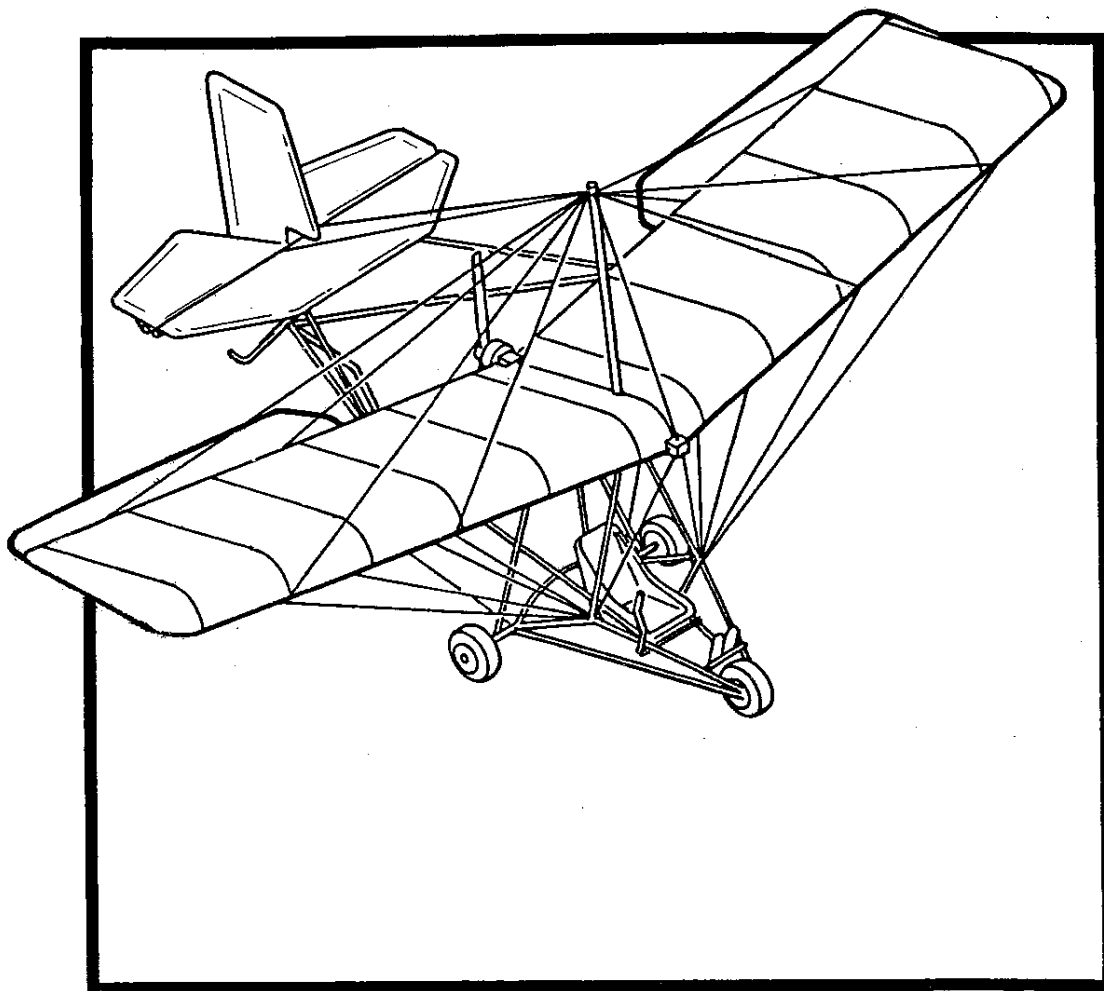


# QUICKSILVER MAX

KIT # 99300



## ASSEMBLY INSTRUCTIONS

DOC # 832-3

REVISION D

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World's Largest Manufacturer of Ultralight Aircraft

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# TABLE OF CONTENTS

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	PAGE		PAGE
CONSTRUCTION NOTES.....	I-II	ROOT TUBE ASSEMBLY.....	26-27
BASIC TOOLS NEEDED FOR ASSY.....	III	BELLCRANK STRUT/COMPRESSION STRUT AND AILERON BELLCRANK ASSY.....	28
TORQUE VALUES.....	IV	AILERON BELLCRANK ATTACH. TO BELLCRANK STRUT.....	29
AN BOLT GAUGE.....	V	WING ASSEMBLY.....	30-33
NICO SLEEVE GAUGE.....	VI	WING RIB AND STRUT ASSEMBLY.....	34
RUDDER ASSEMBLY.....	1-3	COMPRESSION AND AILERON BELLCRANK STRUT INSTALLATION.....	35
ELEVATOR ASSEMBLY.....	4	RIB INSERT SLOT CUTTING.....	36
STABILIZER ASSEMBLY.....	5-6	RIB INSERTING.....	37
TAIL TUBE ASSEMBLY.....	7	DIAGONAL STRUTS.....	38
TAIL SKID ASSEMBLY.....	8	WING WIRE INSTALLATION BELLCRANK/ COMPRESSION STRUT.....	39-41
AILERON ASSEMBLY.....	9-15	WINGS TO NOSE TIPPING.....	42
WHEEL/TIRE ASSEMBLY.....	16	TRI-BAR ASSEMBLY.....	43
LANDING GEAR REFERENCE.....	17	KING POST ASSEMBLY.....	44
NOSE WHEEL ASSEMBLY.....	18	FUEL TANK ASSEMBLY.....	45
FOOT PEDALS AND NOSE BRAKE.....	19	VELCRO DOOR HEAT CUTTING.....	46
LANDING GEAR ASSEMBLY.....	20	CONSTRUCTION REF. DRAWING.....	47
FUEL SYSTEM ASSEMBLY.....	21	ROOT TUBE BELLCRANK ASSY.....	48
FUEL PUMP MOUNTING.....	22	LANDING GEAR/AXLE STRUT ATTACH....	49
EXHAUST HEADER ASSEMBLY.....	23	TAIL TO PLANE ATTACHMENT.....	50
ENGINE MOUNT PROCEDURE.....	24	NOSE GEAR ATTACHMENT.....	51
ENGINE MOUNT ASSEMBLY.....	25	SEAT SUPPORT TUBE.....	52

## TABLE OF CONTENTS (CONT'D.)

	PAGE		PAGE
THROTTLE ASSEMBLY.....	53	ROOT TUBE WIRE/KILL SWITCH ASSY...	71
SEAT MOUNT ASSEMBLY.....	54	ENGINE KILL SWITCH INSTALLATION...	71
NYLON BUSHING NOTE.....	55	CABLE GUIDE ASSEMBLY.....	72
PUSH/PULL ADJUST TUBE PREP.....	55	THROTTLE CABLE ASSEMBLY.....	73
CONTROL STICK ASSEMBLY.....	56-57	WING WASHOUT.....	74
MUFFLER ASSEMBLY.....	58	WING/STABILIZER INCIDENCE.....	75
AILERON INSTALLATION.....	59-64	ENGINE START-UP AND TUNING PROCEDURE.....	76
PUSH/PULL TUBE ASSEMBLY.....	65	ENGINE BREAK-IN PROCEDURE.....	77
REDUCTION ASSEMBLY.....	66	TRIM TAB.....	78
DRIVESHAFT/BEARING ASSEMBLY.....	67	TEMPLATES.....	79-80
"V" BELT TENSIONING.....	68-69	INDEX.....	81-84
BEARING LUBRICATION.....	70		
AILERON SYSTEM CHECK-IMPORTANT....	70		

### IMPORTANT!

All Eipper aircraft are in a state of constant testing and modification. These on-going efforts are carried out to further improve already proven designs, engineering, testing and manufacturing operations. Do not assume, therefore, that a particular model of an aircraft you build today will be identical to the one you built yesterday. The possibility exists that it WILL NOT be the same.

Stated briefly, pay attention not only to the aircraft's assembly instructions, but also to any supplemental instructions which may be supplied with each plane ON AN INDIVIDUAL BASIS.

**QUALITY ASSURANCE ACCEPTED**

*CPW* DATE 12-30-83

ECO # 263

REVISION D

## **CONSTRUCTION NOTES**

### **GENERAL NOTES**

Assembly of your EIPPER aircraft can easily be accomplished in 45 hours, although accuracy and thoroughness are factors more important than time spent. All of the difficult fabrication details have been pre-finished at the factory, including drilling, anodizing, cable swaging, sewing of wing, tail and (if applicable) aileron surfaces, etc.

This manual describes and illustrates the assembly of the aircraft, and the sub-assembly and installation of component parts, in the order of tasks to be performed. Read through this manual thoroughly to familiarize yourself with the terminology, the assembly drawings and detail breakdowns. You will also discover that a helper will be useful in a number of instances such as lifting the tail section into position, alignment or leveling of some items, installation of sail covers, etc.

WHENEVER POSSIBLE, THE ASSEMBLY ILLUSTRATIONS ARE SHOWN IN THE RELATIVE POSITION THE AIRPLANE WILL BE IN WHEN YOU ARE WORKING ON IT--SUCH AS NOSE-DOWN, WING INVERTED, OR UPRIGHT.

### **GETTING READY**

Inventory and inspect the parts comprising the aircraft package, and assemble the tools required. (SEE 'BASIC TOOLS NEEDED FOR CONSTRUCTION.')

### **NICO'S**

IMPORTANT! Before assembly, check all swaged Nico's with the Nico Sleeve Gauge provided. (SEE 'NICO SLEEVE GAUGE PROCEDURE.')

The procedure is also diagrammed on the tool.

### **WIRES**

Untwist wires before making final attachment. A twisted wire is more prone to jamming or twisting a wire thimble during field assembly of your plane.

### **BOLTS**

Check the OWNER'S MANUAL for proper Torque Values of engine bolts. (See 'TORQUE VALUES.')

'AN' quality bolts are used throughout the construction of this airplane for structural integrity. To determine proper sizes, use the 'AN BOLT GAUGE' page for reference.

Bolts that pass through tubes with no solid internal support should be tightened until the tube shows just a "slight" distortion. The bolt should then be backed off a minimal amount. Be particularly careful when installing all Grade 5, forkbolts and eyebolts in the wing and aileron spars.

Before installing bolts, check that the grip length is correct. Using washers as shown, at least one bolt thread should extend out of the nut. One or more washers may be added to prevent the bolt from bottoming out before producing a snug fit. Generally, a washer is installed under a nut to prevent it from turning and digging into the aluminum.

## CONSTRUCTION NOTES (CONT'D.)

### LOCTITE

Locknuts, wing nuts and castle nuts with safety rings are considered to be locking devices and DO NOT require the application of LOCTITE. This adhesive/sealant SHOULD be applied to the threads of all bolts that DO NOT have a locking device; e.g., coarse-thread bolts. Use LOCTITE sparingly and carefully; a small drop on each bolt is sufficient. The liquid can also make a permanent stain on sail fabric.

Where wing nuts are used, be sure to use SAFETY RINGS as specified.

### A FINAL NOTE

Work slowly and carefully, and follow the assembly procedures closely and in the sequence presented. DO NOT use substitute materials or initiate design changes. If you have any construction problems or questions, do not hesitate to contact your dealer or the factory for assistance.

Your safety, assured by highest quality materials, thorough testing, proper construction techniques and supplemental information, is of paramount concern to Eipper Aircraft, Inc.

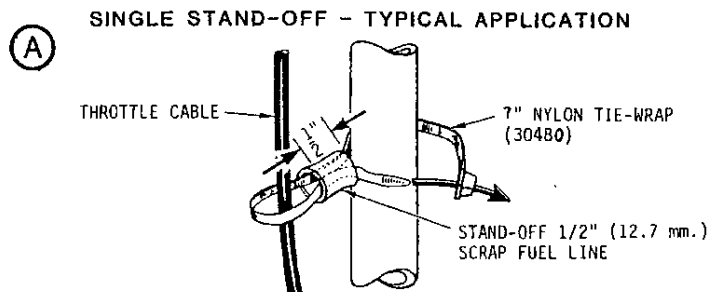
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## STAND-OFF ASSEMBLY

This is an anti-vibration fitting used to isolate Gas Lines, Throttle Cable, Teleflex Cable, Brake Cables and some Electrical Wires throughout the aircraft. The exact locations and numbers used are detailed in the relevant assembly instructions.

1. Refer to illustration 'A', which shows a single Stand-Off in a typical application (Throttle Cable). Cut a 1/2" (12.7 mm.) piece of scrap Fuel Line. Thread the 7" Nylon Tie-Wrap (30480) around the part, thru the scrap Fuel Line and around the Tube as shown. Pull tight, cut off excess and touch the cut end with the Hot Knife to remove sharp edges.



## BASIC TOOLS NEEDED FOR ASSEMBLY

(2) C-Clamps	Screwdrivers (flat edge, phillips)
Center punch	Straight edge - 6 ft. (2 m.)
Hammer	(2) 1" x 4" x 5' boards
Hand riveting tool for 1/8" and 3/16" rivets	Soldering iron w/ blade edge or sailmaker's hot knife
Tape measure & marking pencil	Fine flat, 1/2 round and rat-tail files
Masking tape (min. 1" - 2.5 mm.)	Hacksaw
Rope (10 ft. x 1/4" diameter) (3.3 m. x 6.4 mm.)	Duct Tape
Open end (or socket) wrenches: 3/16"-1/4"-3/8"-7/16"-1/2"-5/16"-11/16" (2 ea.) METRIC: 5 mm.-6 mm.-10 mm.-11 mm.-13 mm.-16 mm.-17 mm.	Drill motor or hand drill with: 3/32" 1/8"-3/16"-1/4"-5/16"-1/2" bits.
Allen wrenches: 1/8" (3.2 mm.) and 6 mm.	Lubricant (3-in-1 Oil or equivalent)
Scissors or razor knife	Level
Torque wrench (optional)	(2) Approx. 10 lb. - 4.5 kilo weights

### TUBE CAPS

TUBE CAPS: Be sure to install all tube caps. It is recommended that the caps with a loose fit be pop-riveted on with small 1/8" rivets. The following tubes receive caps:

7/8" TUBE CAPS  
(one in each end of:)

1. TAIL BRACE TUBES
2. RUDDER BRACE TUBE
3. STABILIZER T.E.
4. ELEVATOR L.E.
5. TOP OF TAIL SKID
6. RUDDER FRAME (top & bottom)

1" TUBE CAP  
(only instance)

1. BOTTOM OF TAIL SKID

### WARNING

BOLTS ON THE AIRCRAFT WHICH ARE SUBJECT TO ROTATION IN USE WILL CALL FOR "CASTLE NUTS." A CASTLE NUT RELIES ON A SAFETY RING TO KEEP IT FROM BACKING OFF. MAKE SURE ALL CASTLE NUTS ARE SECURED WITH SAFETY RINGS!!

## TORQUE VALUES

### SPECIFIED TORQUE VALUES

	in./lbs.	ft./lbs.	Newton/Meters
3/16" ---- (AN3) -----	20-25	1.5-2.0	2.25-2.75
With Thin Locknut	12-15	1.0-1.25	1.25-1.75
1/4" ---- (AN4) -----	50-70	4.0-5.75	5.5-8.0
With Thin Locknut	30-40	2.5-3.25	3.5-4.5
1/4-20 Thread	40-50	3.25-4.0	4.5-5.50
5/16" ---- (AN5) -----	100-140	8.25-11.5	11.25-15.75
With Thin Locknut	60-85	5.0-7.0	6.75-9.5
7/16" ---- (AN7) -----	450-500	37.5-41.5	51.0-56.5

PROPER TORQUE = TORQUE SPECIFICATION + RUN-ON TORQUE



← ALL WING NUTS HAND TIGHTEN ONLY

RUN-ON TORQUE - amount of resistance encountered in order to thread a nut onto a given bolt once the bolt threads appear past the nut.

Because of minute machining differences, varying degrees of resistance may be encountered when threading a nut to a bolt. Remember, run-on torque value can vary widely even within the same size or gauge of bolts and nuts.

If, for example, it takes 20 inch/lbs. for you to run a nut onto a 3/16" (AN-3) bolt so that threads appear past the nut, you add the (RUN-ON) 20 inch/lbs. to the 20-25 inch/lbs. (TORQUE VALUE) to arrive at (and use) the (PROPER TORQUE) for the individual bolt within that size or gauge.

Therefore, ALL BOLTS SHOULD BE TIGHTENED TO PROPER TORQUE RATHER THAN SPECIFIED TORQUE.

Self-locking nuts can be torqued to the proper torque.

Self-locking nuts should not be removed and installed more than once. Generally, they become less vibration resistant with each removal.

Apply a smooth even pull when applying torque pressure. If chattering or a jerking motion occurs during final torque, back off and re-torque.

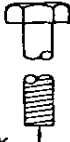
### Main Torque Specifications - ROTAX 377 Engine.

	Nm	in/lbs.
Cylinder Head Nuts M8	18 to 24	160 to 210
Crankcase Screws M6	8 " 10	70 " 88
" " M8	18 " 24	160 " 210
Magneto Housing Nut (M22x1,5)	80 " 90	710 " 800
Fan Nut M16 x 1,5	60 " 70	530 " 620
Crankcase Nuts (or screws) M10	36 " 40	320 " 354
Exhaust Manifold Screws M8	18 " 24	160 " 210

# AN BOLT GAUGE

THE GAUGE BELOW WILL AID YOU IN DETERMINING  
THE TYPE AND LENGTH OF BOLTS

USE GAUGE FOR MEASURING BOLT SIZE.  
SEE EXAMPLE ON RIGHT.





WITH   
AN3-15<sub>a</sub> MEANS NO SAFETY  
RING HOLE AT BOTTOM OF SHANK.

WITHOUT   
AN3-15 MEANS THERE IS SAFETY  
RING HOLE AT BOTTOM OF SHANK.

AN3 MEANS 3/16" DIA. SHANK.

AN4 MEANS 1/4" DIA. SHANK.

AN5 MEANS 5/16" DIA. SHANK.

EXAMPLE: AN3-15 <sub>a</sub>	AN3	AN4	AN5
			
	3/16"	1/4"	5/16"
	3	3	4
	4	4	5
	5	5	6
	6	6	7
	7	7	8
	10	10	11
	11	11	12
	12	12	13
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	43	43	44
	44	44	45
	45	45	46
	46	46	47
	47	47	48
	50	50	50

## NOTICE:

The "AN" Bolts are used throughout the construction of this airplane  
for structural integrity.

DO NOT use substitutes. See your dealer for replacements if necessary.



## NICO SLEEVE GAUGE PROCEDURE

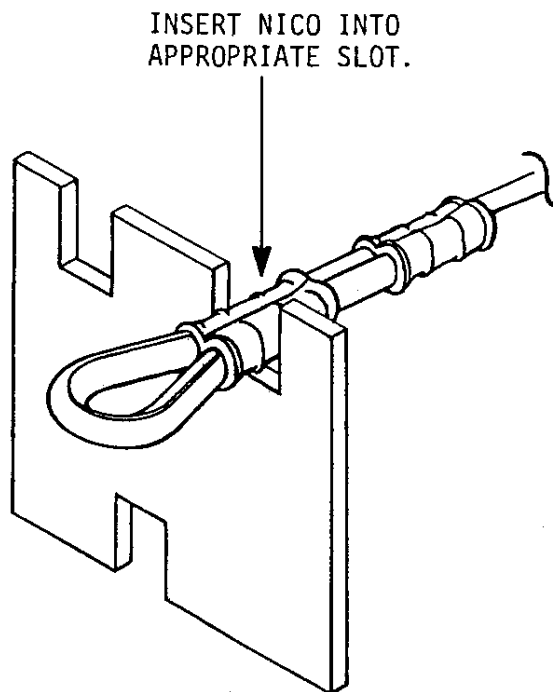
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The Nico Sleeve Gauge (20447) is a measuring device which determines the size accuracy of sleeves swaging various dimension cables to thimbles, cable bushings, tangs, etc.

The gauge has precision machined notches for measuring swaged nico sleeves having 1/8" (3.2 mm), 1/16" (1.6 mm), and 3/32" (2.4 mm) sizes. It should be used when making a cable inventory upon receipt of your aircraft assembly kit.

### TO USE...

- ① Insert the swaged portions of the sleeve into the appropriate notch on the sleeve gauge.
- ② Inability to insert the swaged part of the sleeve indicates improper swage. REPLACE THROUGH YOUR DEALER.
- ③ In addition, check the positioning of the cables swaged within the sleeve. Cables are properly swaged when they lie directly side-by-side and the sleeve opening has a symmetrical shape.

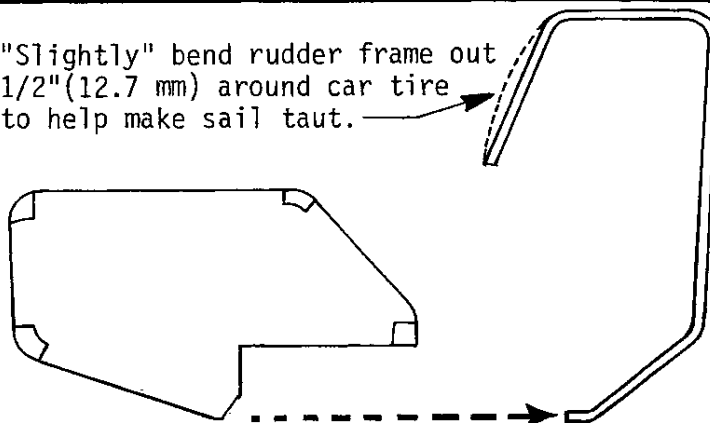


# RUDDER ASSEMBLY

Bend tube as described at right, then slip sail cover over rudder frame (40329) as shown. It will be necessary to bunch up sail to negotiate going around corners of rudder frame.

Follow the sequence of drawings as shown below to complete the rudder assembly.

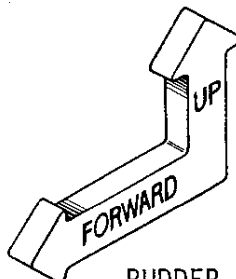
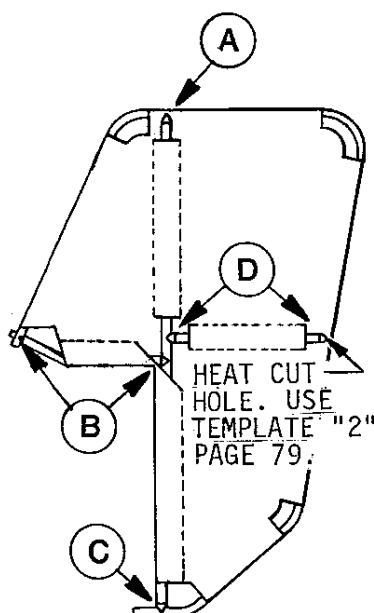
"Slightly" bend rudder frame out 1/2" (12.7 mm) around car tire to help make sail taut.



**A**

Heat cut hole as shown for installation of Rudder L.E. Slip Rudder L.E. into pocket (nut plate on bottom half and faces backwards). Insert 1" plastic tube connector in top and 1" alumn. tube connector in bottom. (See next page) "POP" Rudder L.E. into place.

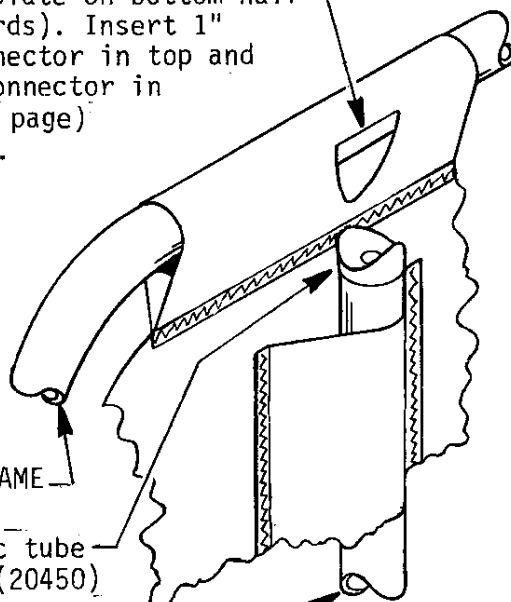
HEAT CUT HOLE. USE TEMPLATE "1" PAGE 79.



