuselage is built according to the plans you may well be able to do it. This is another reason that I advocate building the Skybolt with the rear seat 2" further aft than the plans call for. In any event, I highly rec-recommend that you consider wearing a crash helmet.

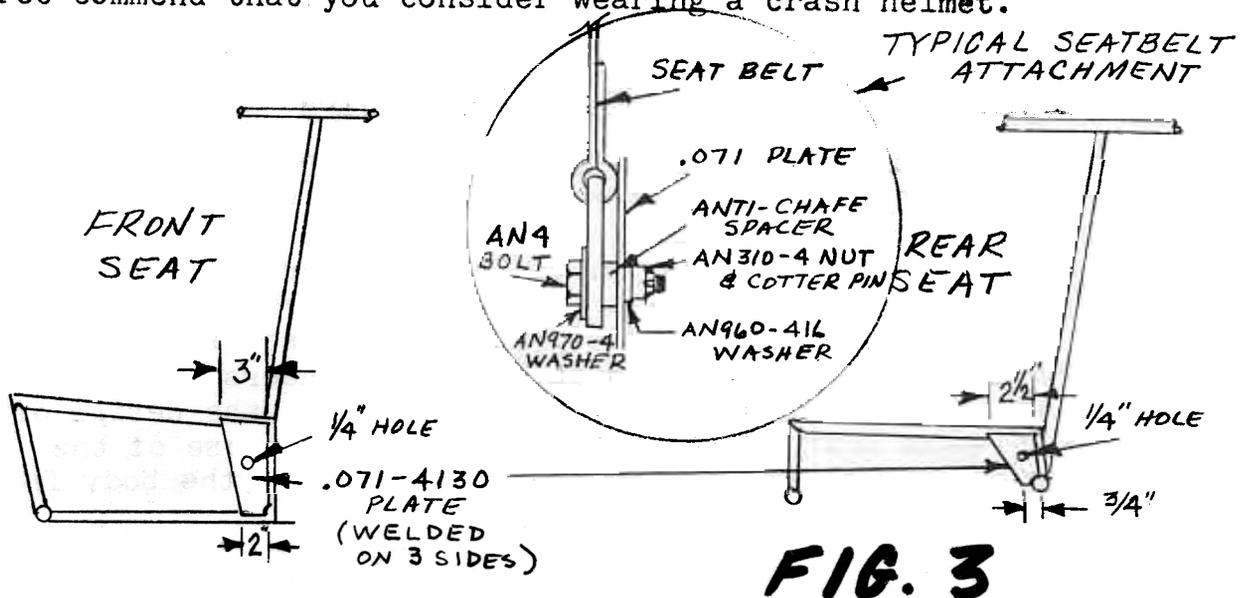
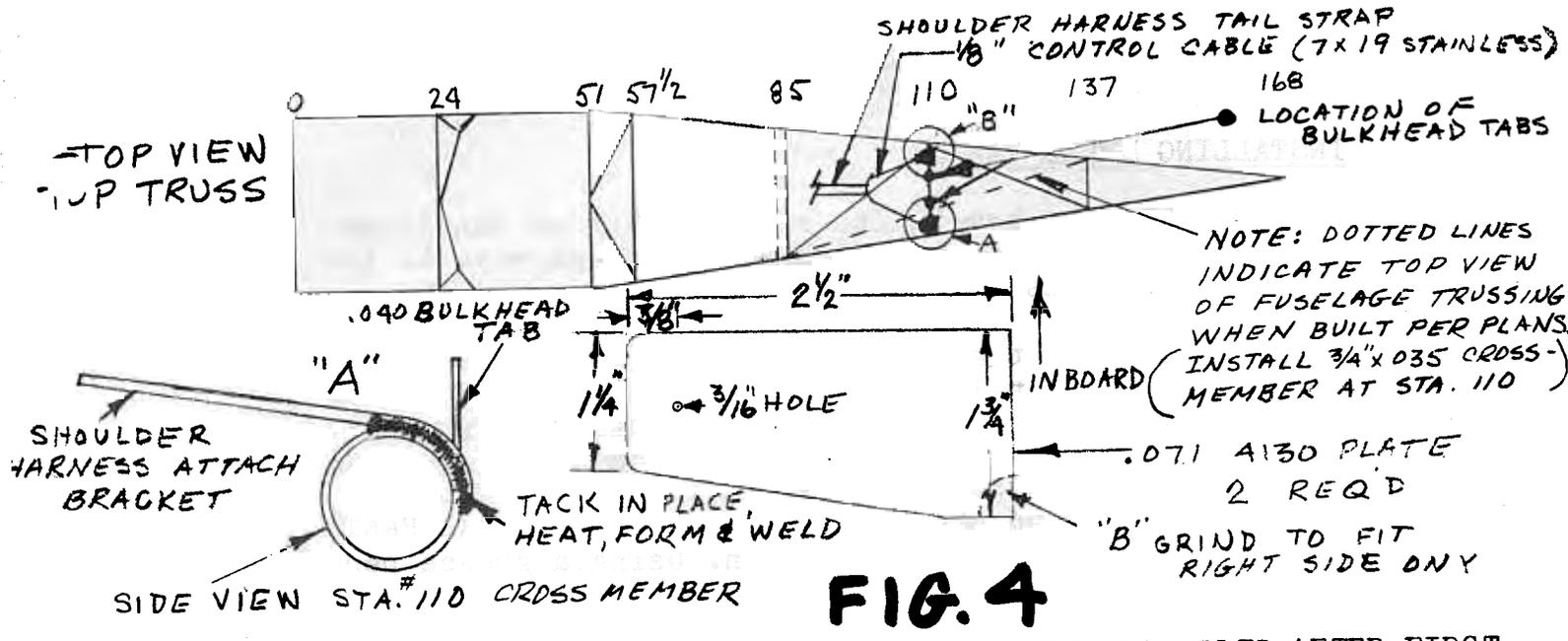