RUDDER FRAME (40329)

1" Plastic tube connector (20450)

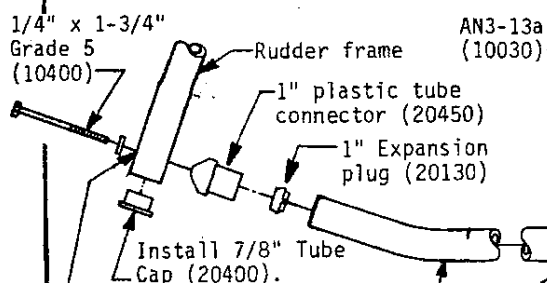
RUDDER L.E. (40251)



**B**

Assemble RUDDER BALANCE STRUT, slip into pocket and install aft end of strut to RUDDER. PUSH forward edge of strut down so sail is "TIGHT", mark and drill 1/4" hole as shown at right. Now install forward GRADE 5 BOLT.

1/4" x 1-3/4" Grade 5 (10400)



**IMPORTANT!**

NOTE: Trim excess rudder frame 5/8" (15.9 mm.) past bolt hole so rudder safely clears upper tail wires.

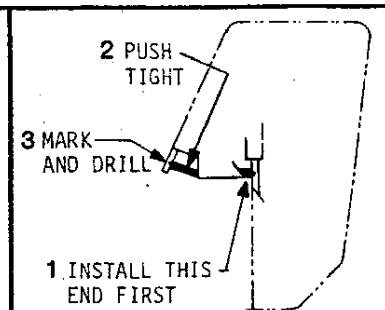
Rudder Balance Strut (40396)

Heat cut hole in sail and install nut last.

Rudder L.E. (40251)

1/4" x 1 3/4" Grade 5 (10400)

1" alumn. tube connector (20446)



## RUDDER ASSEMBLY (CONT'D.)

**C**

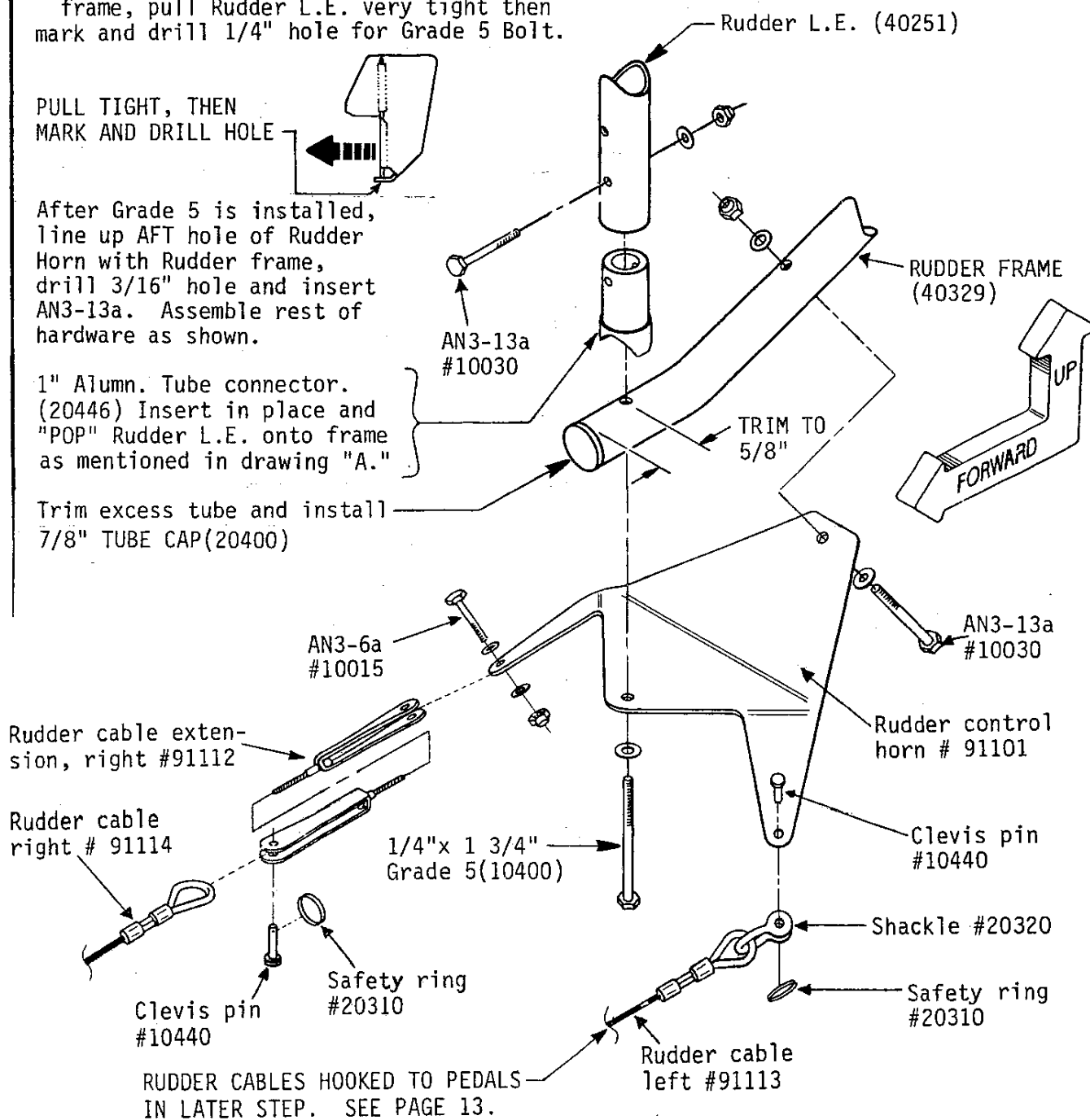
With Rudder L.E. in place on Rudder frame, pull Rudder L.E. very tight then mark and drill 1/4" hole for Grade 5 Bolt.

PULL TIGHT, THEN  
MARK AND DRILL HOLE

After Grade 5 is installed, line up AFT hole of Rudder Horn with Rudder frame, drill 3/16" hole and insert AN3-13a. Assemble rest of hardware as shown.

1" Alumn. Tube connector. (20446) Insert in place and "POP" Rudder L.E. onto frame as mentioned in drawing "A."

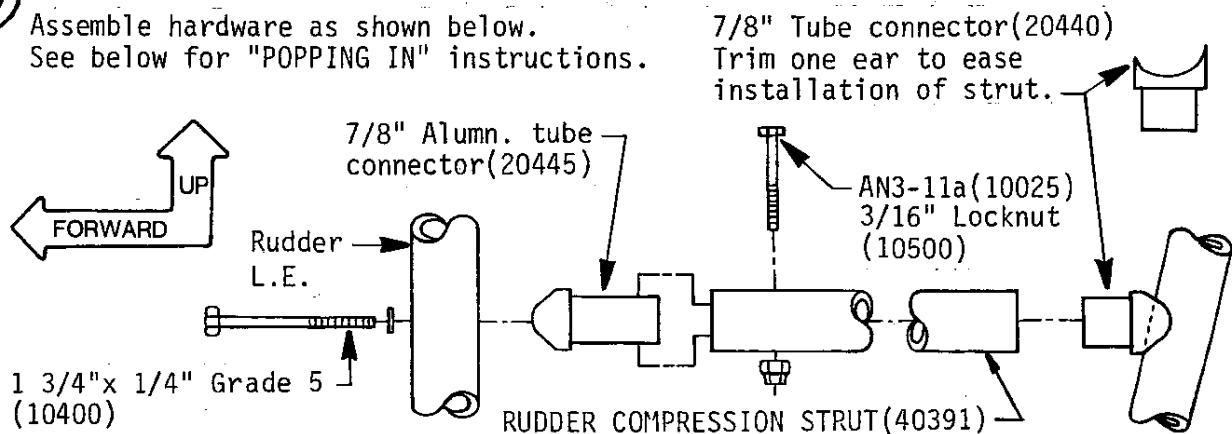
Trim excess tube and install 7/8" TUBE CAP(20400)



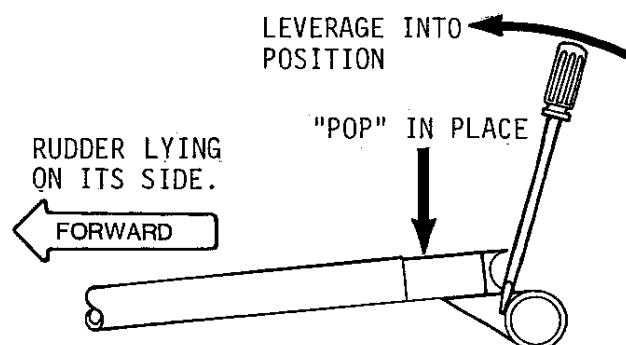
## RUDDER ASSEMBLY (CONT'D.)

**D**

Assemble hardware as shown below.  
See below for "POPPING IN" instructions.

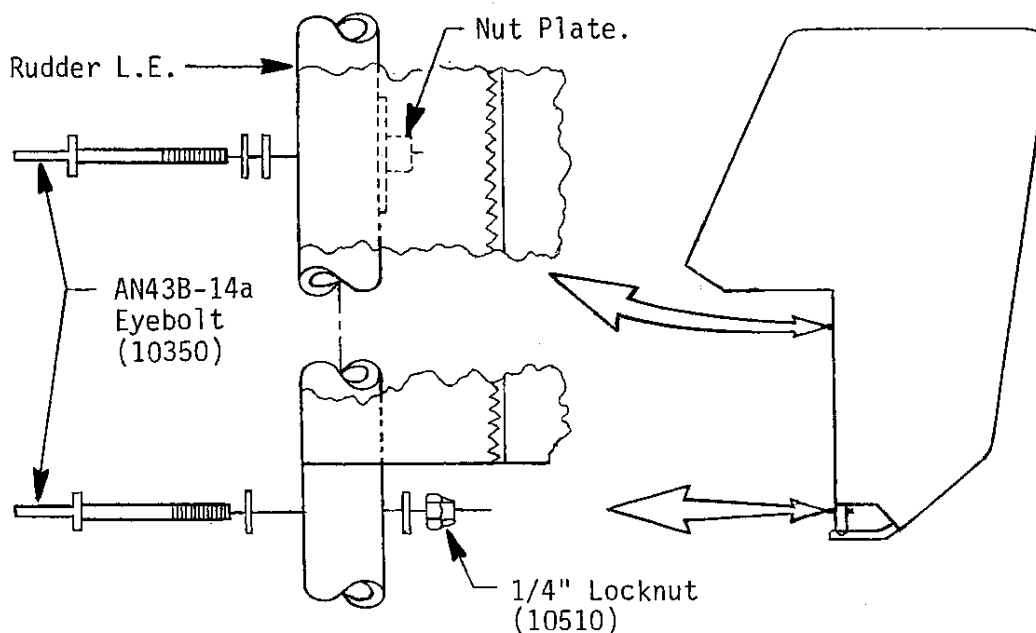


Heat cut hole for compression strut as was done for Rudder L.E. in drawing "A." With hardware assembled for drawing "B" you are now ready to "POP" compression strut into place. Use LARGE screwdriver to leverage Strut into position, then "POP" Strut into Rudder Frame as shown.



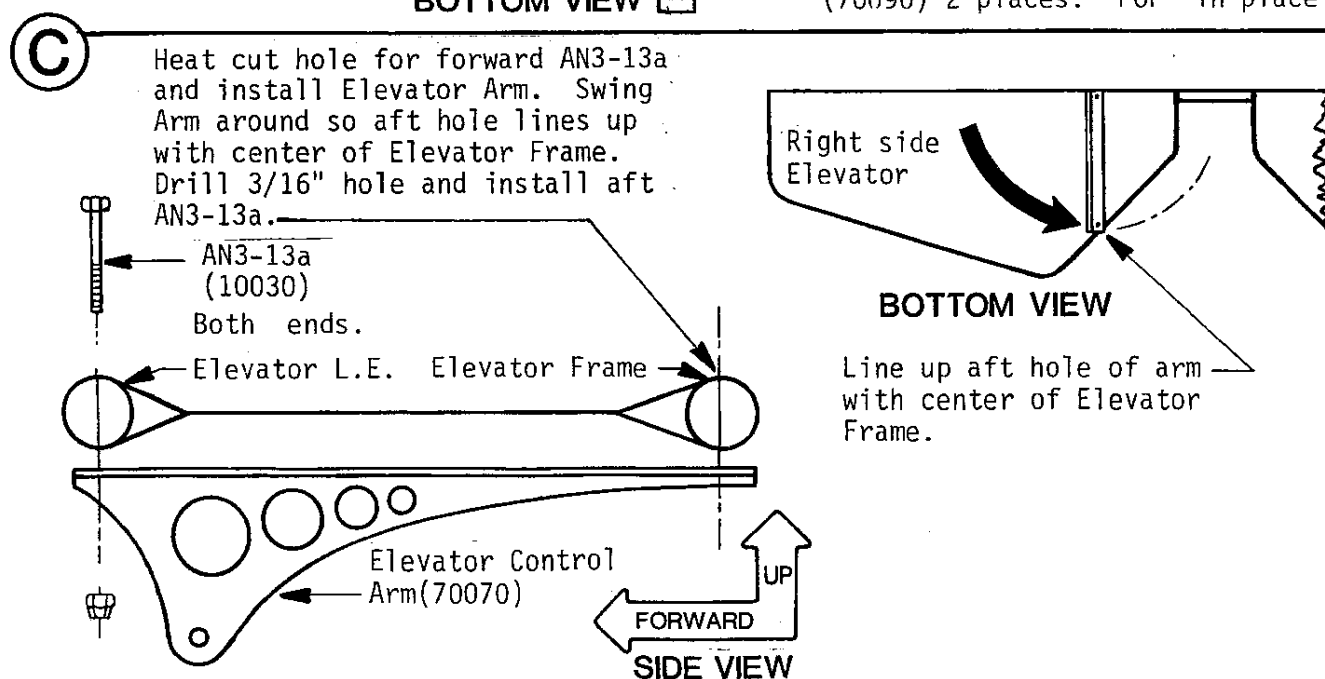
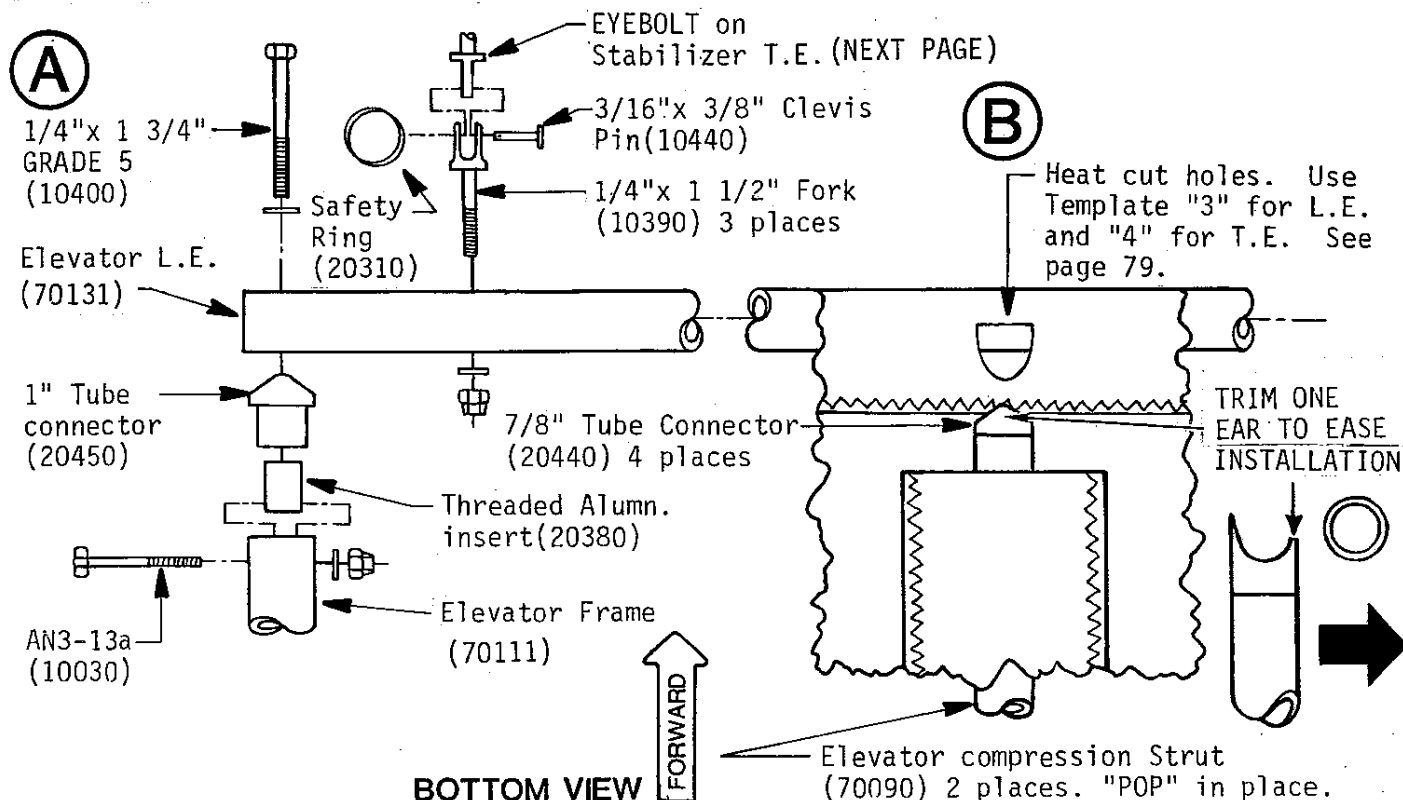
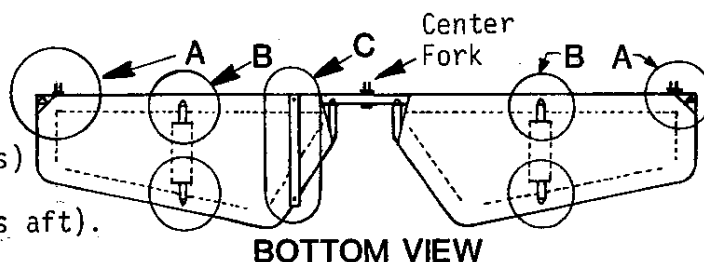
## RUDDER EYEBOLT ASSY.

Heat cut hole for upper eyebolt.  
Use 1/4" washers as shown.



## ELEVATOR ASSEMBLY

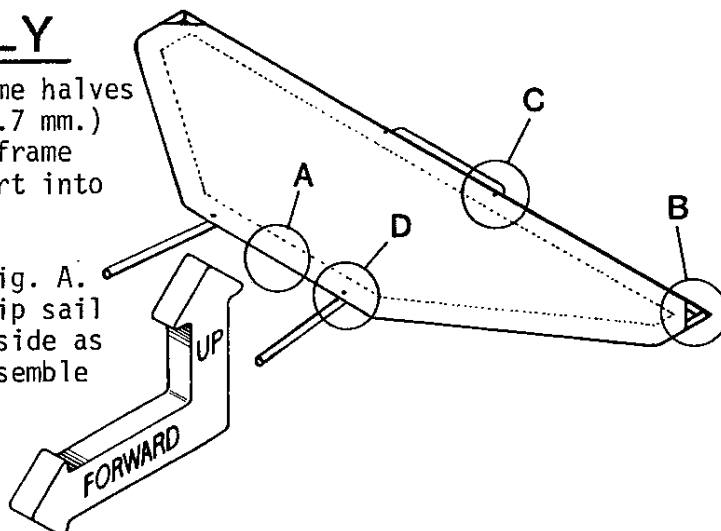
DRAWING "A". Slip ELEVATOR covers over ELEVATOR FRAMES (Pockets on bottom). Install TUBE CONNECTOR hardware (4 places) then slide ELEVATOR L.E. into sail. (ELEVATOR ARM hole on right & POP rivets aft). Install GRADE 5's and FORKS as shown. Do DRAWINGS "B" and "C" as shown.



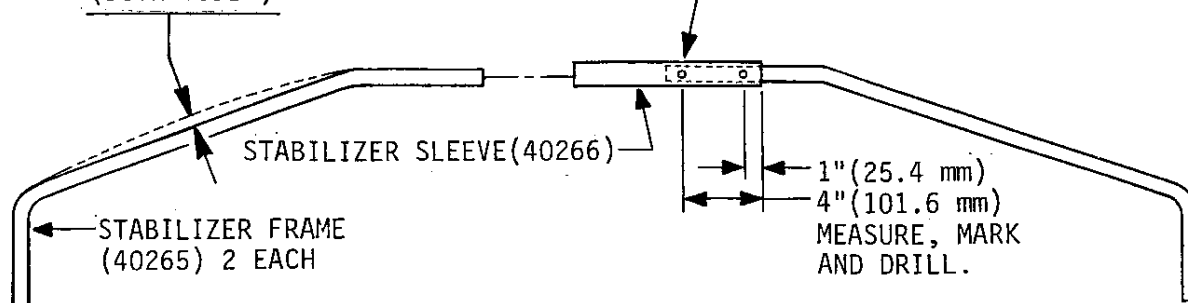
## STABILIZER ASSEMBLY

DRAWING "A" - Bend stabilizer frame halves "SLIGHTLY" over car tire 1/2" (12.7 mm.) to help make sail taut. Lay the frame halves on the floor flat and insert into STABILIZER SLEEVE.

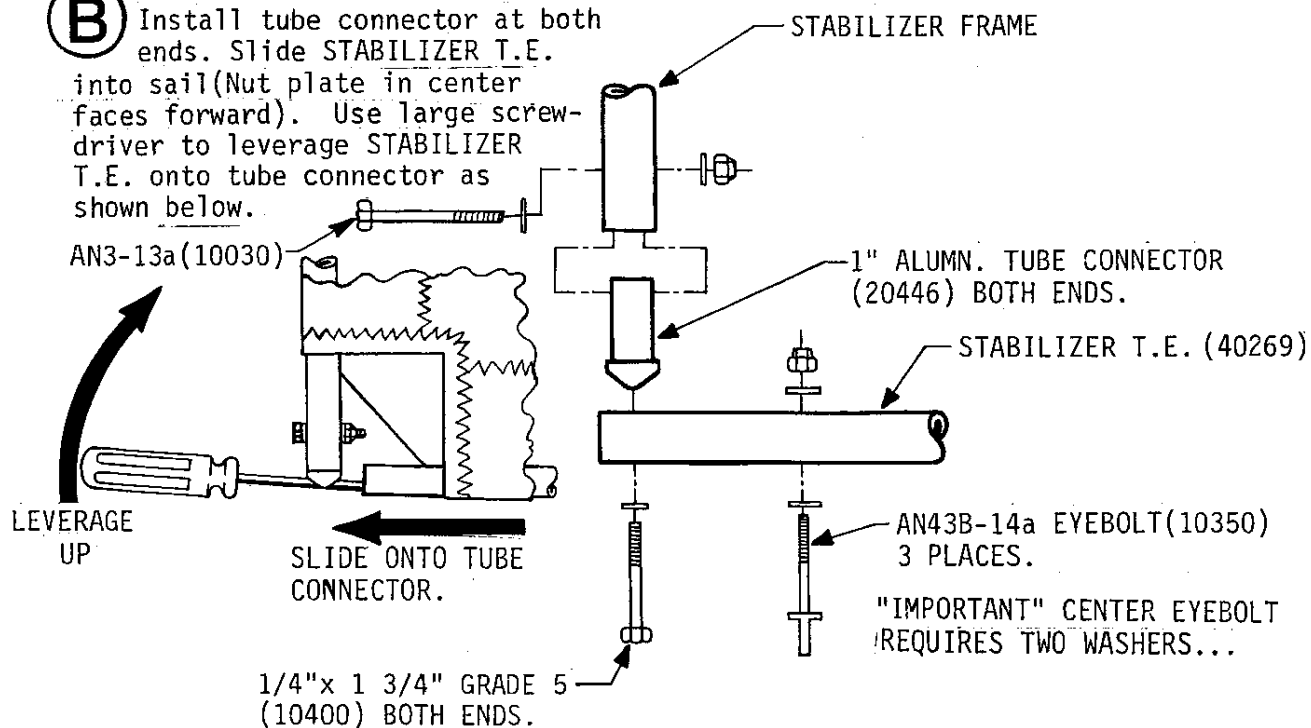
Measure, mark and drill 3/16" holes for both halves as shown, Fig. A. Install 3/16" Rivets (20225). Slip sail onto frame (SEAM of sail on same side as rivets). DRAWINGS "B" - "D" - Assemble as shown.



- A** Slightly bend frame out 1/2" (12.7 mm) over car tire to help make sail taut. (BOTH SIDES)
- 3/16" POP RIVETS  
4 PLACES.



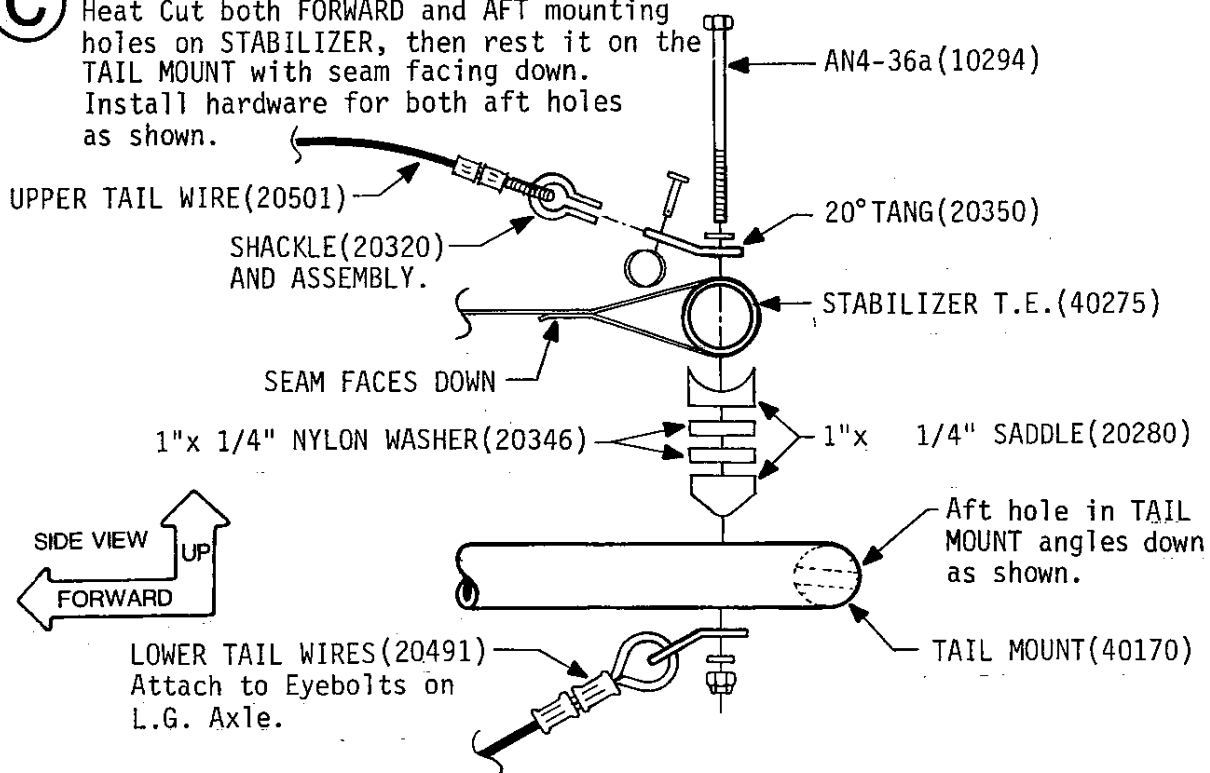
- B** Install tube connector at both ends. Slide STABILIZER T.E. into sail (Nut plate in center faces forward). Use large screwdriver to leverage STABILIZER T.E. onto tube connector as shown below.



## STABILIZER ASSEMBLY CON'T.

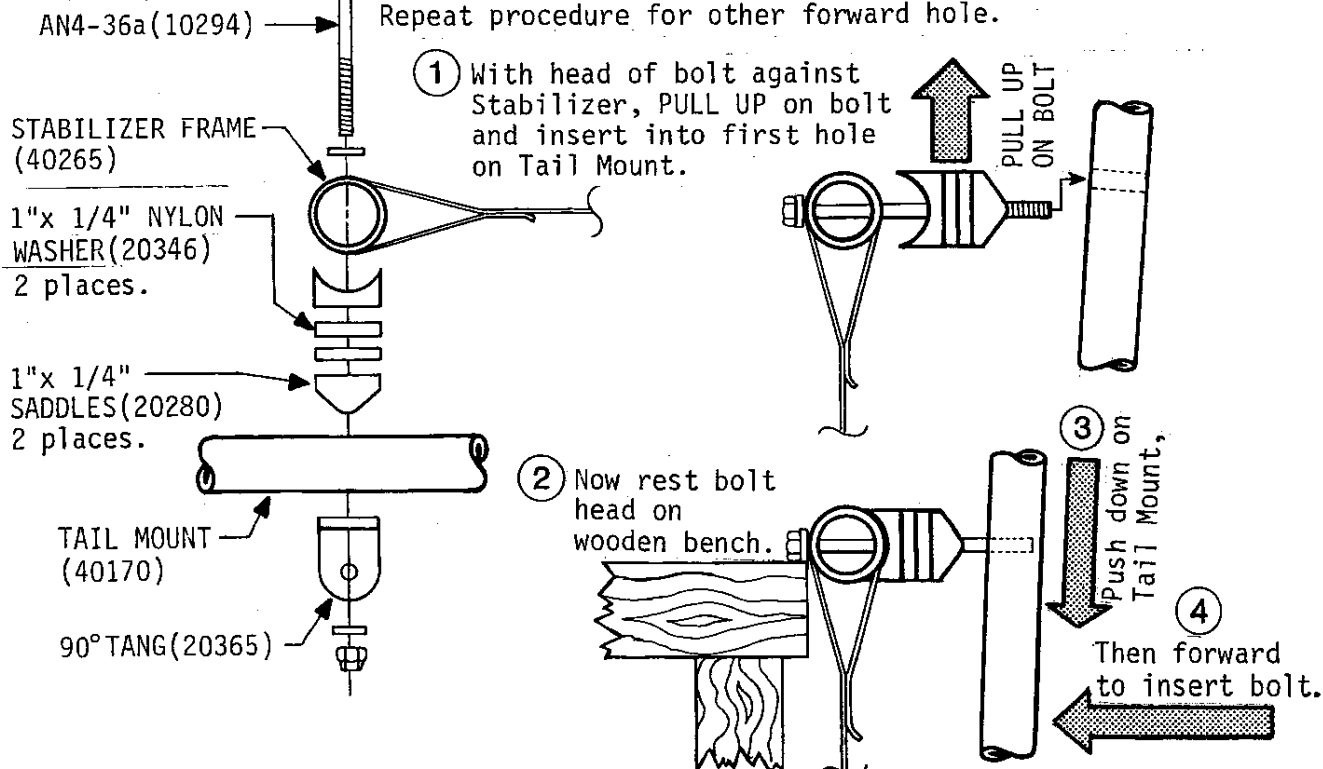
**(C)**

Heat Cut both FORWARD and AFT mounting holes on STABILIZER, then rest it on the TAIL MOUNT with seam facing down. Install hardware for both aft holes as shown.



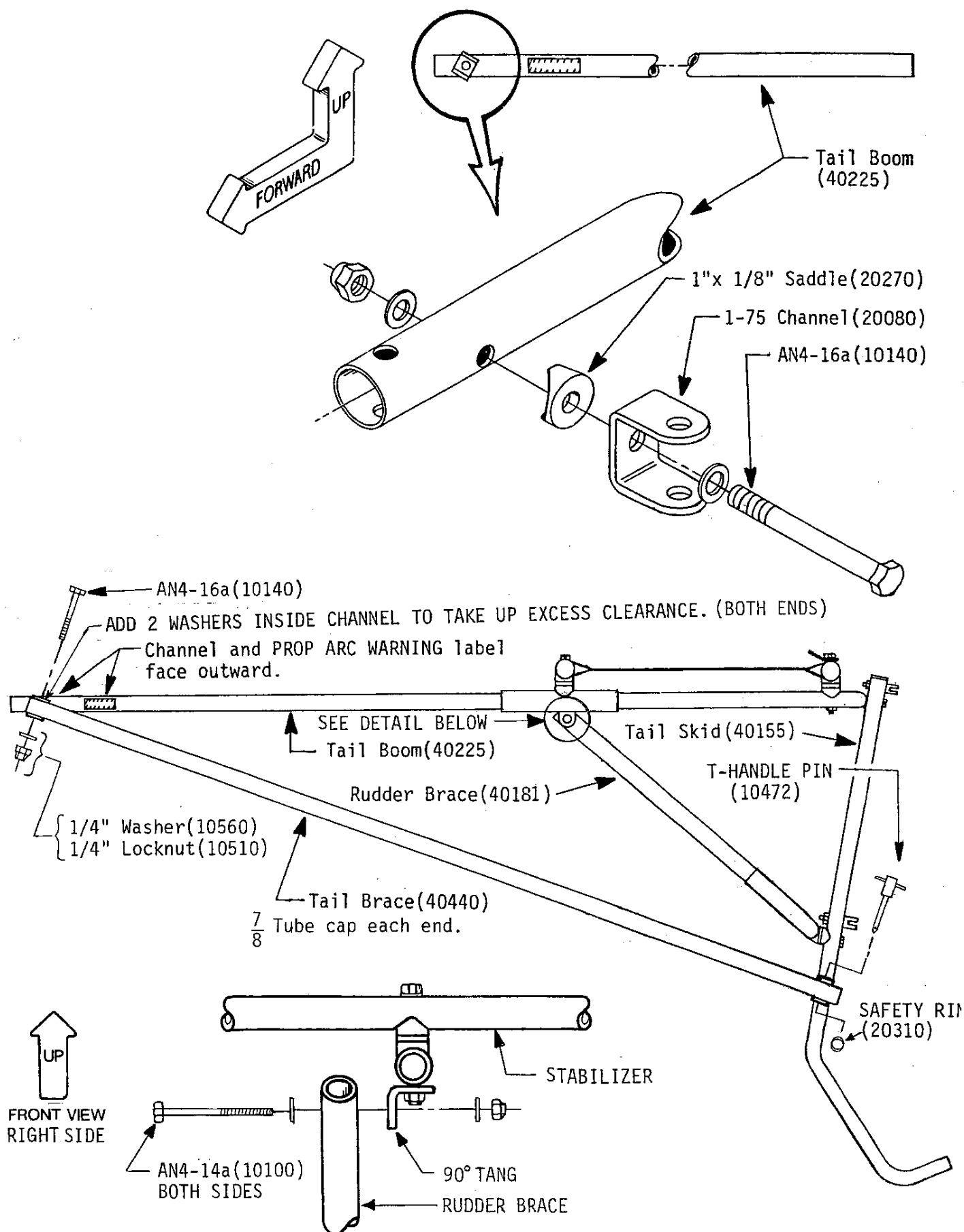
**(D)**

Assemble hardware as shown and STOP at second saddle. See procedure below to help insert bolt into TAIL MOUNT. When bolt is through TAIL MOUNT, add tang, washer and nut. Repeat procedure for other forward hole.



# TAIL TUBE ASSY.

7

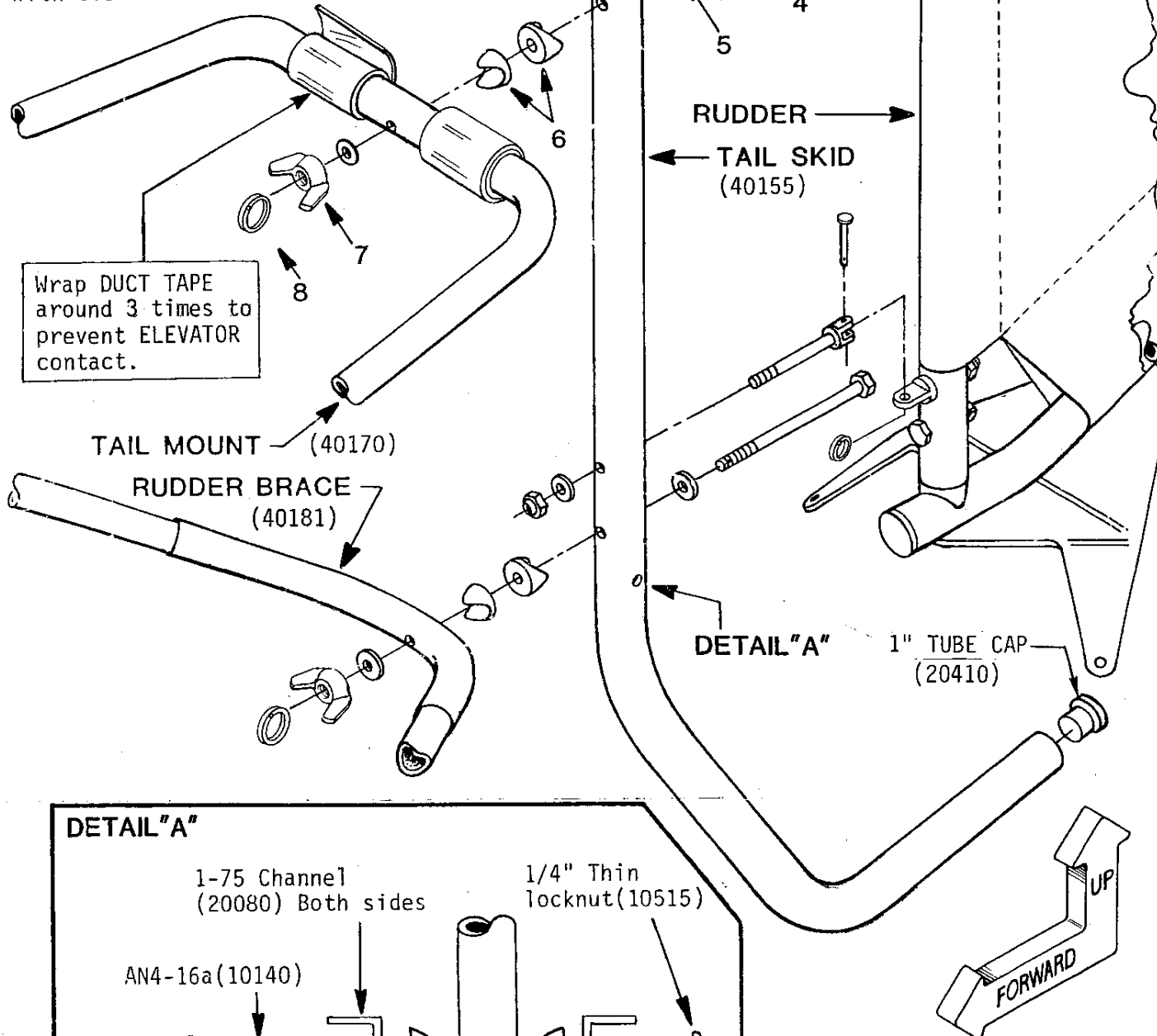




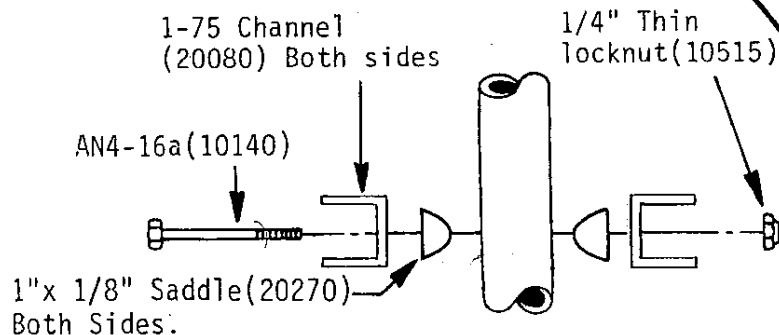
# TAIL SKID ASSY.

- 1) 1/4" Locknut(10510)
- 2) 1/4" Washers(10560) 2 per Assy.
- 3) Rudder hinge fork(10390)
- 4) AN4-26(10241)
- 5) 1/4" Washers(10560)
- 6) 1"x 1/8" Saddles(20270)
- 7) 1/4" Wingnut(10520)
- 8) Safety Ring(20310)

Repeat steps 1-8 for lower half of tail skid assembly.  
Attach Rudder to Tail Skid with Clevis Pins as shown.



## DETAIL "A"



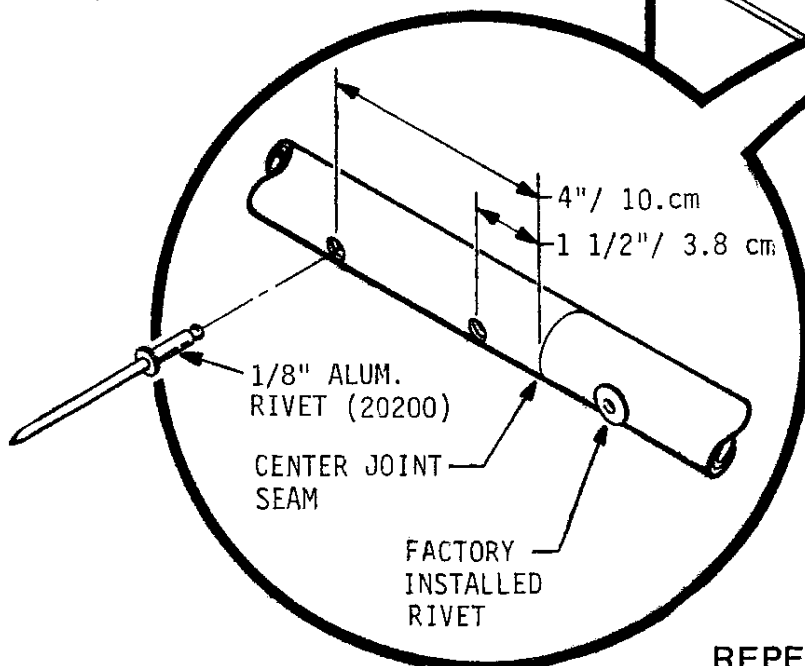
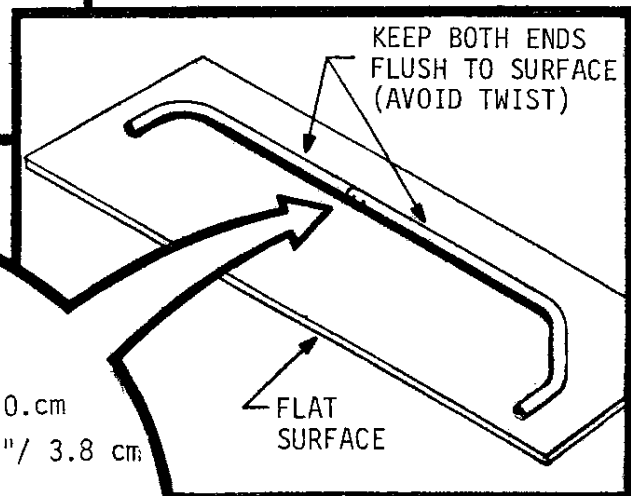
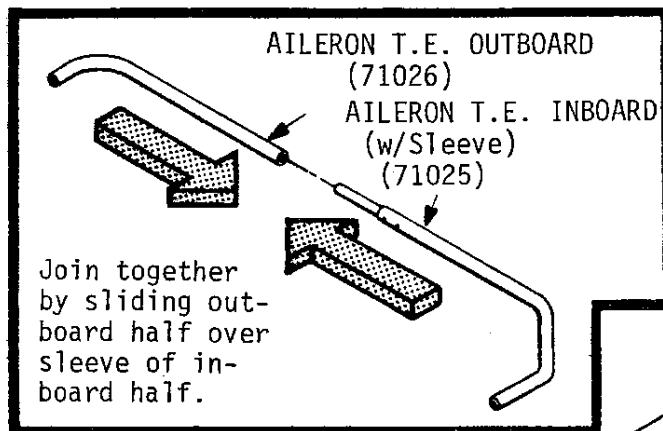
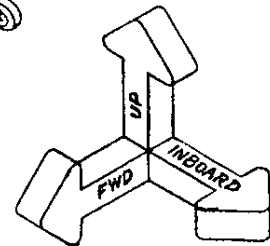
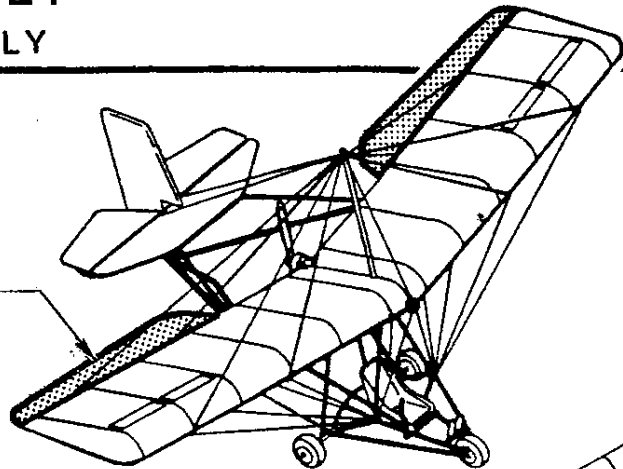
## TUBE CAP NOTE:

Secure with 1/8" rivet. Drill hole 90 deg. to 1/4" hole.

# AILERON ASSEMBLY

## TRAILING EDGE ASSEMBLY

Work on a flat surface.  
Inboard T.E. spar has  
connecting SLEEVE  
factory-installed with  
1/8" RIVETS.