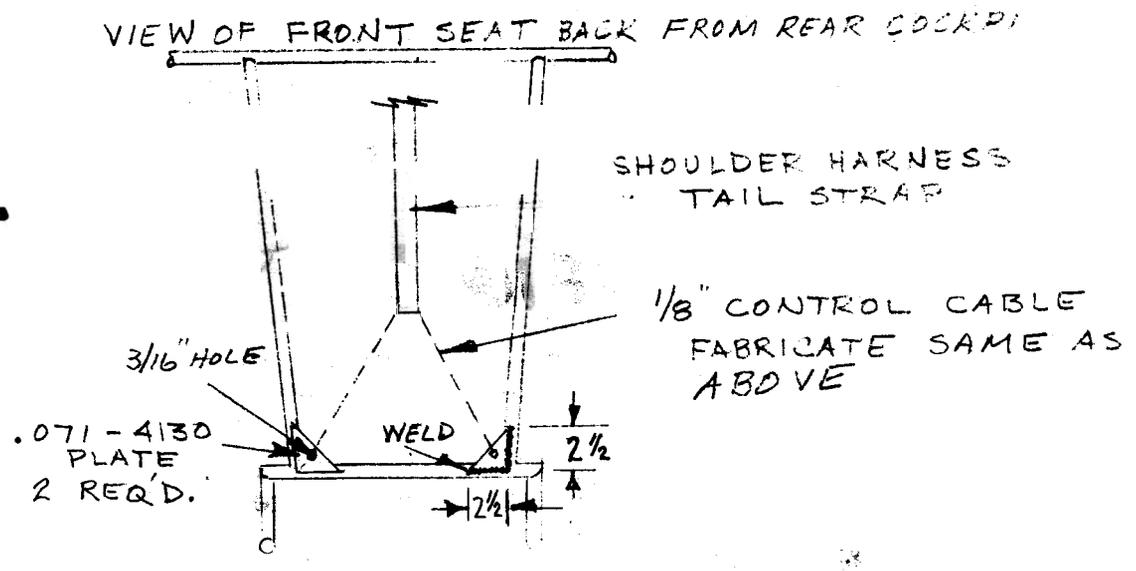
FIG. 3



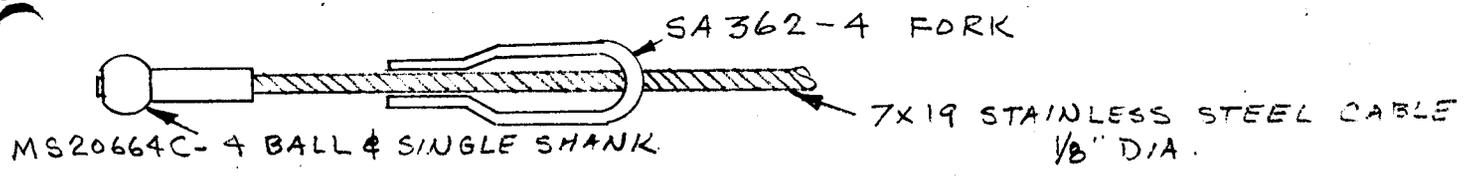
THE 1/8" CONTROL CABLE IS ATTACHED TO THE BRACKETS WITH AN3 BOLTS AFTER FIRST MAKING A LOOP ON THE ENDS OF THE CABLE WITH AN100-4 CABLE THIMBLES AND NICO-PRESS SLEEVES. USE AN 115 - 21 SHACKLES TO BOLT CABLE ASSEMBLY TO BRACKET.

Bulkhead Tabs are shown in FIG.4 While not part of the Shoulder Harness Attach, they are worthy of note. Two .040 Tabs welded in the vertical position along the Sta.#110 Cross Member serve as attach points for a plywood bulkhead which forms the rear wall of the baggage compartment.

FIG. 5



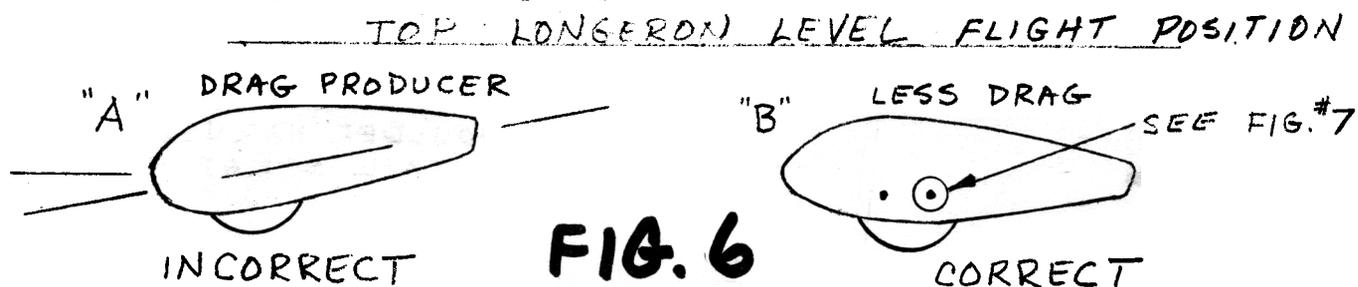
IF YOU WISH TO MAKE SOME SUPER NICE CABLE ASSEMBLIES TO ATTACH THE TAIL STRAPS OF THE SHOULDER HARNESSSES YOU CAN USE PLASTIC TUBING OVER THE CABLE AND USE SA362-4 FORKS WITH MS20664C-4 SINGLE SHANK BALLS SWAGED TO THE ENDS OF THE CABLES THE PRICE OF THIS TYPE CABLE FABRICATION IS APPROX. \$15.25 PER CABLE, READY MADE.



MIN. TENSILE STRENGTH 2000 LBS.

INSTALLING WHEEL PANTS

After looking at homebuilts at Oshkosh I am convinced that there is at least a hundred different ways to install Wheel Pants. Many of them wrong. Compare the pants shown in FIG. #6 and I think that you will agree with me. Some excellent aircraft have had their appearance ruined by the installation of Wheel Pants. In fact the installation shown in FIG.#6A is a drag producer instead of a drag REDUCER. To prevent this from occurring, raise the tail of the aircraft to level flying position and place the pants on the wheels so that the WHEEL PANTS are also in level flight position. Using a grease pencil or lead pencil (No ink marks please) make some index marks on the Pants on the inboard side. Make an index mark on the centerline of the front landing gear leg with a silver pencil or felt marker. Now you can lower the tail of the aircraft so it rests on the tail wheel after you have made note of the measurement from the index marks on the Pants to the index mark on the gear leg. When the aircraft is sitting in the 3 point position check the measurements you have taken and note the clearance of the rear tip of the Pants with the ground. If the Pants do not have enough ground clearance you either have the Pants pulled down over the wheel too far or the wheel pants are sitting at the wrong angle.



The reason most builders wind up with the condition shown in FIG.#6A is because they install the wheel pants level with the hangar floor while the airplane is sitting in the 3 point position. While the drawings in FIG.#6 leave a lot to be desired, they do give you the general message.

The next thing to consider is how we are going to secure the Wheel Pants to the landing gear and they must be secure. Pants that are not securely mounted can set up damaging vibration. Especially when the pants are mounted as in FIG.#6A above. The most commonly used Wheel Pants today are made from fiberglass. Vibration raises holy you know what with fiberglass. Many builders use only 1 screw or bolt to fasten the outboard side of the Wheel Pant. This is not enough.

FIG.#7 shows how we make the "T" Bracket to fasten the outboard side of the Wheel Pants. It is simply a piece of .050-4130 plate $1\frac{1}{4}$ " wide x 4" long welded to a piece of $1\frac{1}{4}$ " - .049-4130 tubing, 2" long.

"T" BRACKET

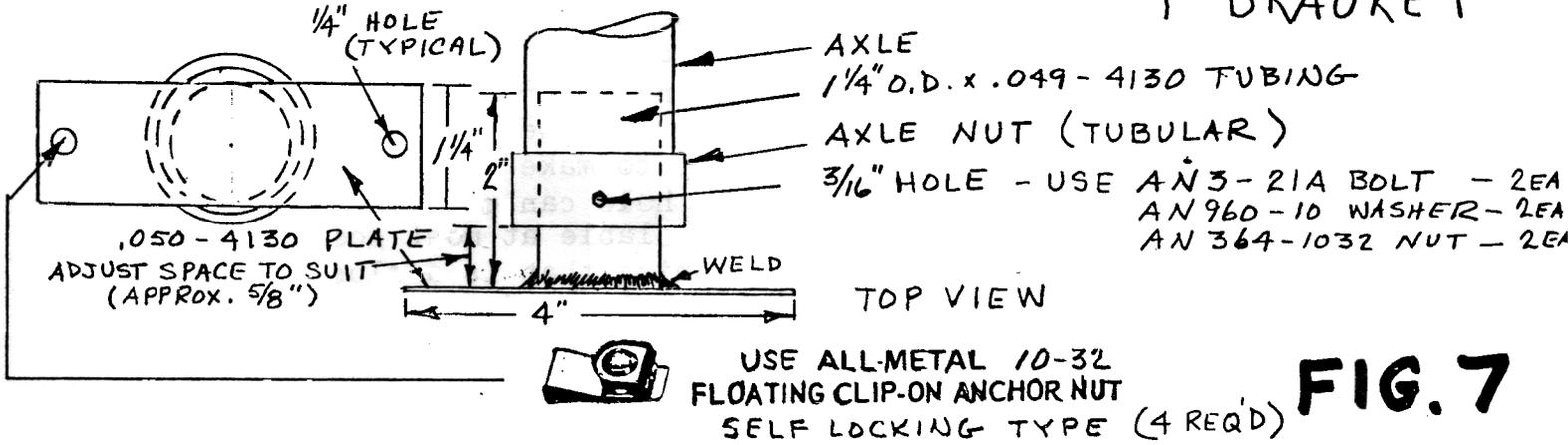


FIG. 7

Instead of securing the Axle Nut with a $1/8$ " cotter pin, drill the axle nut and the axle for a AN3 Bolt. When you have properly located the "T" Bracket, drill the tubing portion of the "T" Bracket to coincide with the holes in the nut and axle. Note that the hole is drilled at right angles to the "T" Bracket. As shown in FIG.#7 above, the plate of the "T" Bracket is shown as being straight when in fact you will have to bend it slightly to conform to the radius inside of the Wheel Pants. Use oval head stainless steel machine screws to fasten the Pants to the Bracket. Be sure that the screw does not protrude through the clip-on nuts more than 3 threads or you will wonder whats happening to your wheels plus the strange sound. Use AN960 Washers under all screw heads.