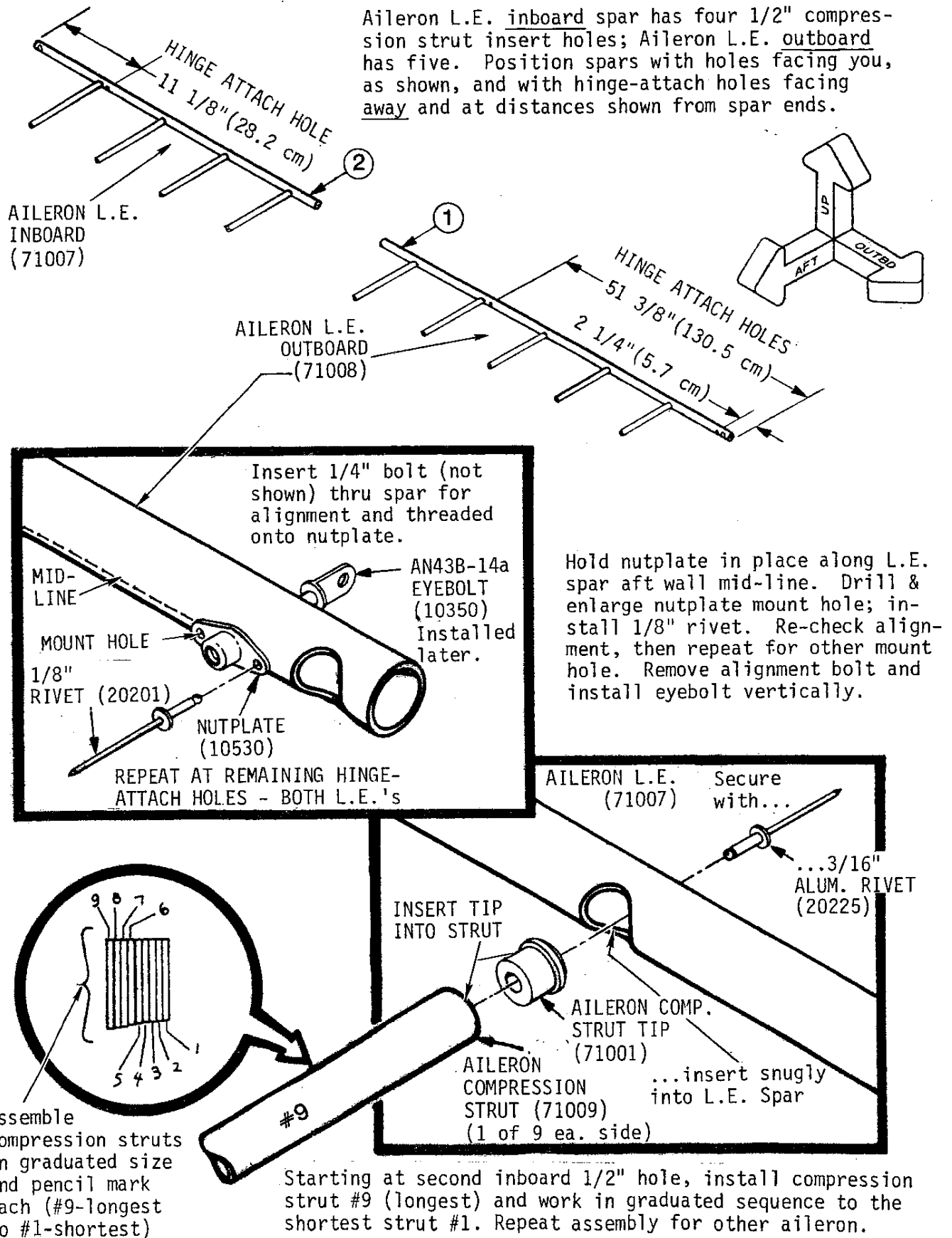
Measure distances shown  
from center joint seam  
(same as factory-installed  
rivets - one shown).

Punch and drill 1/8"  
holes and install  
rivets as shown.

REPEAT ON OPPOSITE SIDE

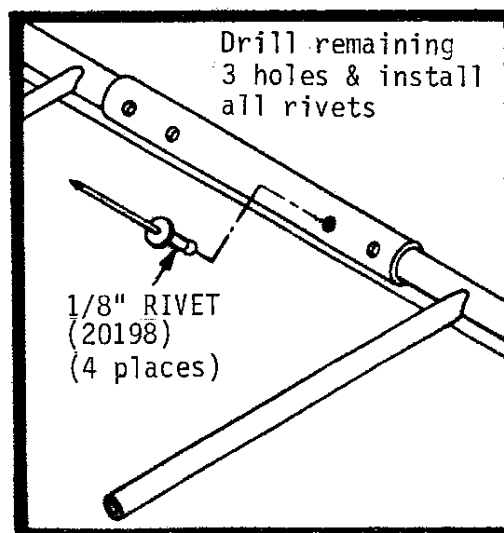
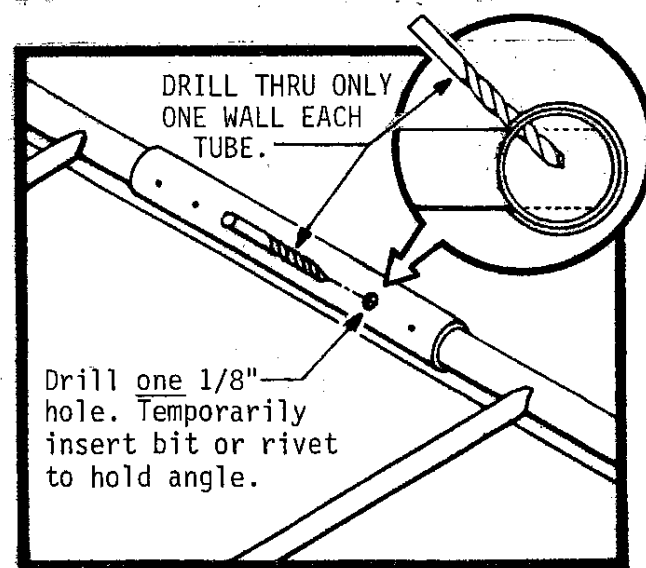
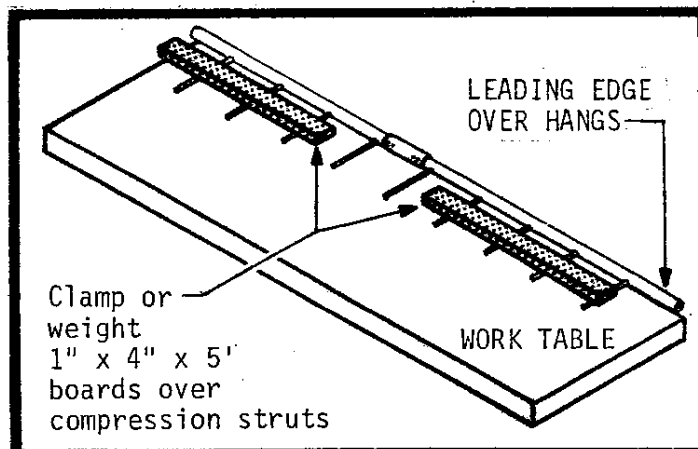
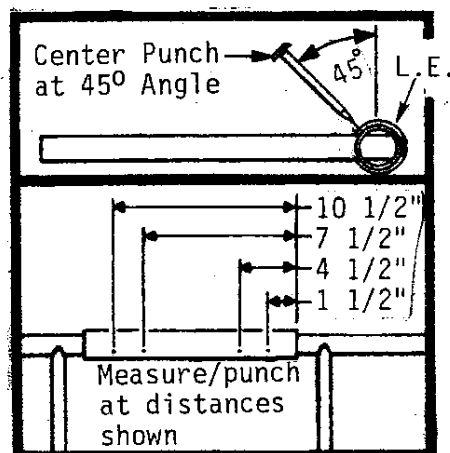
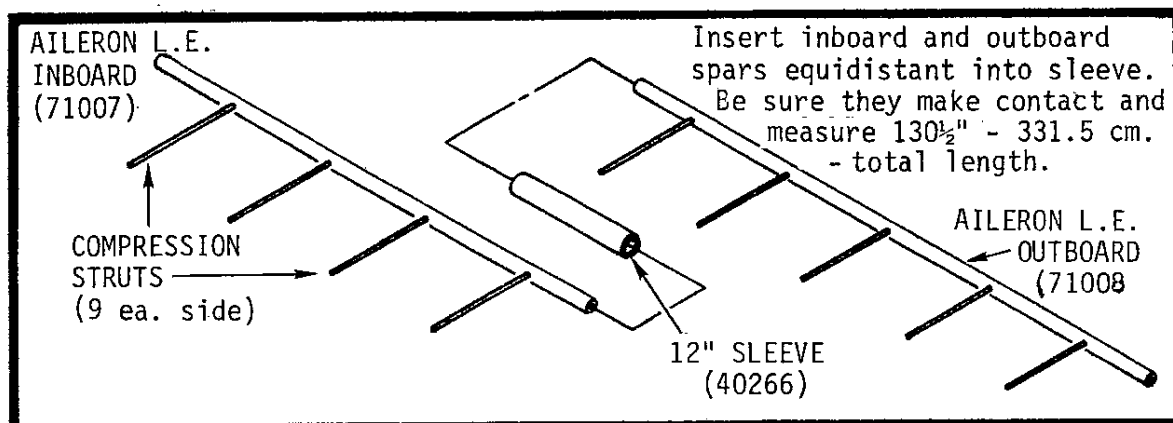
## AILERON ASSEMBLY (CONT'D.)

### NUTPLATE/COMPRESSION STRUT ASSEMBLY



## AILERON ASSEMBLY (CONT'D.)

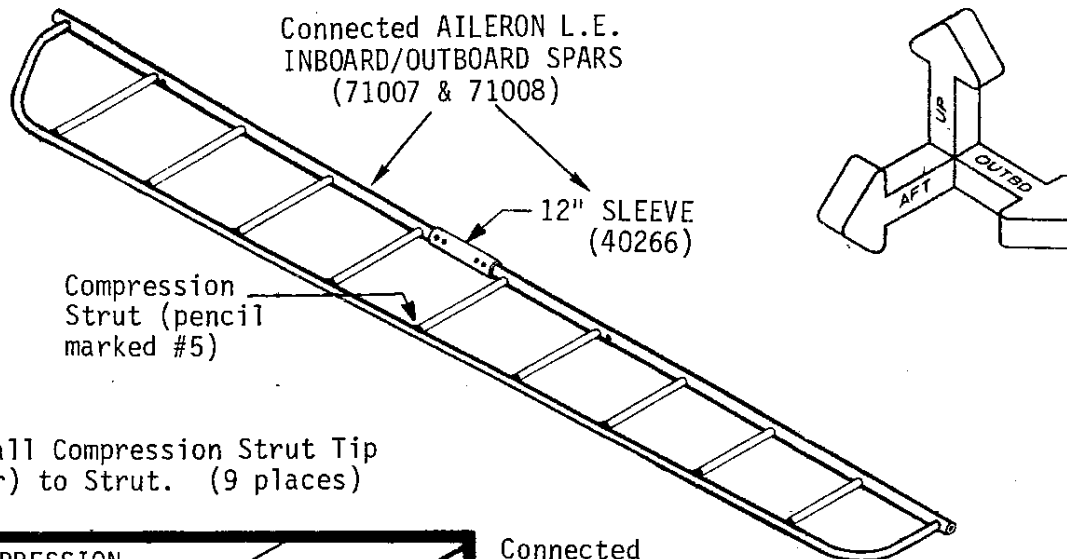
### LEADING EDGE ASSEMBLY



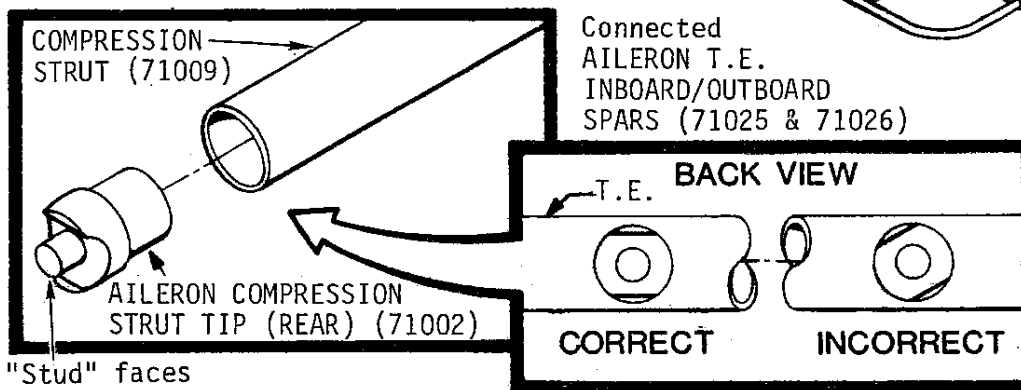
REPEAT ON OPPOSITE SIDE

# AILERON ASSEMBLY (CONT'D.)

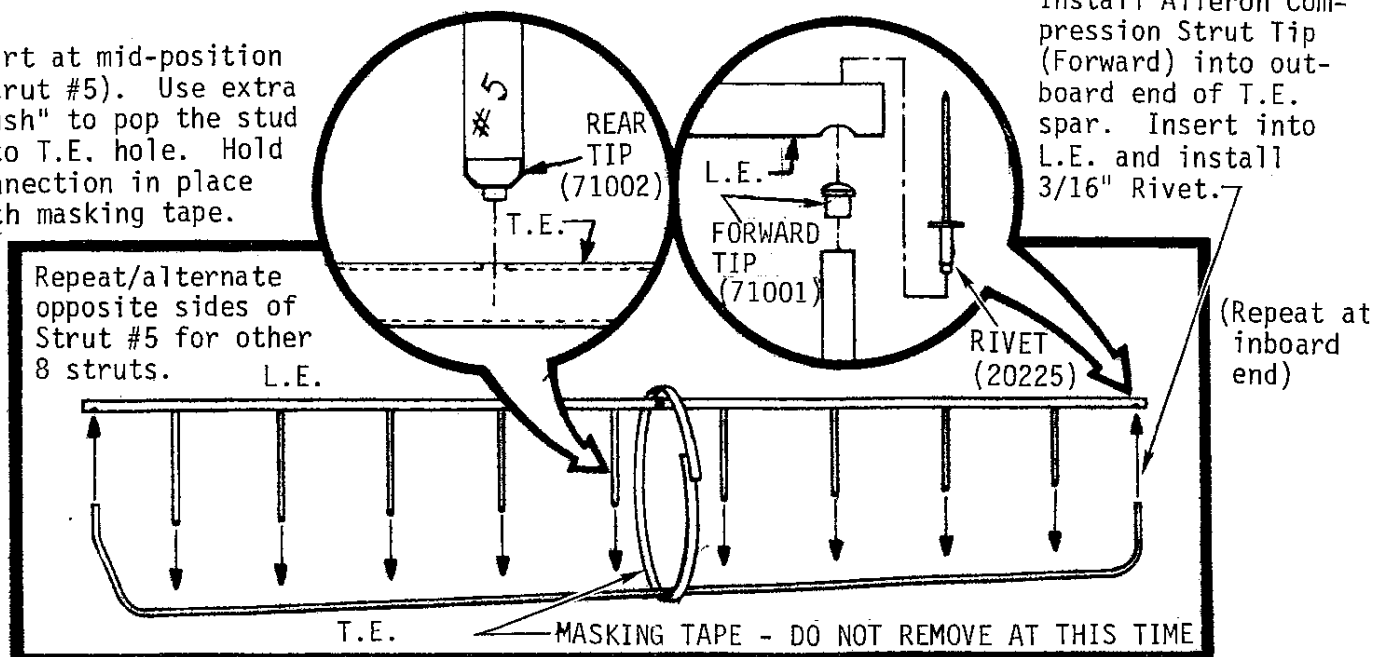
## TRAILING EDGE/COMPRESSION STRUT ASSY.



Install Compression Strut Tip (Rear) to Strut. (9 places)



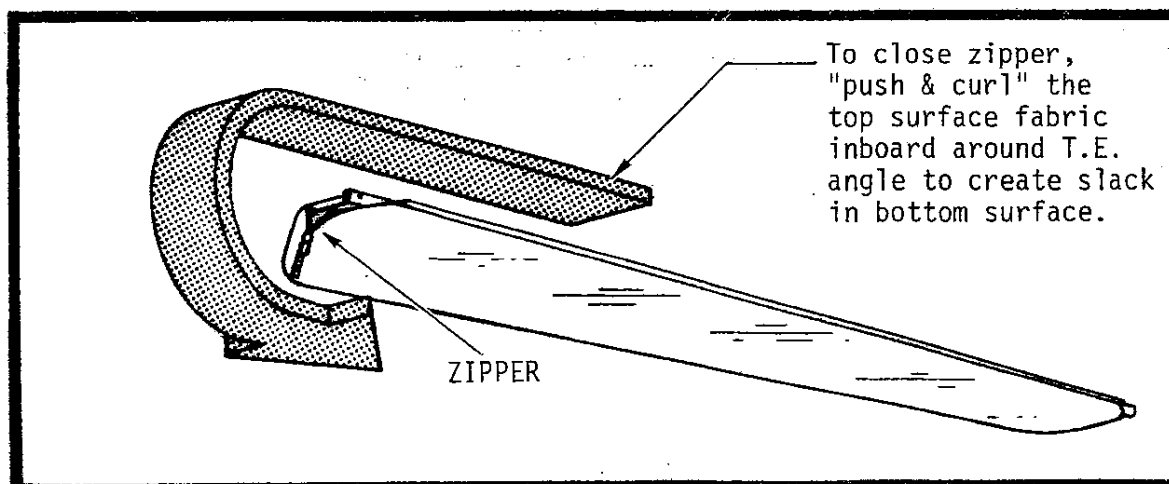
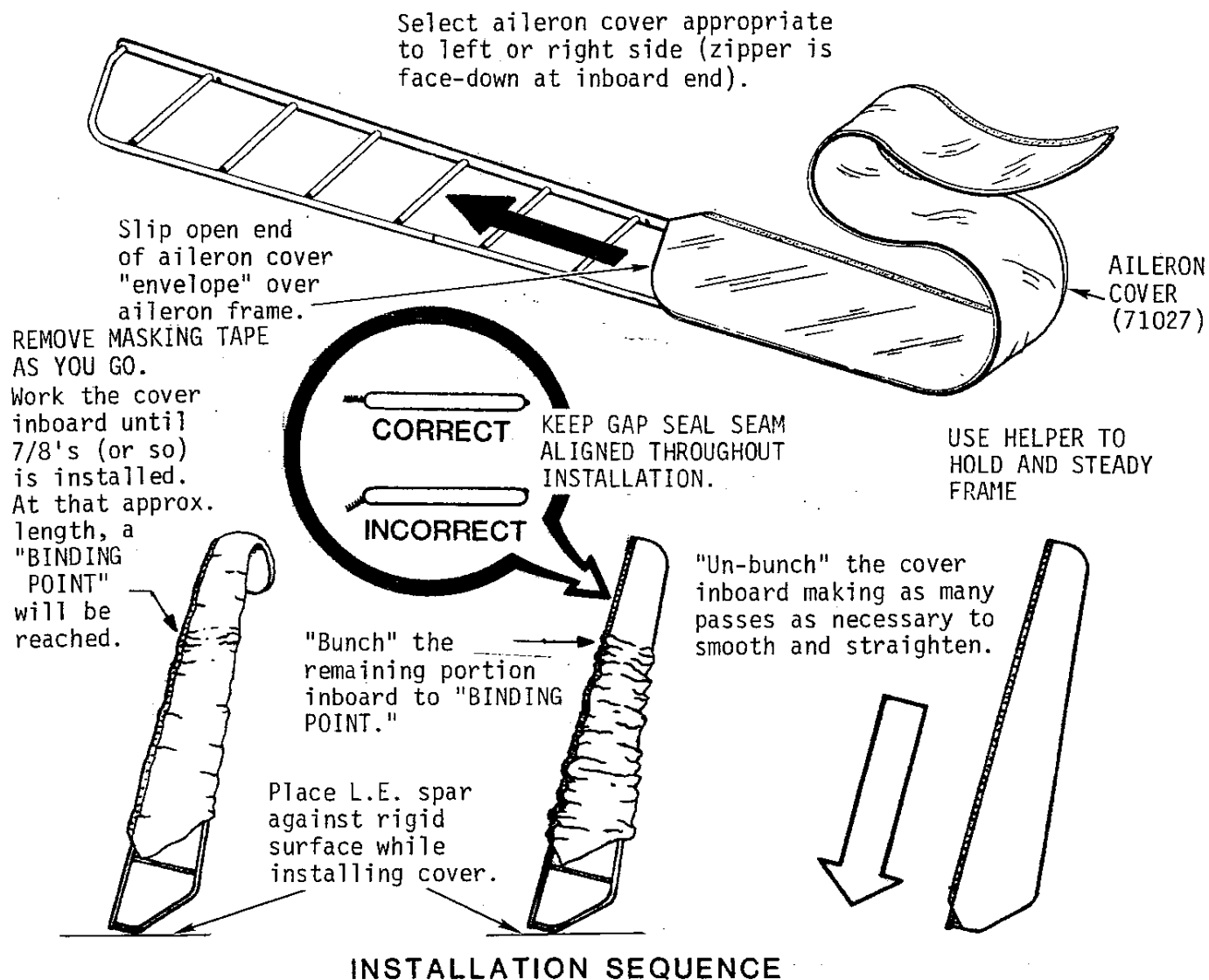
Start at mid-position (Strut #5). Use extra "push" to pop the stud into T.E. hole. Hold connection in place with masking tape.



REPEAT ON OPPOSITE SIDE AILERON

# AILERON ASSEMBLY (CONT'D.)

## AILERON COVER INSTALLATION



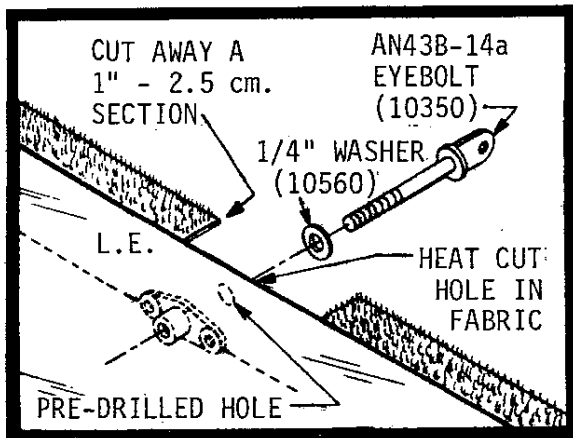
(NOTE: FRAME NOT PERFECTLY STRAIGHT UNTIL ATTACHED TO WING.)

**REPEAT ON OTHER SIDE**  
 AILERON COVER (L)  
 (71028) not shown.

## AILERON ASSEMBLY (CONT'D.)

### AILERON EYEBOLT & HORN ATTACHMENT

(3 PLACES EACH L.E.)



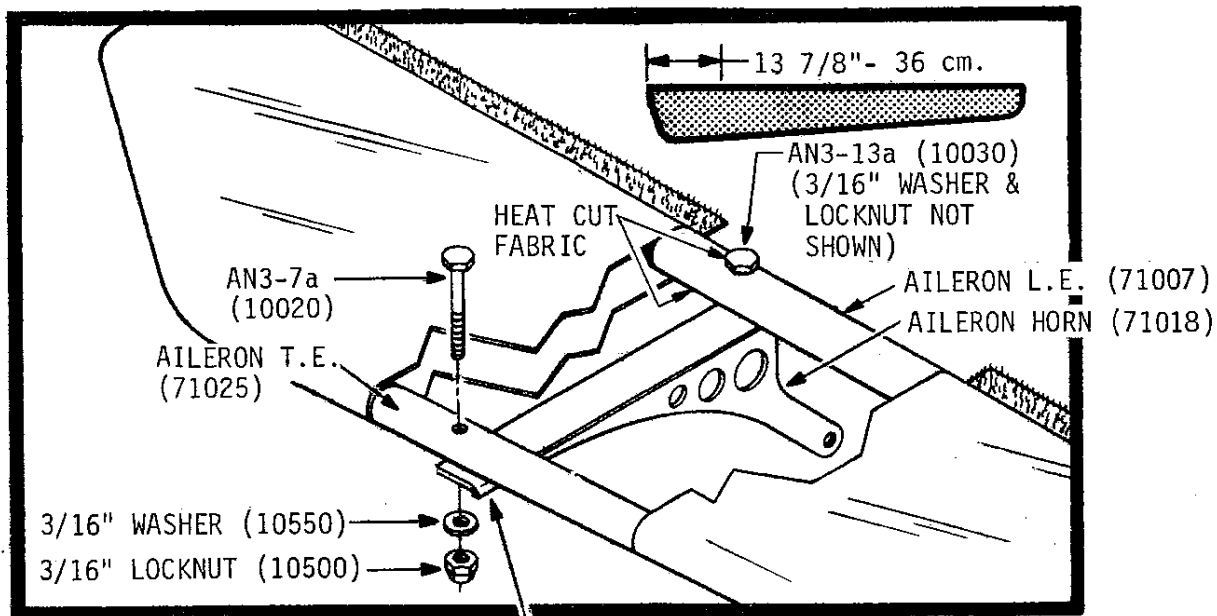
Locate the 3 hinge-attached holes under fabric on Aileron L.E.