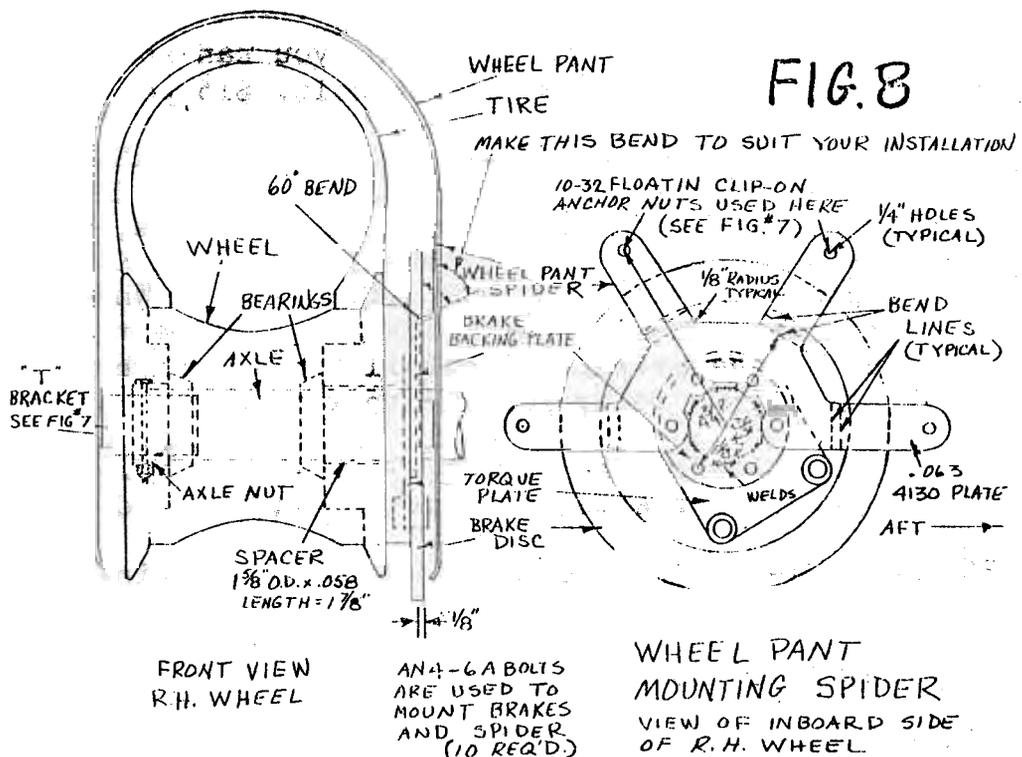


FIG. 8

FIG.#8 shows how to mount the inboard side of the Wheel Pants using a Spider made from .063-4130 plate. I am unable to give you the exact depth of the bend of the fingers of the Spider due to varying widths of Wheel Pants. I think that FIG.#8 is self explanatory. The Wheel Pant support offered by the "T" Bracket and the Wheel Pant Spider will assure you of long life and minimum cracking tendencies of the Wheel Pants. In order to service the valve stem of the tire tube it will be necessary to make a 3/4" hole in the outboard side of the Pant. The hole can be covered with a Clip-on, pronged plug that is available at most good hardware stores. If you want something that is a flush fit, you can make a small rectangular opening and use a doubler plate inside of the Pant and make an alum. plate to fit the opening.

COMING IN DECEMBER --- 1. Wing Root Fairings 2. Baffling The Engine For Proper Cooling 3. Starting Wing Construction and the Discrepancies in the Plans. 4. Some Second Thoughts about Elev. Trim and Vert. Fin Offset and a letter from Dr. Dean Hall concerning same. 5. The Torque Method For Tightening Drag and Anti-Drag Wires. 6. Recommended Torque Values for Nuts used on Bolts as well as Torque Values for Nuts used on Alum. Tubing.

ADS AND SWAPS

BRAKE PEDAL PIVOT PINS ---- for mounting the Brake Pedals to the Rudder Pedals. Will fit plans built Pedals. \$3.25 per set of 4 (Postpaid)

CANTILEVER LANDING GEAR PLANS -- Now you can adapt th Charger type gear to your Skybolt. \$15 per set.

CANTILEVER LANDING GEAR KIT --- ALL PARTS SHEARED AND PRE-FIT -- Includes Axles, Axel Nuts, Rubber Shock Discs and Spacers, pre-formed mounting brackets, Cleve. Wheels and Brakes, Tires and Tubes. This Kit is ready to jig and weld. Also available without Wheels, Brakes, Tires and Tubes but we think you will want them when you see the price. All detail in Dec. Skybolt News. Kits will be ready for delivery by Jan. 15,1978

HEAT TREATED LANDING GEAR BOLTS -- Front only. For Reg. Skybolt Gear. A must. \$7 per set (Postpaid)

T-88 EPOXY --- Super nice stuff for building wings especially for you guys in the colder parts of the world. Can be used at Temps. as low as 35 degrees F. \$15 per Qt. (Postpaid) (U.S. Only)

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