Distances from L.E. Outboard spar end are:  $2\frac{1}{4}$ " - 5.7 cm.,  $51\frac{7}{8}$ " - 130.5 cm., and  $119\frac{3}{8}$ " - 303.2 cm.

Cut away 1" wide - 2.5 cm. section in front of each hole position. Heat cut fabric in front of hole and install washer and eyebolt.

NOTE: Make sure eyebolts are secured vertically for later attach to wing T.E. forkbolts.

Measure from L.E. Inboard end (SHADED DRAWING DISTANCE) to locate pre-drilled hole through L.E. spar underneath cover fabric. HEAT CUT hole for bolt insertion through both surfaces.



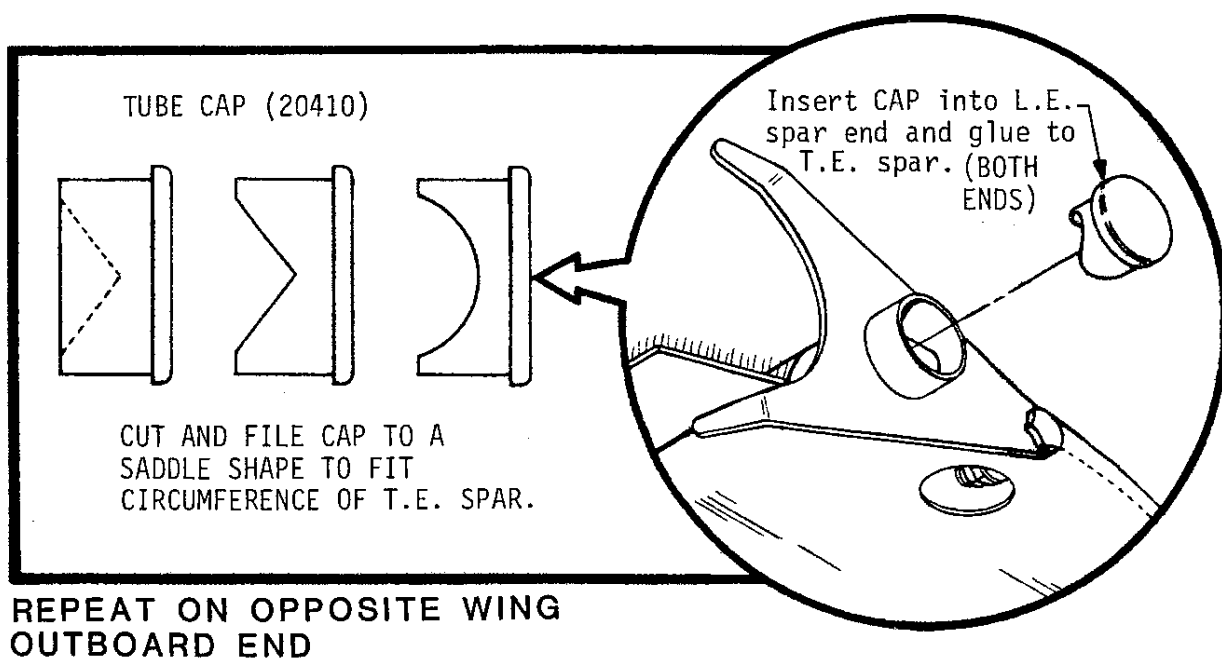
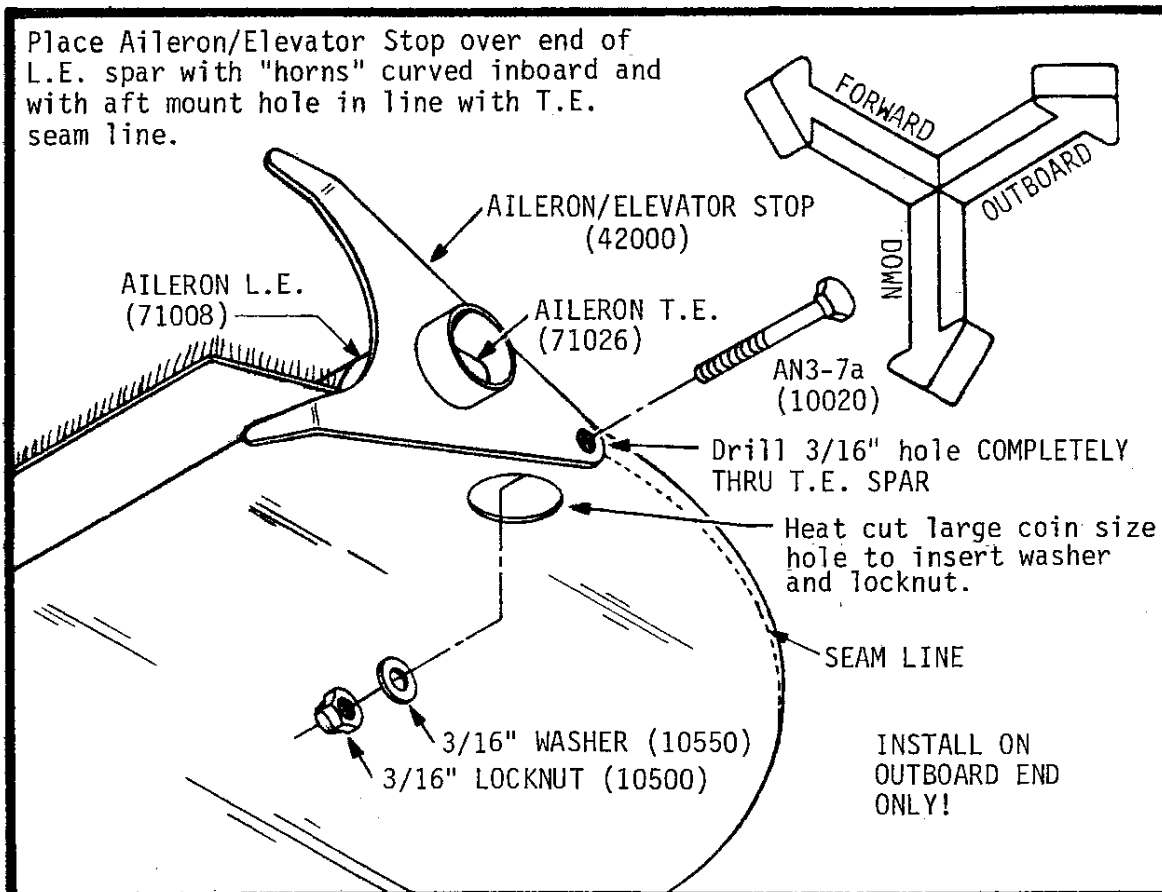
NOTE: ATTACH HORN TO SAME SURFACE AS ZIPPER.

REPEAT ON OPPOSITE SIDE

drill  $\frac{3}{16}$ " hole through horn and Aileron T.E. Center

## AILERON ASSEMBLY (CONT'D.)

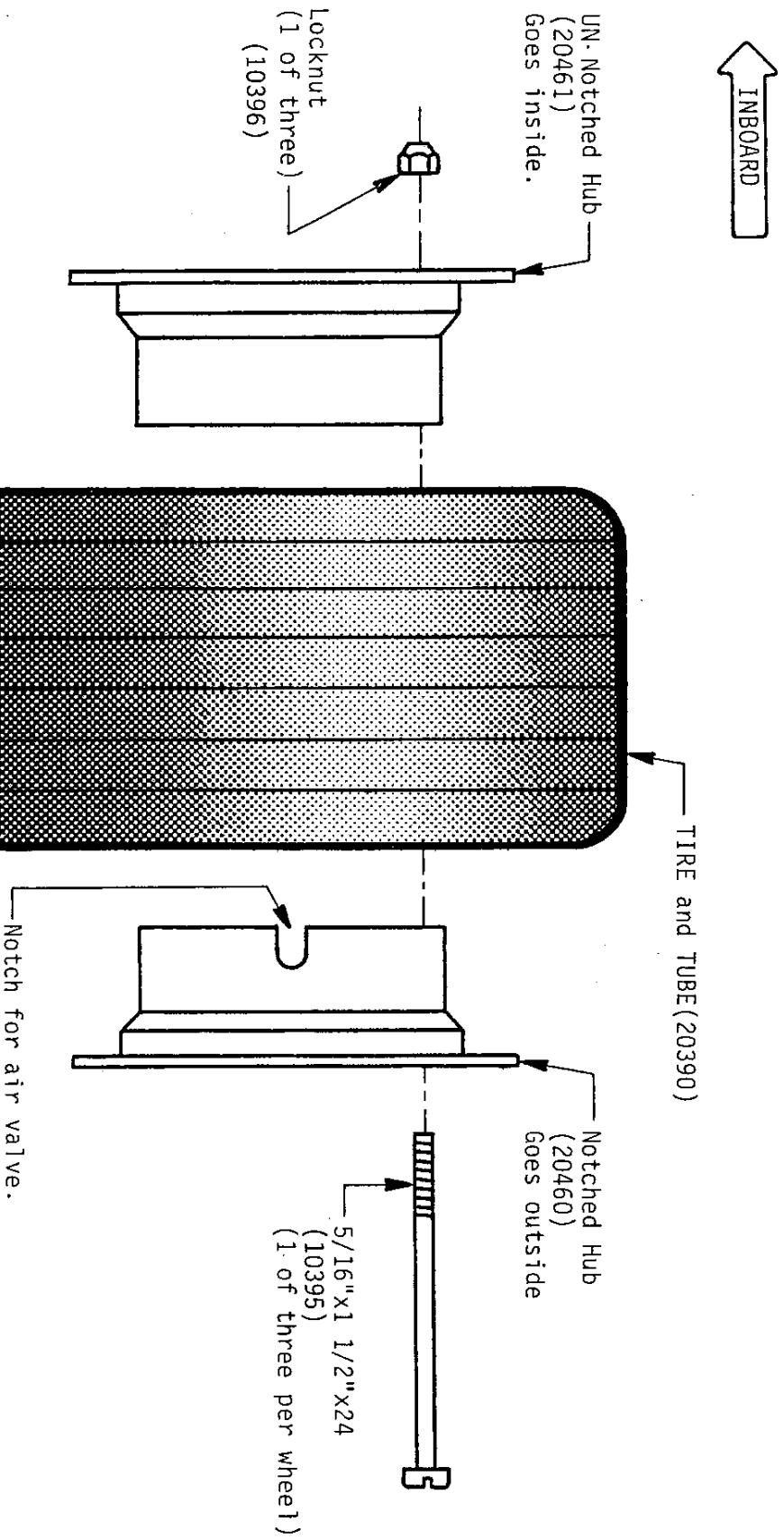
### AILERON STOP/TUBE CAP INSTALLATION:



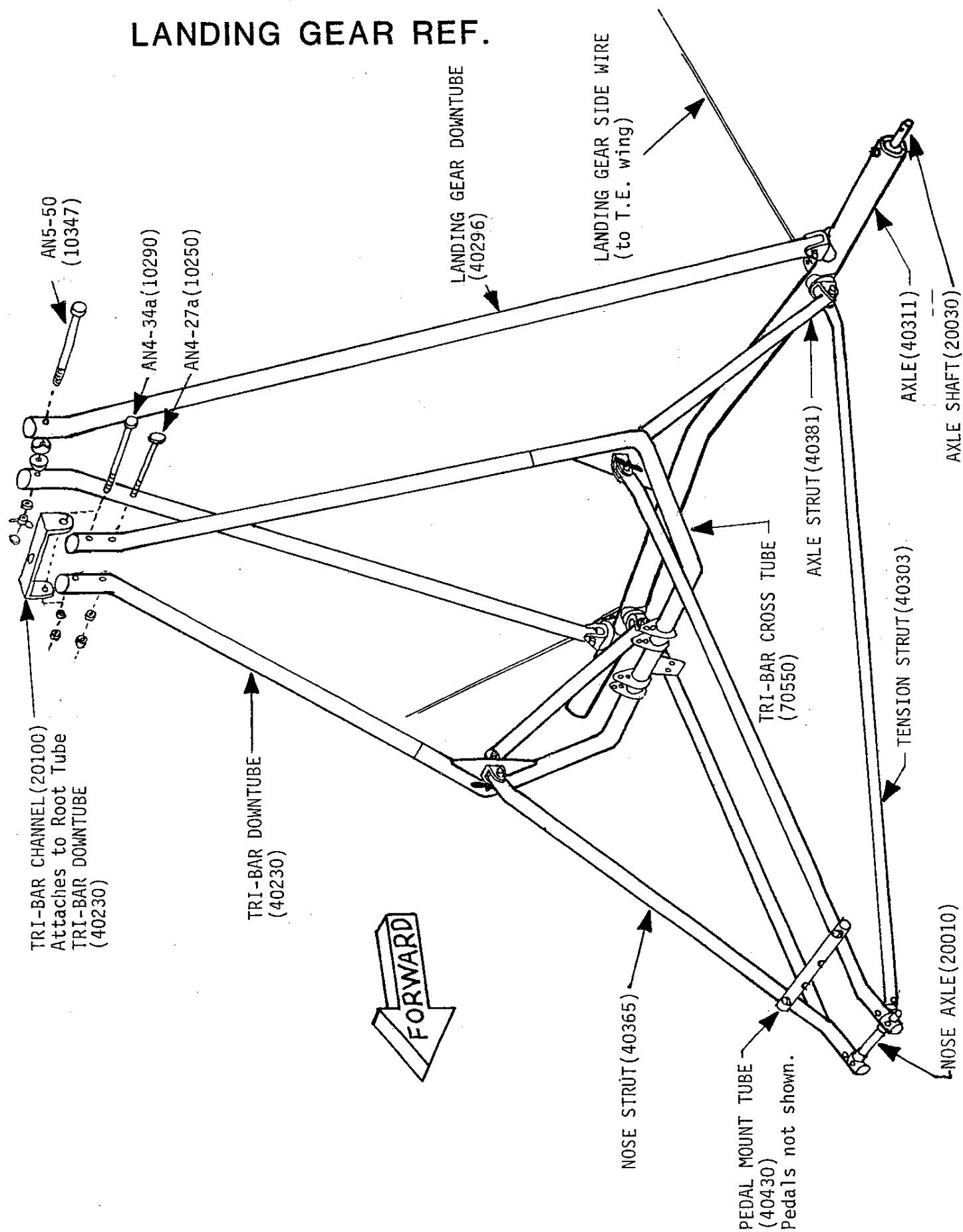


## WHEEL / TIRE ASSY.

Take the two wheel halves and insert into tire then assemble as shown. Remember that the notched half for the air valve stem goes outboard when putting the tires onto the axle.

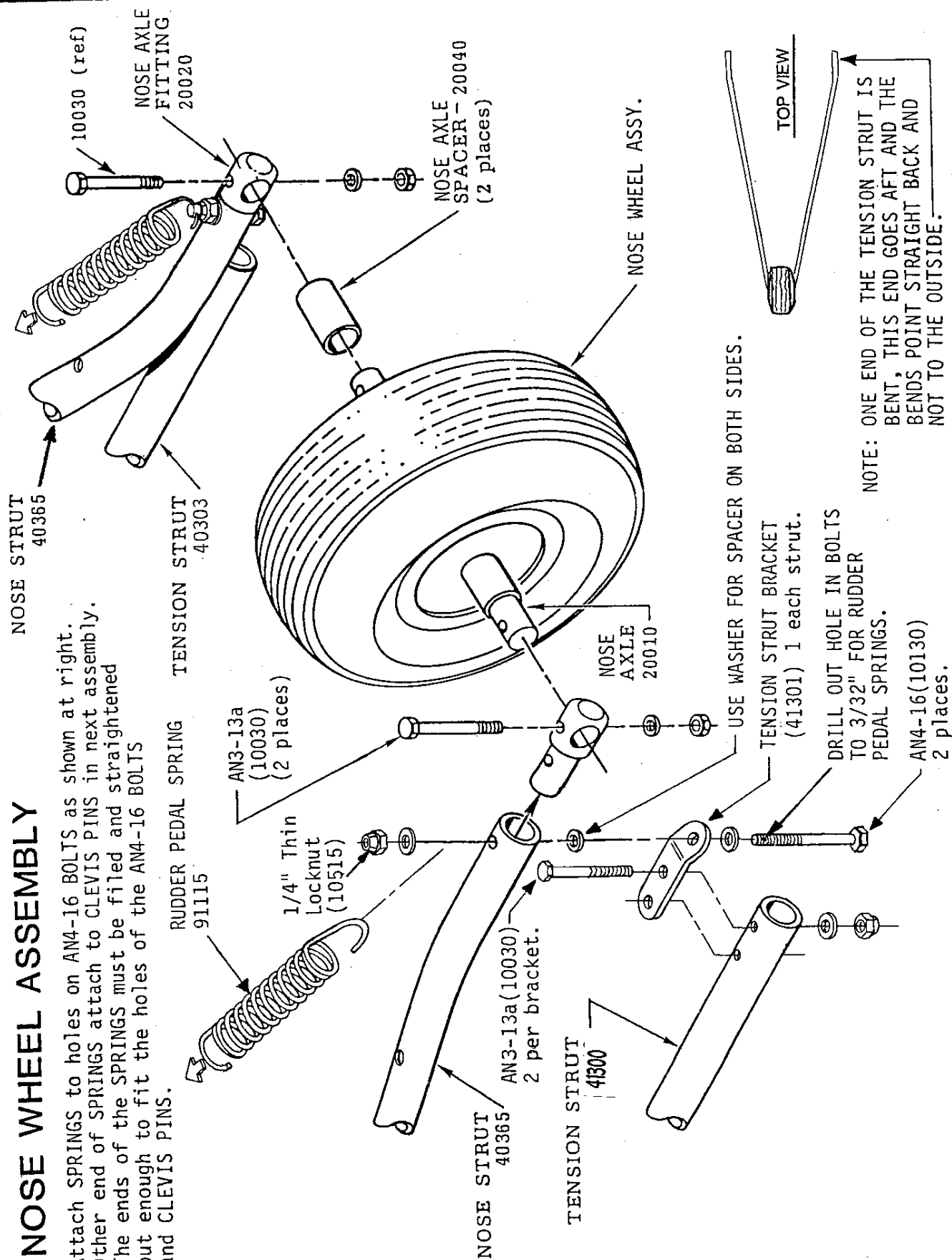


## LANDING GEAR REF.



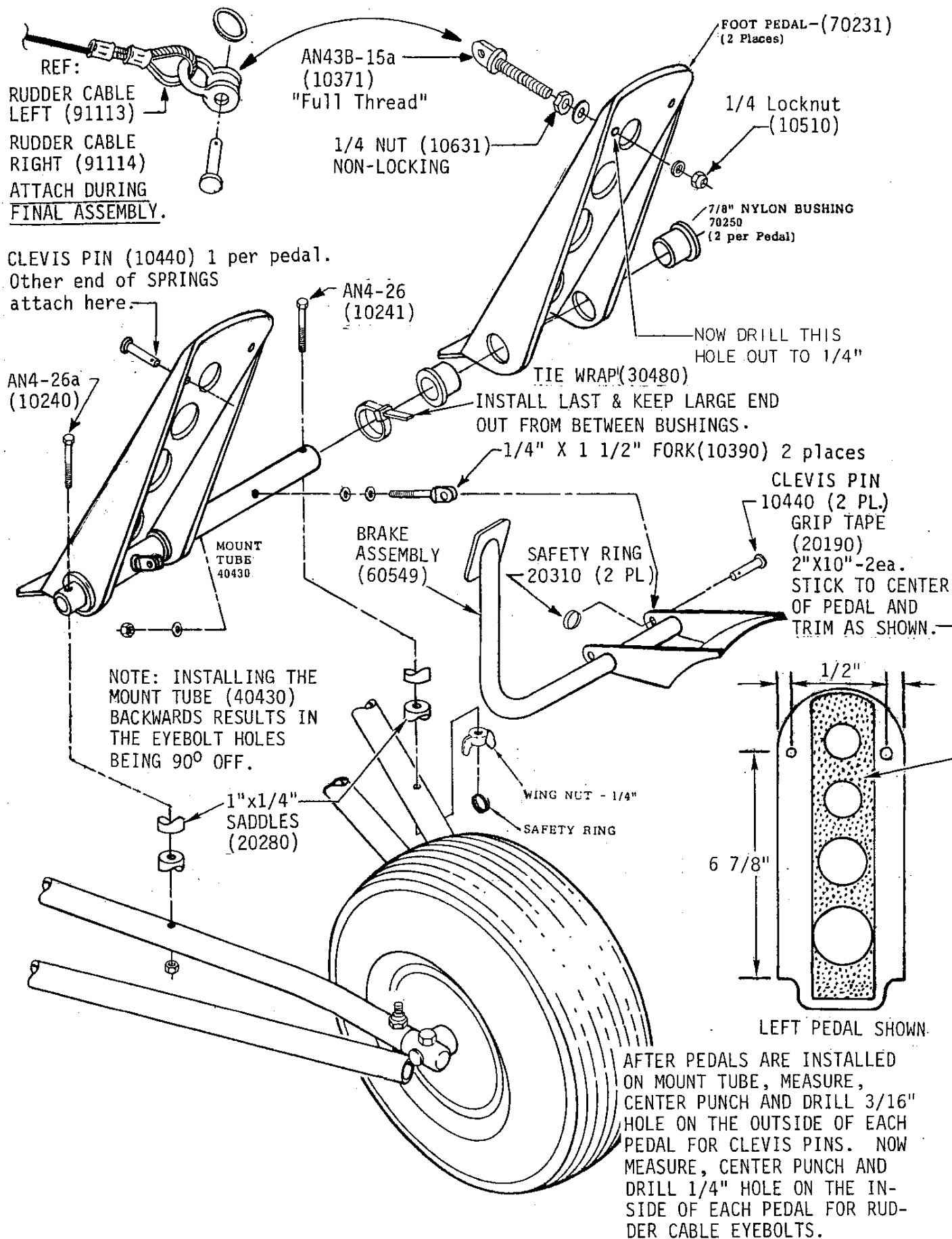
# NOSE WHEEL ASSEMBLY

Attach SPRINGS to holes on AN4-16 BOLTS as shown at right.  
Other end of SPRINGS attach to CLEVIS PINS in next assembly.  
The ends of the SPRINGS must be filed and straightened out enough to fit the holes of the AN4-16 BOLTS and CLEVIS PINS.



# FOOT PEDALS & NOSE BRAKE

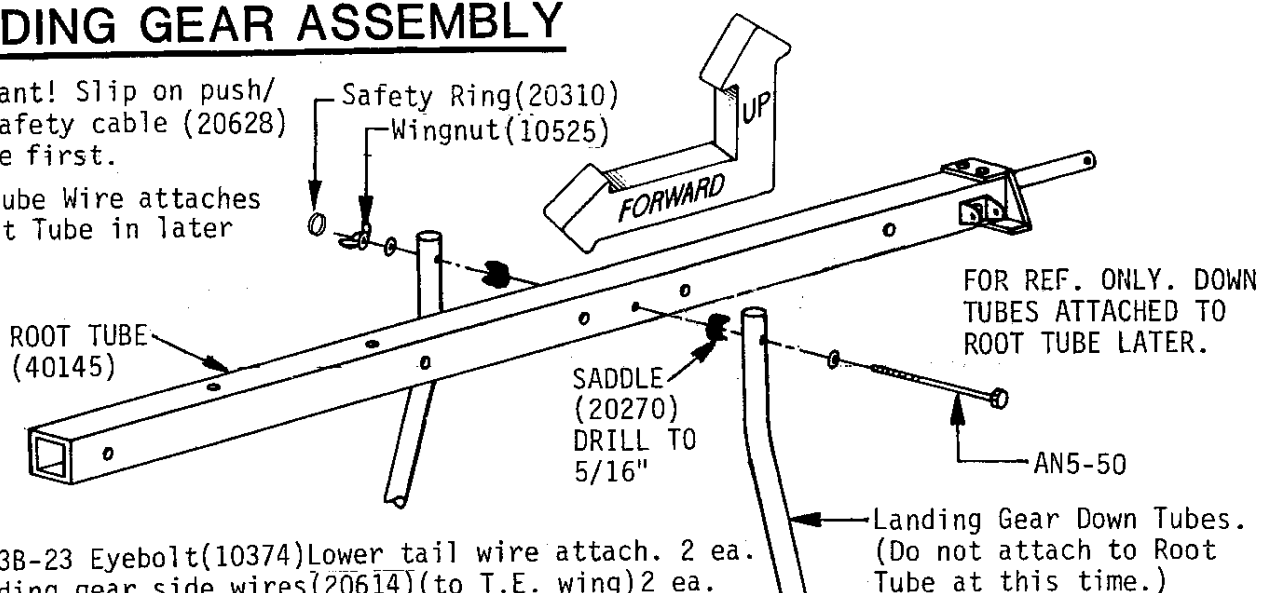
19



# LANDING GEAR ASSEMBLY

Important! Slip on push/pull safety cable (20628) to axle first.

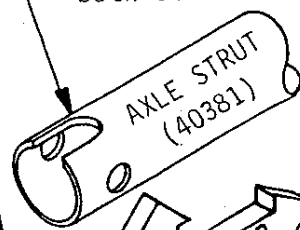
Root Tube Wire attaches to Root Tube in later step.



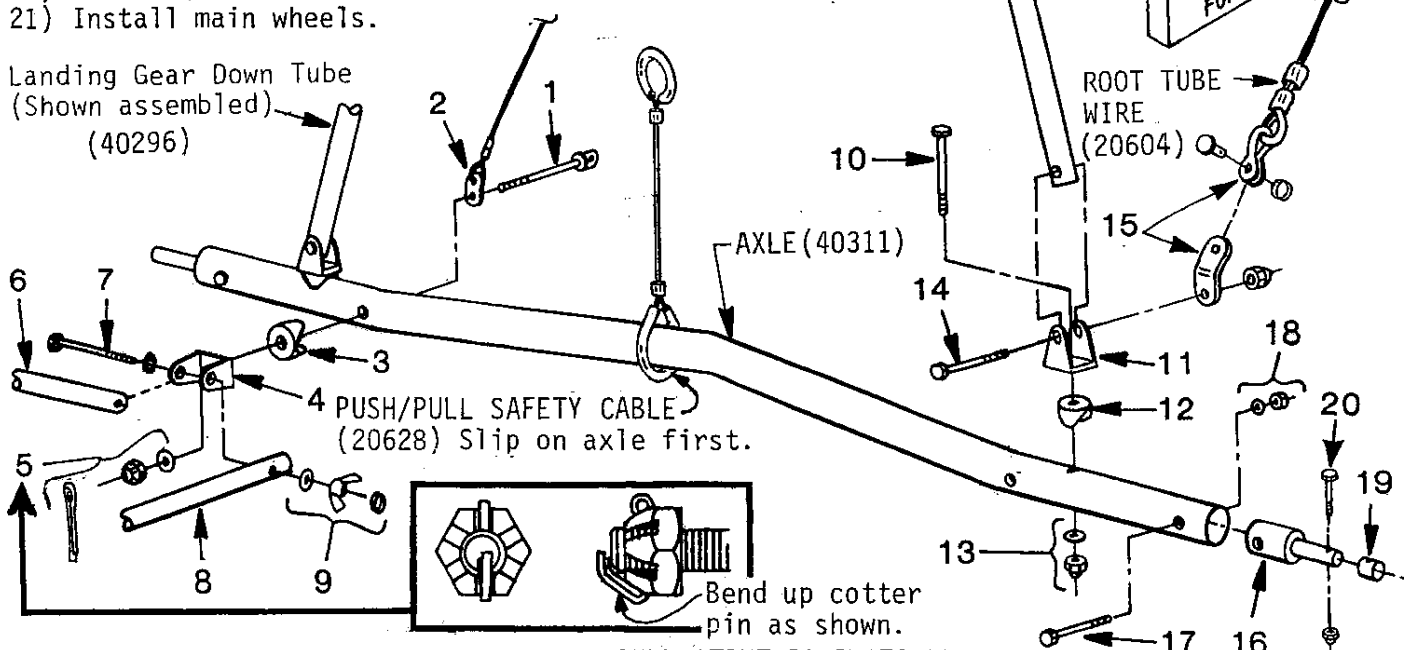
- 1) AN43B-23 Eyebolt(10374) Lower tail wire attach. 2 ea.
- 2) Landing gear side wires(20614)(to T.E. wing) 2 ea.
- 3) 1 3/4" Saddle(20290) 2 ea.
- 4) I-75 Channel(20080) 2 ea.
- 5) 1/4" Washer(10560) Castle Nut(10521) Cotter Pin(10635) 2 ea.
- 6) Axle Strut(40381) IMPORTANT! See illustration on right.
- 7) AN4-26(10241) 2 ea.
- \* 8) Tension Strut(40303) 2 ea.
- 9) 1/4" Washer/ 1/4" Wingnut(10520)/Safety Ring(20310) 2 ea.
- 10) AN4-22a(10190) 2 ea.
- 11) S-1-125 Channel(20060) 2 ea.
- 12) 1 3/4" Saddle(20290) 2 ea.
- 13) 1/4" Washer/ 1/4" Locknut 2 ea.
- 14) AN4-17a(10150) 1/4" Locknut(10510) 2 ea.
- 15) 20° Tang(20350)/ Shackle Assy. for ROOT TUBE WIRE 2 ea.
- 16) Axle Shaft(20030) 2 ea.
- 17) AN3-17a(10050) 2 ea.
- 18) 3/16" Washer(10550)/ 3/16" Locknut(10500) 2 ea.
- 19) Axle Collar(20031) 2 ea.
- 20) AN3-11a(10025) / 3/16" LOCKNUT(10500) 2 ea.
- 21) Install main wheels.

File groove into UPPER half of AXLE STRUT (40381) so it can clear 1/4" lock-nut (callout #5) when folding plane for transport.

File groove on both struts.



Landing Gear Down Tube (Shown assembled) (40296)



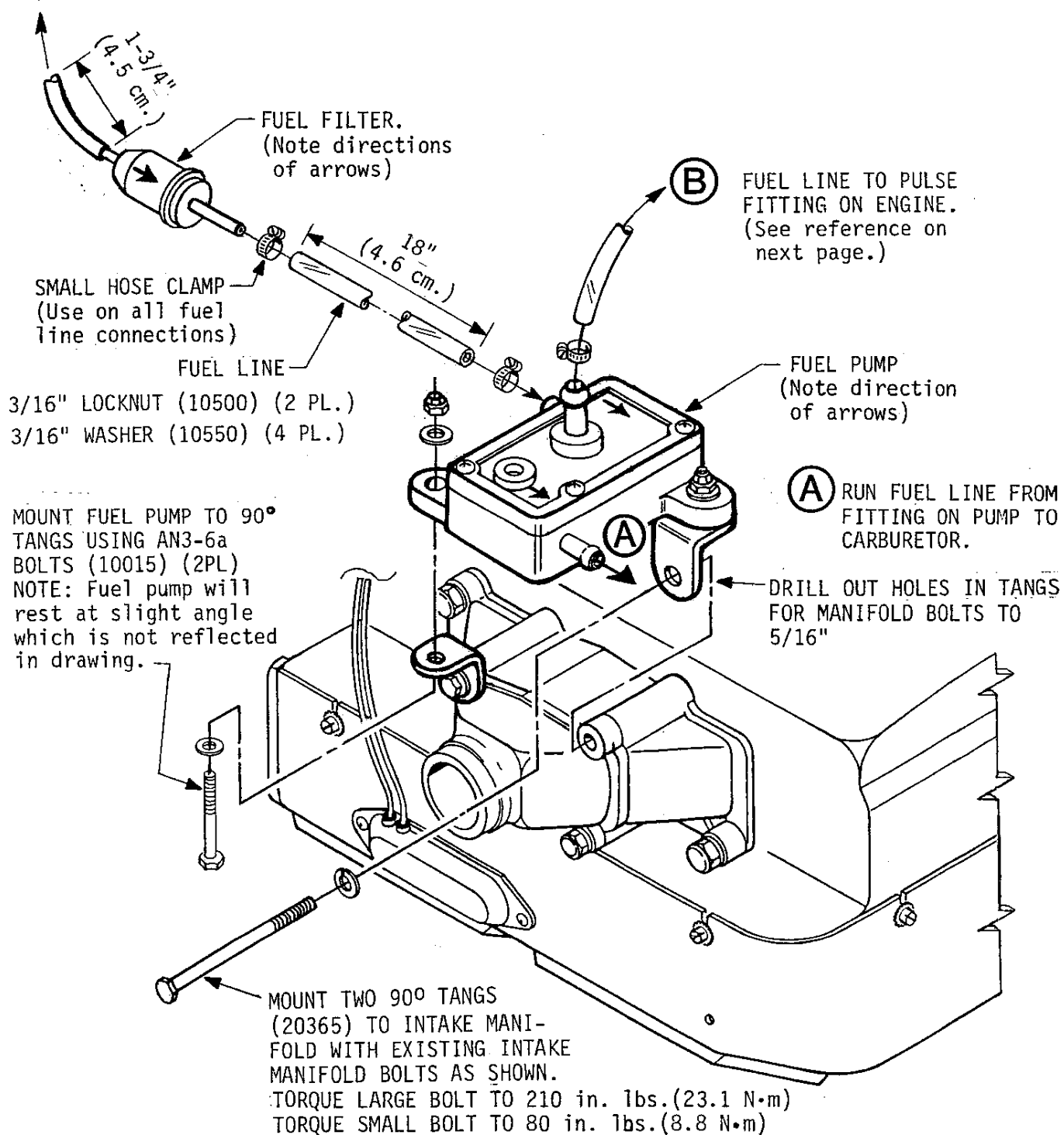
\* DO NOT INSTALL AT THIS TIME.

IMPORTANT! WHEN AXLE STRUT IS INSTALLED, MAKE SURE IT PIVOTS FREELY AND DOES NOT INTERFERE OR BIND ON CASTLE NUT OR COTTER

## FUEL PUMP MOUNTING

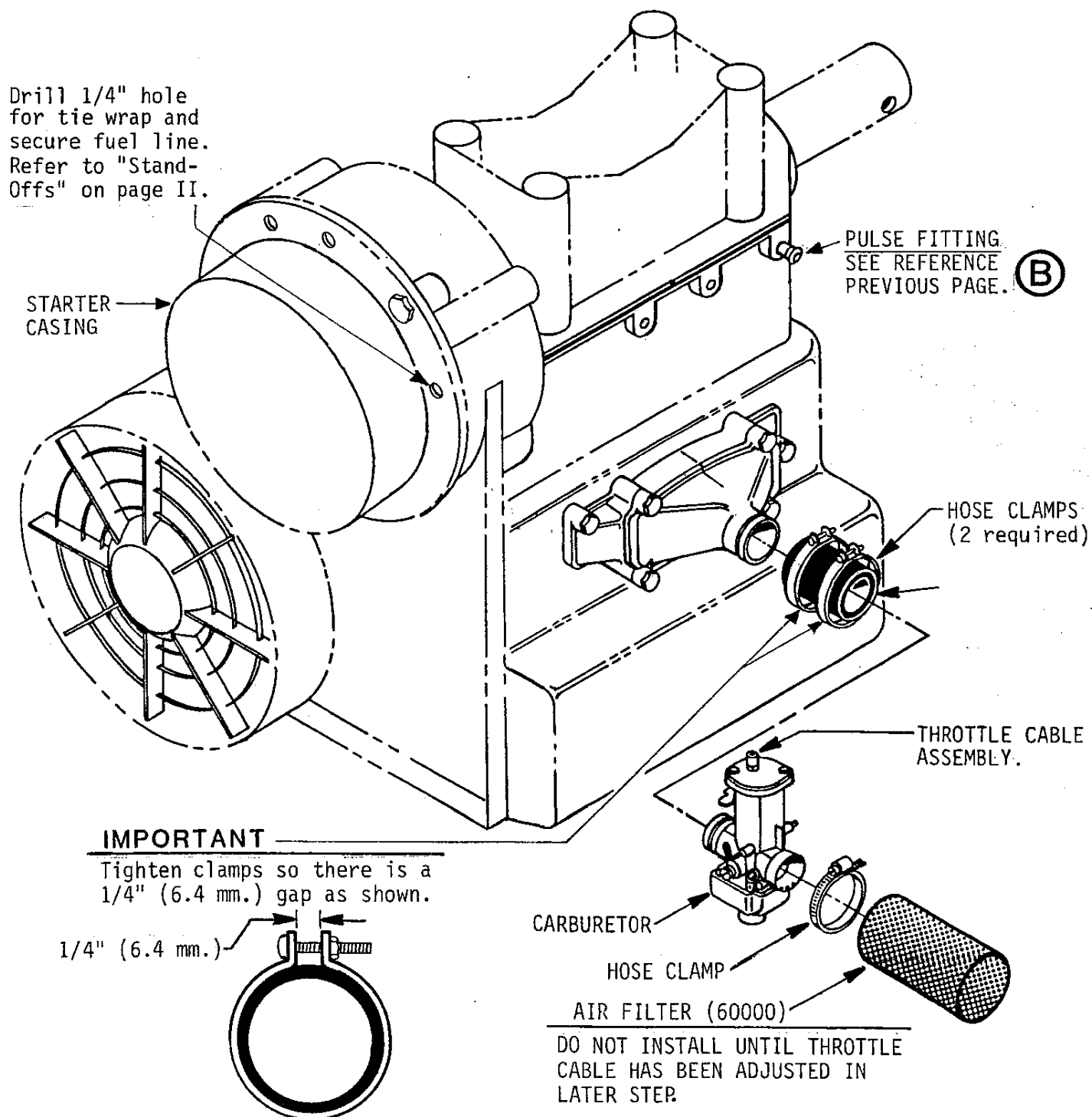
- 1 Install FUEL PUMP to INTAKE MANIFOLD as described below.
- 2 Hook up FUEL LINES to FUEL and ENGINE as shown.

FUEL LINE TO TANK INSTALLED IN LATER STEP.



## FUEL SYSTEM ASSY.

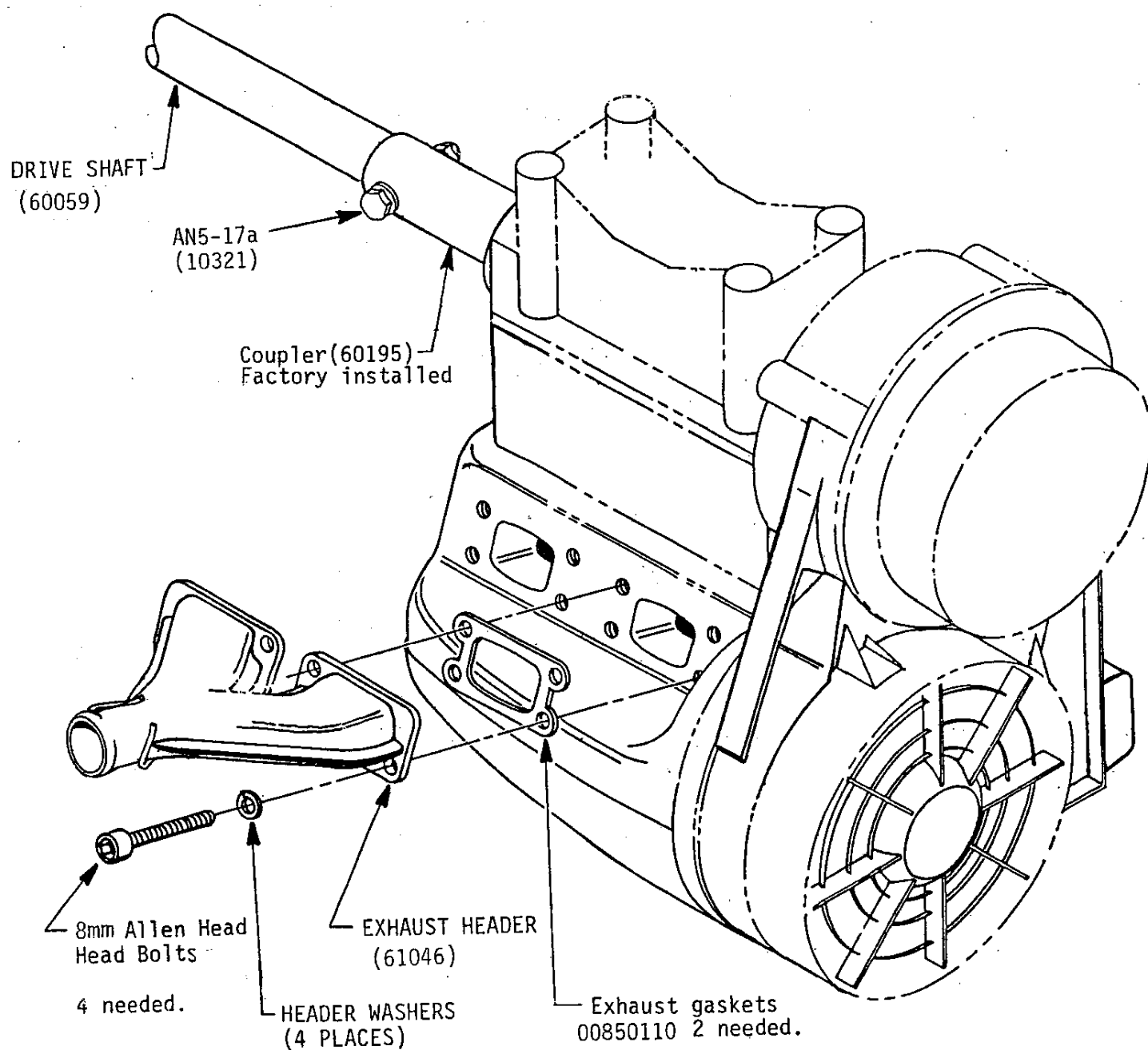
Mount CARBURETOR as shown below. Drill out STARTER CASING HOLES as shown for routing of electric and fuel lines.



## EXHAUST HEADER ASSY.

INSTALL EXHAUST HEADER AS SHOWN:

NOTE: AFTER ENGINE HAS BEEN  
BROKEN IN, RETIGHTEN EXHAUST  
HEADER BOLTS. ALSO, WHEN INSTALLING  
DRIVESHAFT, HOLE SPACED 3/4" FROM  
END GOES INTO ENGINE COUPLER.

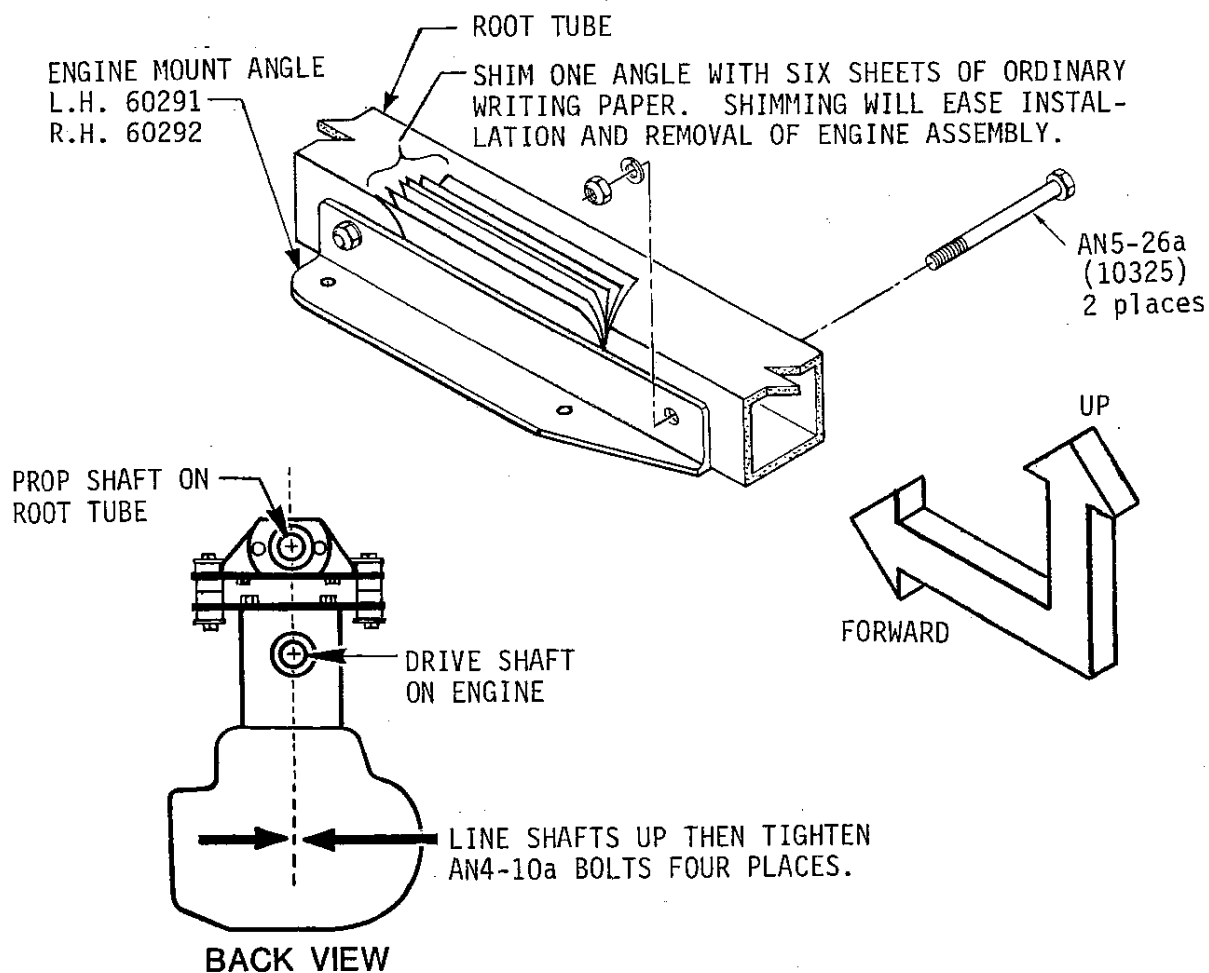




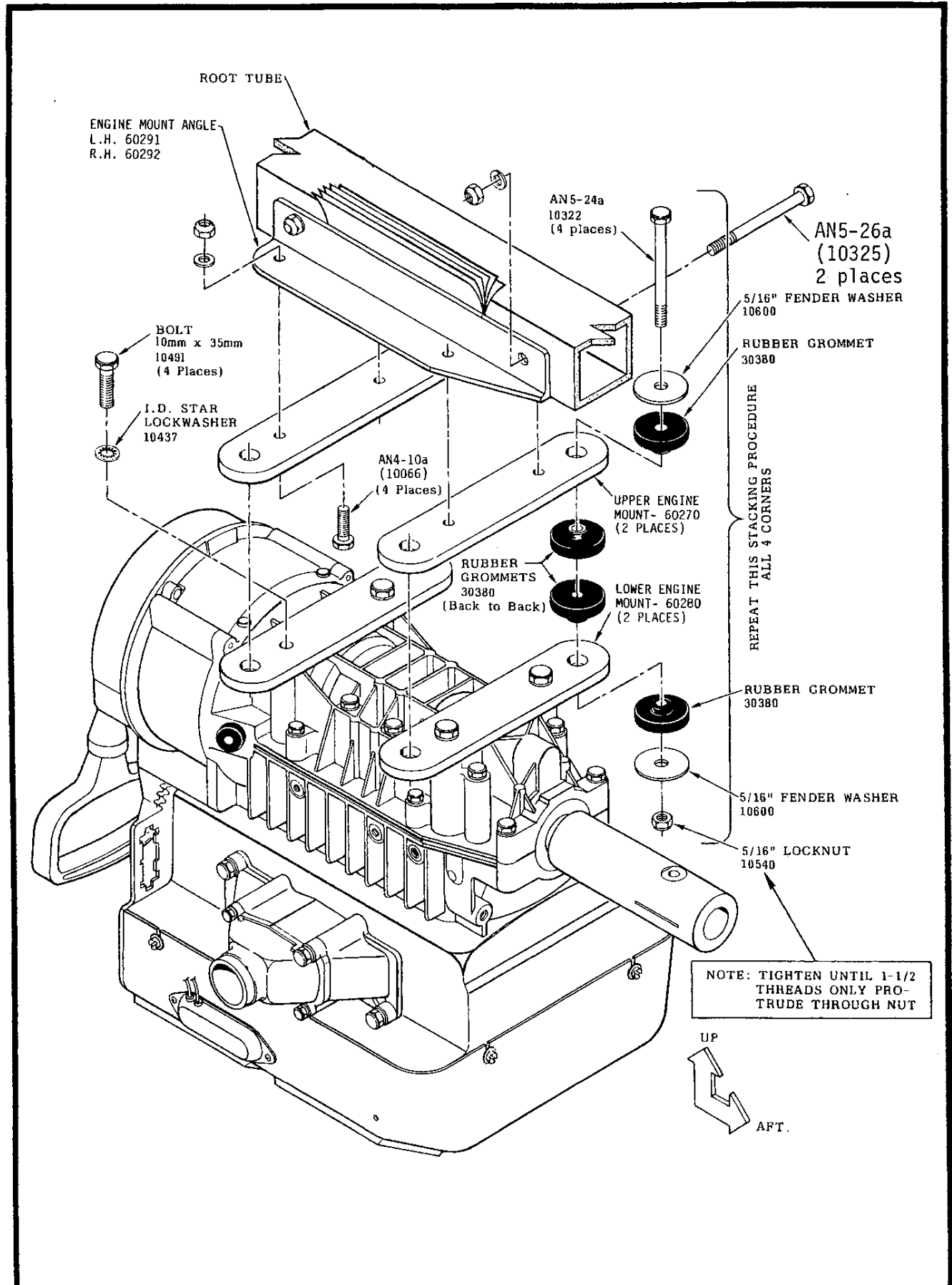
## ENGINE MOUNT PROCEDURE

Remove any studs that may still be in the engine.  
Follow assembly sequence below for engine mounting drawing on next page.

- (1) Install lower engine mounts(60280) to engine. Torque to 18-23 ft./lbs. (25-32 N·m).
- (2) Install upper engine mounts(60270) to engine mount angles(60291-60292) but DO NOT tighten the four AN4-10a bolts yet.
- (3) Assemble the upper engine mounts(60270) to the lower engine mounts (60280) with the rubber grommets, etc. Final tighten after step 5.
- (4) Place root tube in between engine mount angles and shim one of the angles with six sheets of ordinary writing paper as shown. Install AN5-26a bolts (2 places) to attach root tube to angles. Final tighten after Step 5.
- (5) Line up drive shaft to prop shaft and now tighten the four AN4-10a bolts that hold engine mount angles to upper engine mounts.
- (6) Take root tube back off of engine mount angles and set completed engine assembly out of the way until re-installation in later step.

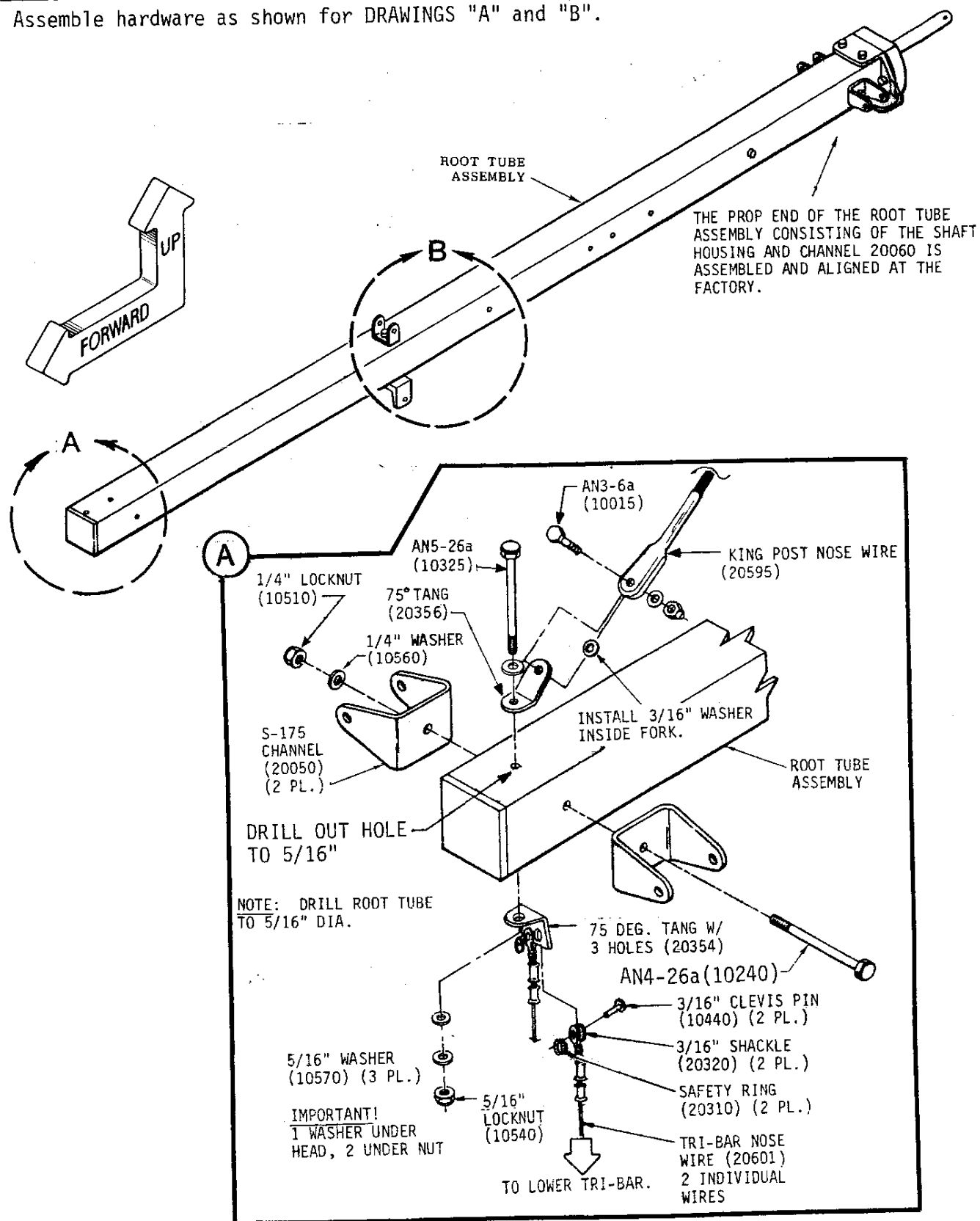


## ENGINE MOUNT ASSY.



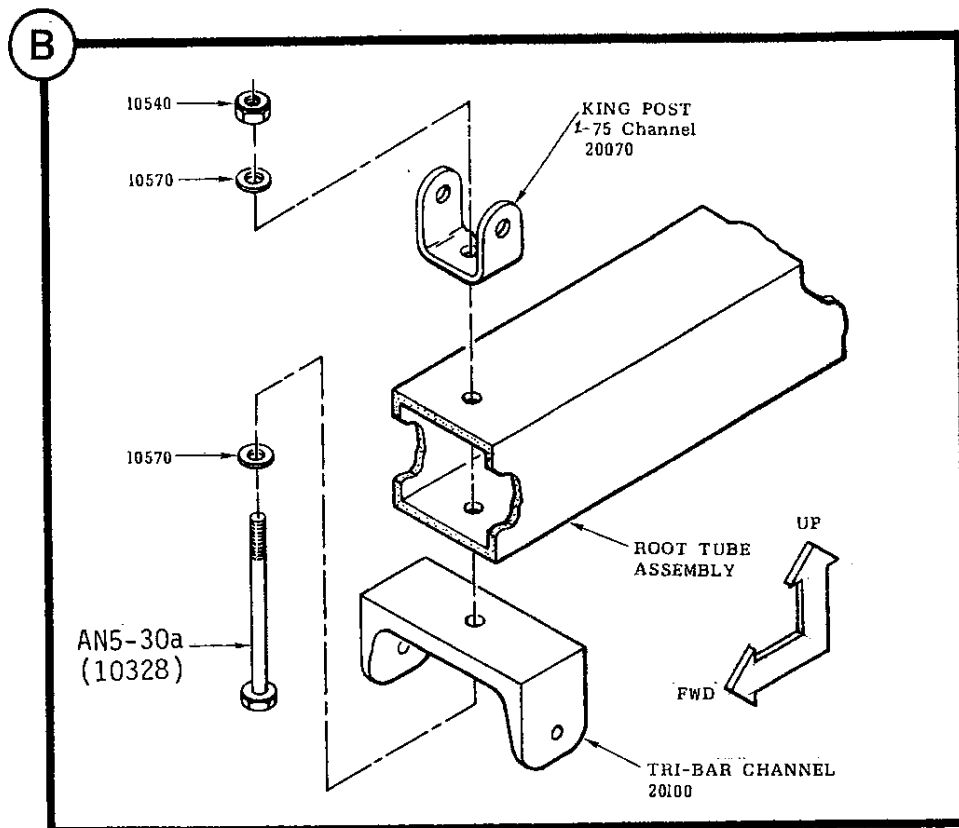
## ROOT TUBE ASSY.

Assemble hardware as shown for DRAWINGS "A" and "B".



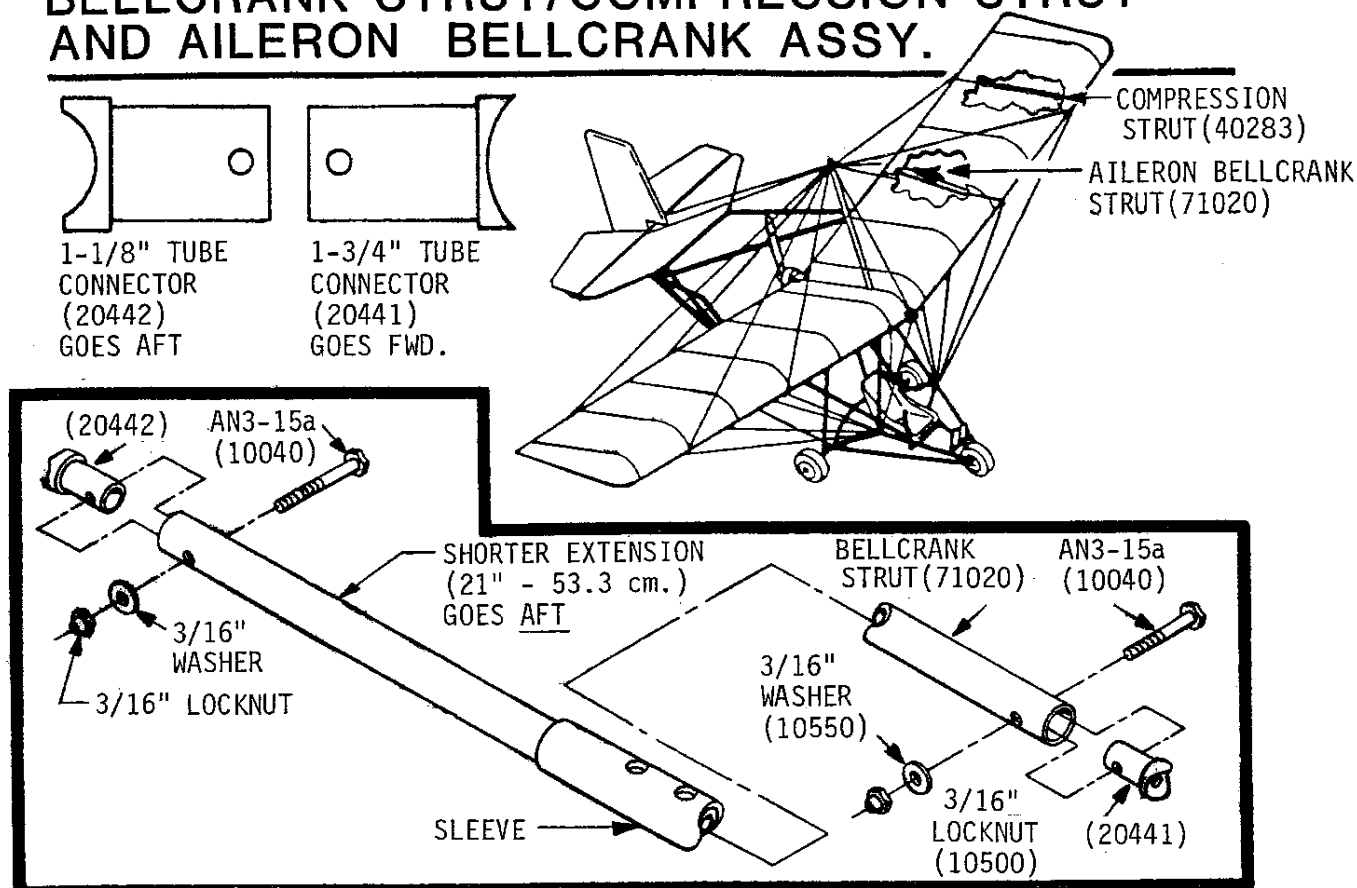
DETAILS CONTINUED ON NEXT PAGE.

## ROOT TUBE ASSY. CON'T.



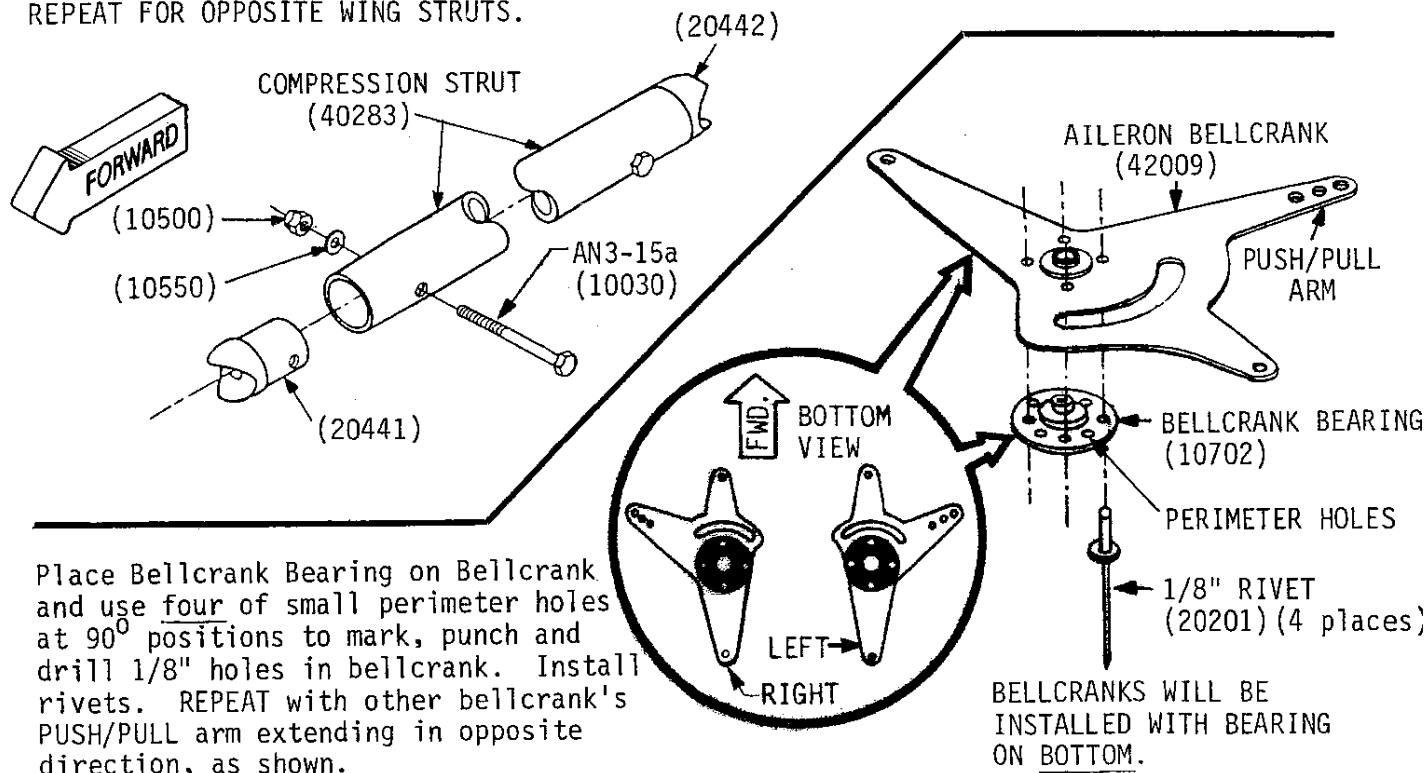
FINGER TIGHTEN ONLY AS ASSEMBLY MAY BE TEMPORARILY REMOVED  
FOR LATER CONSTRUCTION.

# BELLCRANK STRUT/COMPRESSION STRUT AND AILERON BELLCRANK ASSY.



Assemble Aileron Bellcrank Strut (ABOVE) and Comp. Strut (BELOW LEFT) as shown using 1-3/4" Alum. Tube Conn. on forward end and 1-1/8" Alum. Tube Conn. on aft end of struts. (NOTE: AFT END OF BELLCRANK STRUT IS THE SHORTER LENGTH FROM STRUT SLEEVE.)

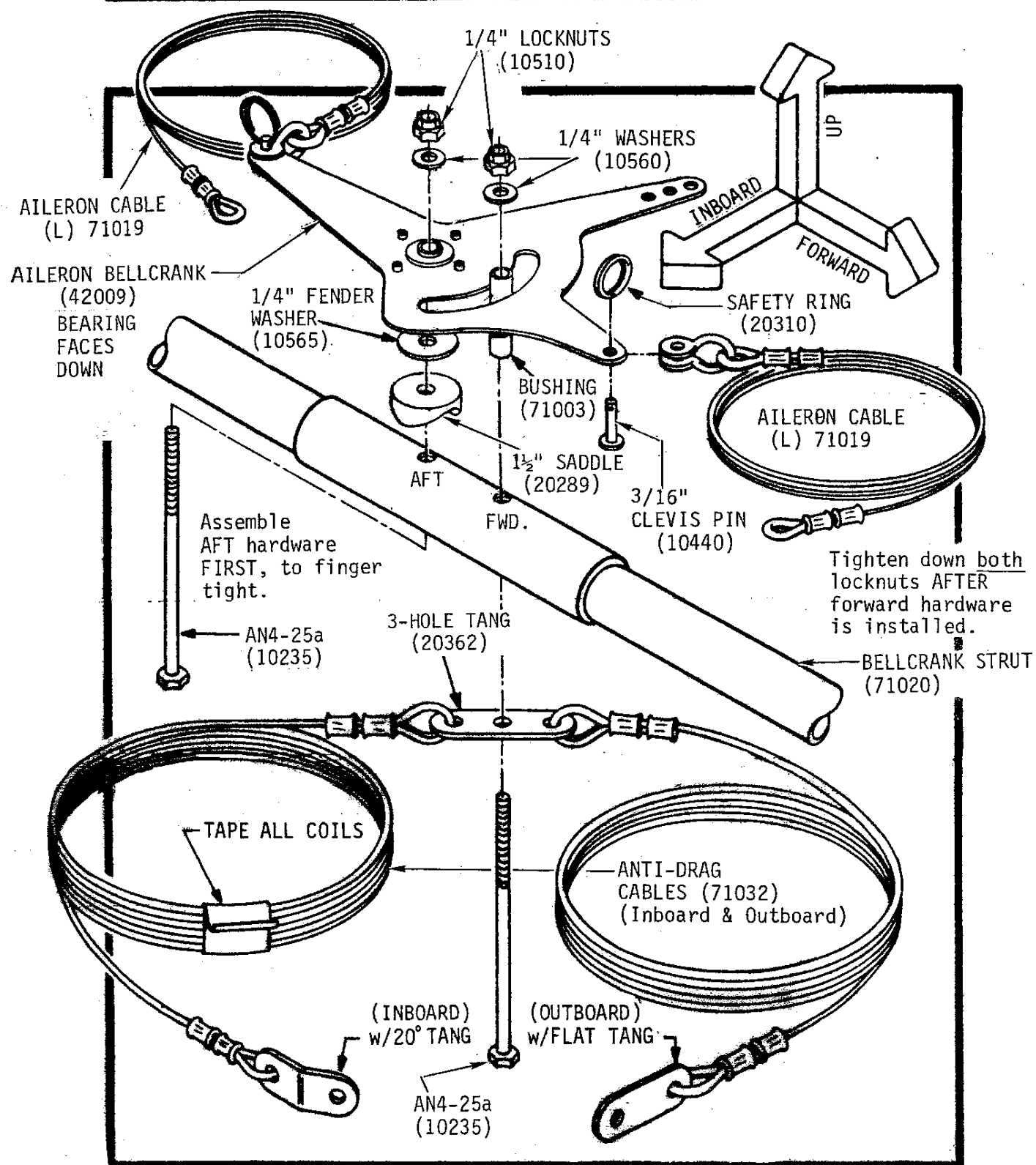
REPEAT FOR OPPOSITE WING STRUTS.



Place Bellcrank Bearing on Bellcrank and use four of small perimeter holes at 90° positions to mark, punch and drill 1/8" holes in bellcrank. Install rivets. REPEAT with other bellcrank's PUSH/PULL arm extending in opposite direction, as shown.

BELLCRANKS WILL BE INSTALLED WITH BEARING ON BOTTOM.

# AILERON BELLCRANK ATTACH TO BELLCRANK STRUT



LEFT SIDE ASSEMBLY SHOWN. REPEAT FOR RIGHT SIDE.

## WING ASSEMBLY

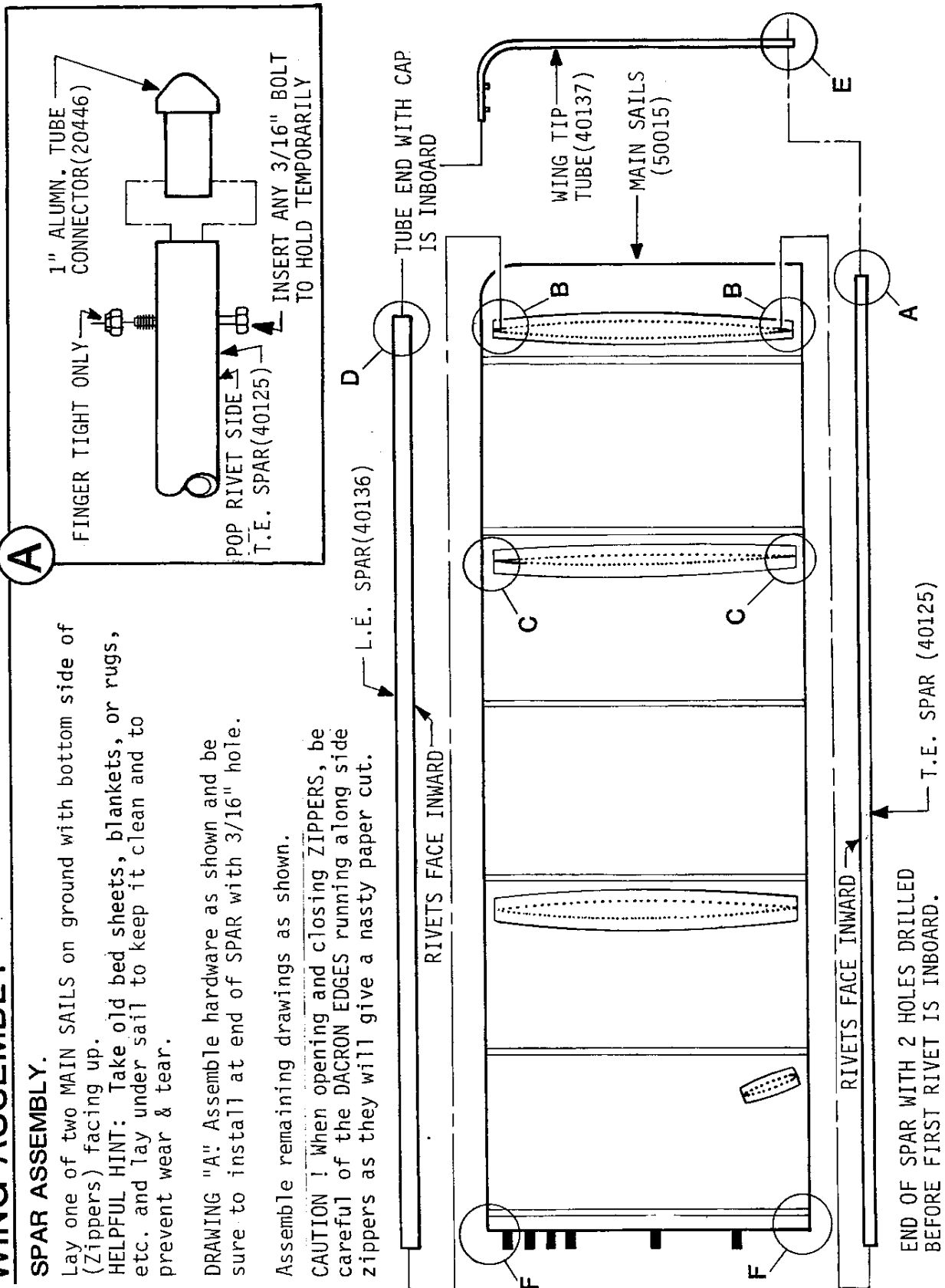
### SPAR ASSEMBLY.

Lay one of two MAIN SAILS on ground with bottom side of (Zippers) facing up.  
**HELPFUL HINT:** Take old bed sheets, blankets, or rugs, etc. and lay under sail to keep it clean and to prevent wear & tear.

**DRAWING "A":** Assemble hardware as shown and be sure to install at end of SPAR with 3/16" hole.

Assemble remaining drawings as shown.

**CAUTION !** When opening and closing ZIPPERS, be careful of the DACRON EDGES running along side zippers as they will give a nasty paper cut.

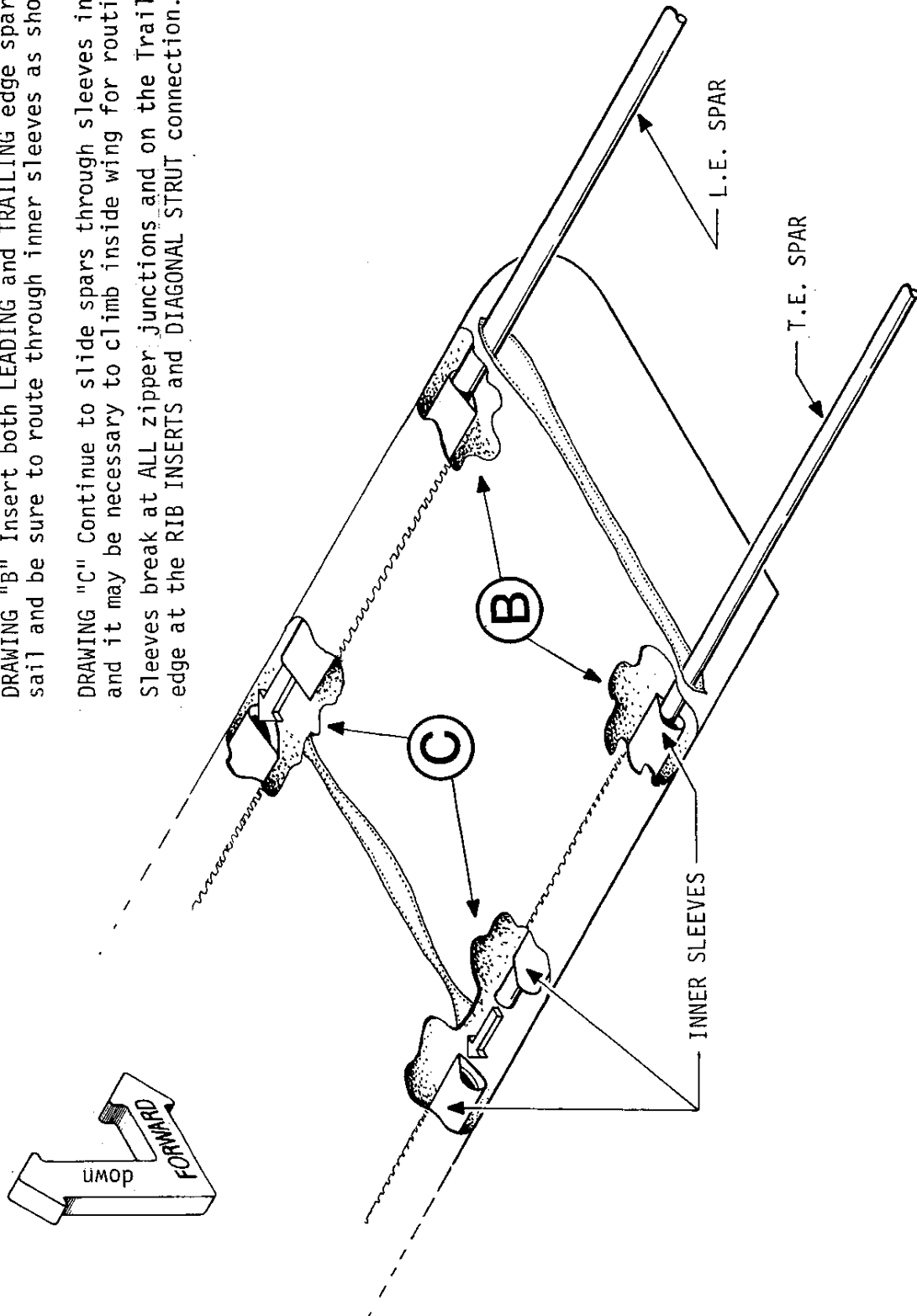


# WING ASSEMBLY (CONT'D.)

## SPAR ASSY. DRAWINGS "B" & "C"

DRAWING "B" Insert both LEADING and TRAILING edge spars into sail and be sure to route through inner sleeves as shown.

DRAWING "C" Continue to slide spars through sleeves in wing and it may be necessary to climb inside wing for routing. Sleeves break at ALL zipper junctions and on the Trailing edge at the RIB INSERTS and DIAGONAL STRUT connection.

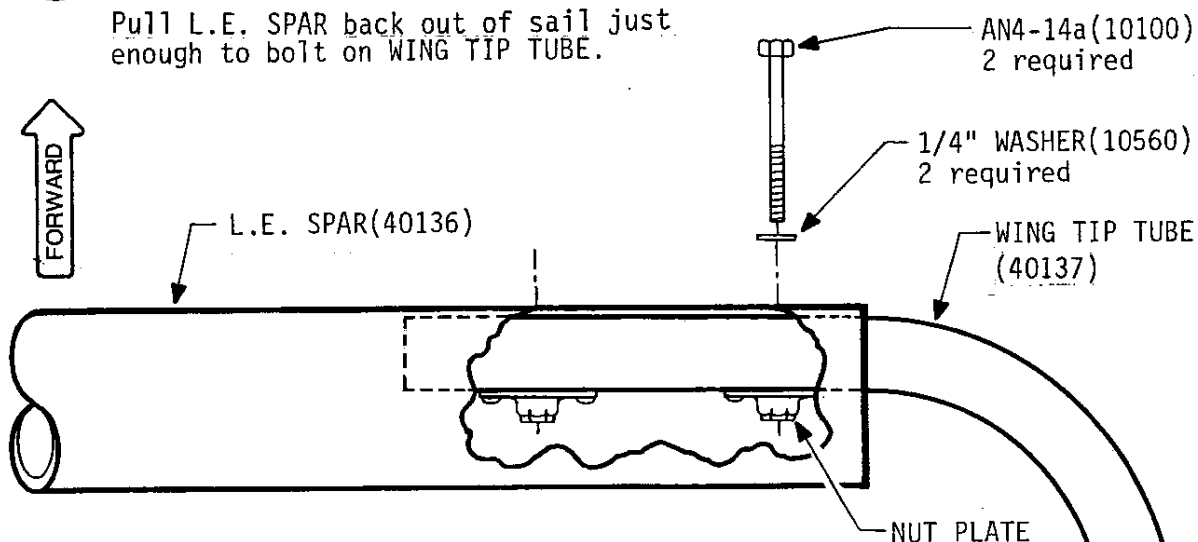




## WING ASSEMBLY (CONT'D.)

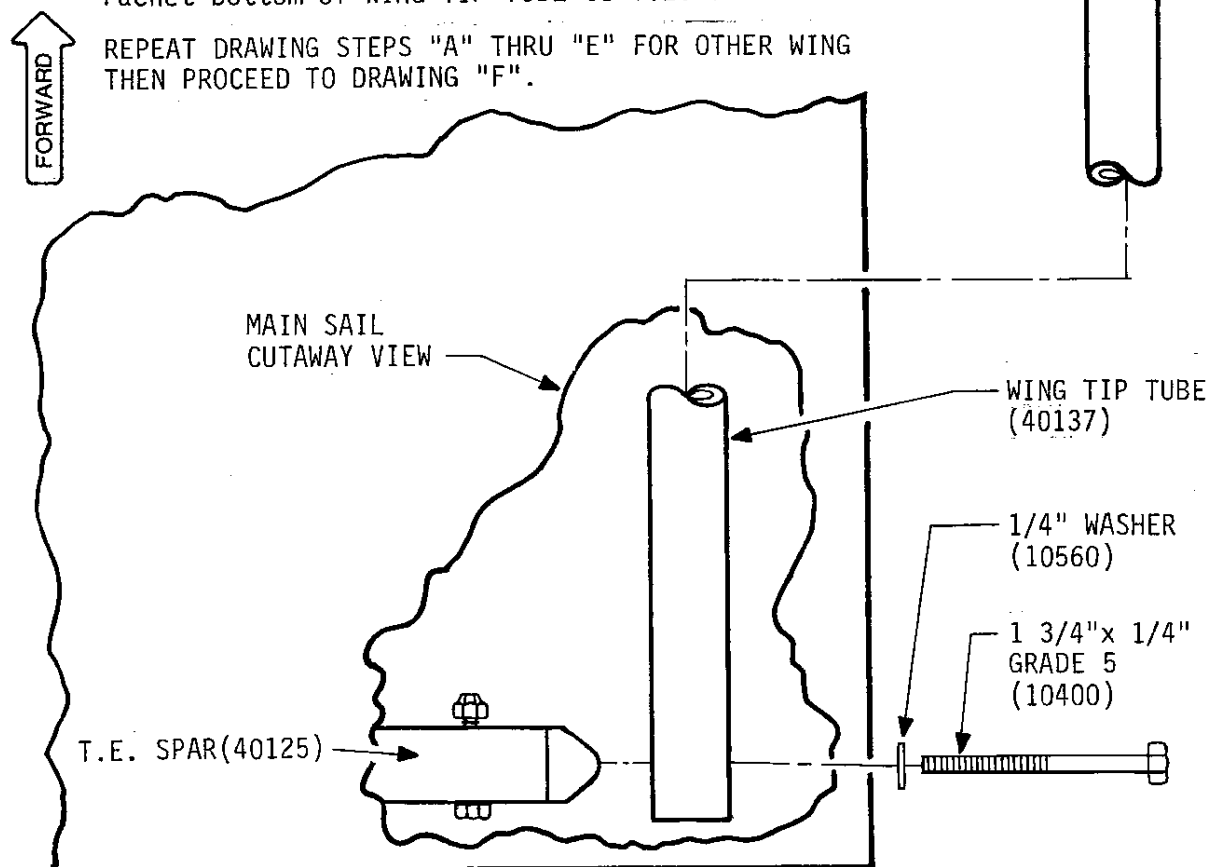
**D** WING TIP TUBE.

Pull L.E. SPAR back out of sail just enough to bolt on WING TIP TUBE.



**E** With WING TIP TUBE now attached to L.E., slide assembly back into sail and angle around to get all of TUBE inside sail. Reach inside sail through ZIPPER and ratchet bottom of WING TIP TUBE to T.E. SPAR as shown.

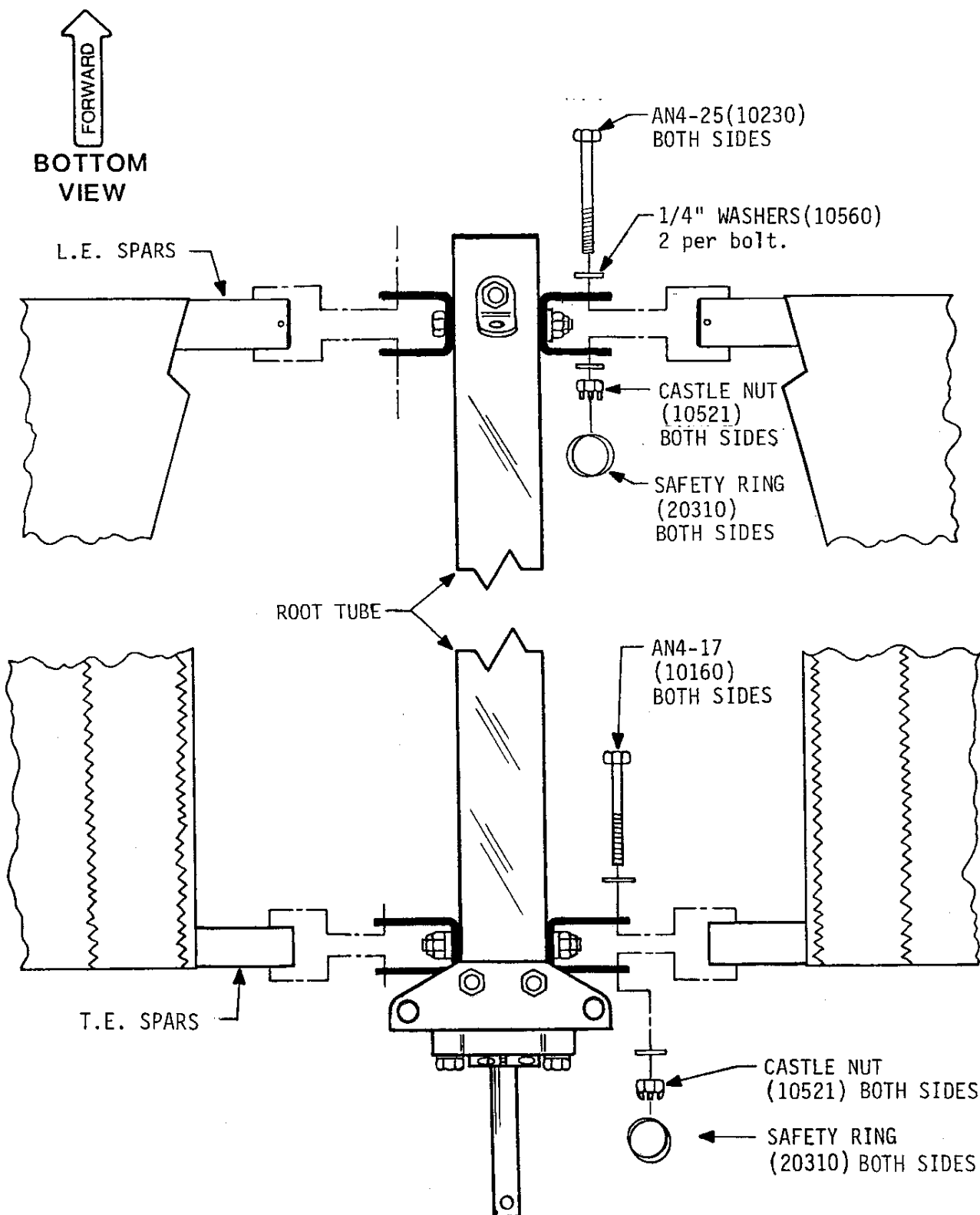
REPEAT DRAWING STEPS "A" THRU "E" FOR OTHER WING THEN PROCEED TO DRAWING "F".



## WING ASSEMBLY (CONT'D.)

**F****ROOT TUBE ATTACH**

Install SPARS to ROOT TUBE as shown.



## WING RIB & STRUT ASSY.

DRAWING "1" Set wings up on wooden horse as shown below.

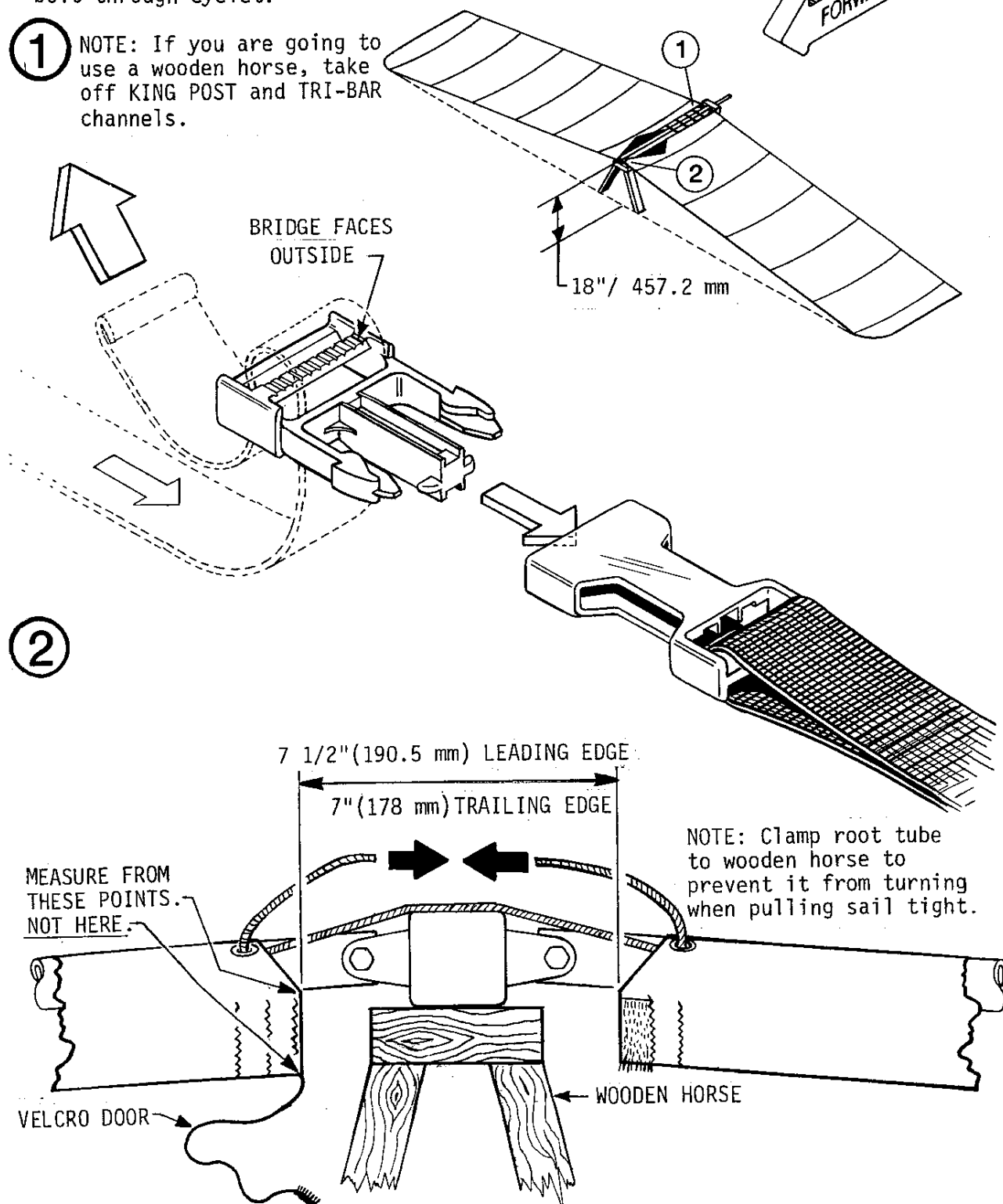
DRAWING "2" Pull sail tight with BUCKLES and ROPE to the measurements given below.

NOTE: Eyelets are for initial sail tightening only.

Trailing edge eyelets may line up with ANTI-DRAW WIRE holes.

If this is the case then go ahead and run anti-draw wire bolt through eyelet.

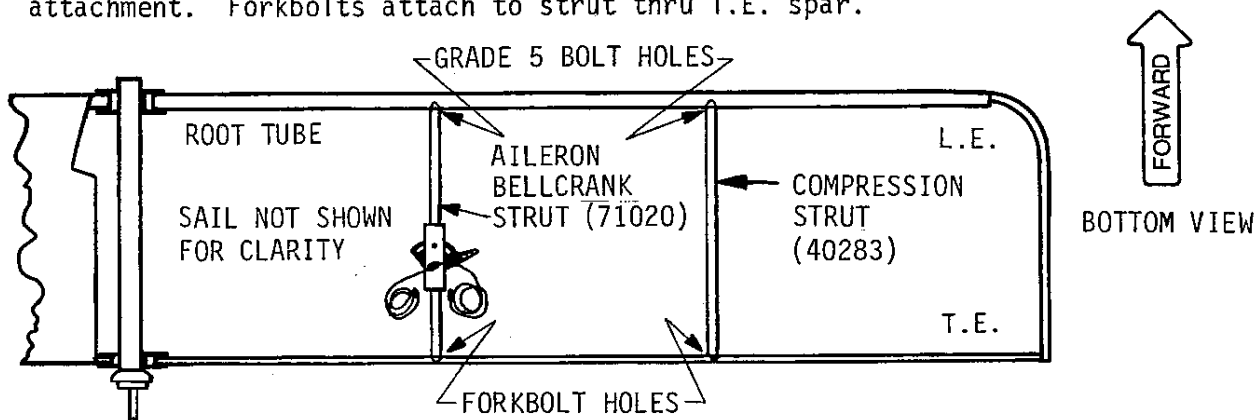
- ① NOTE: If you are going to use a wooden horse, take off KING POST and TRI-BAR channels.



## COMPRESSION & AILERON BELLCRANK STRUT INSTALL.

### COMPRESSION STRUTS

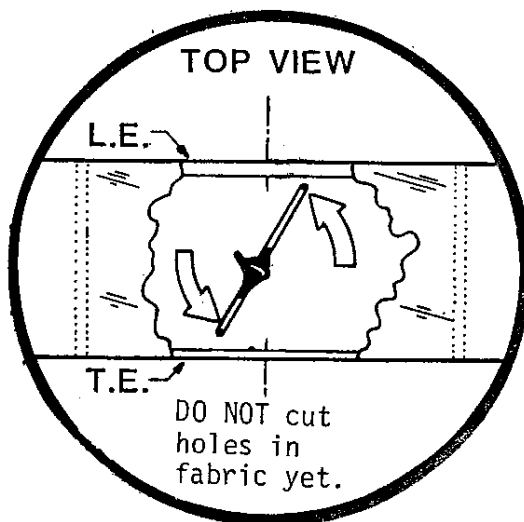
Look through zipper openings to locate holes in wing L.E. spar for Grade 5 bolts (for both aileron bellcrank and compression strut forward end attach - 1 ea. per wing), and to locate the corresponding wing T.E. holes for forkbolt-to-strut aft end attachment. Forkbolts attach to strut thru T.E. spar.



### STRUT INSERTION METHOD

1. Insert struts into position through zipper openings at an angle, with strut forward end extending OUTBOARD.

2. Maneuver strut into position between spars until lined up with L.E. and T.E. attach holes.

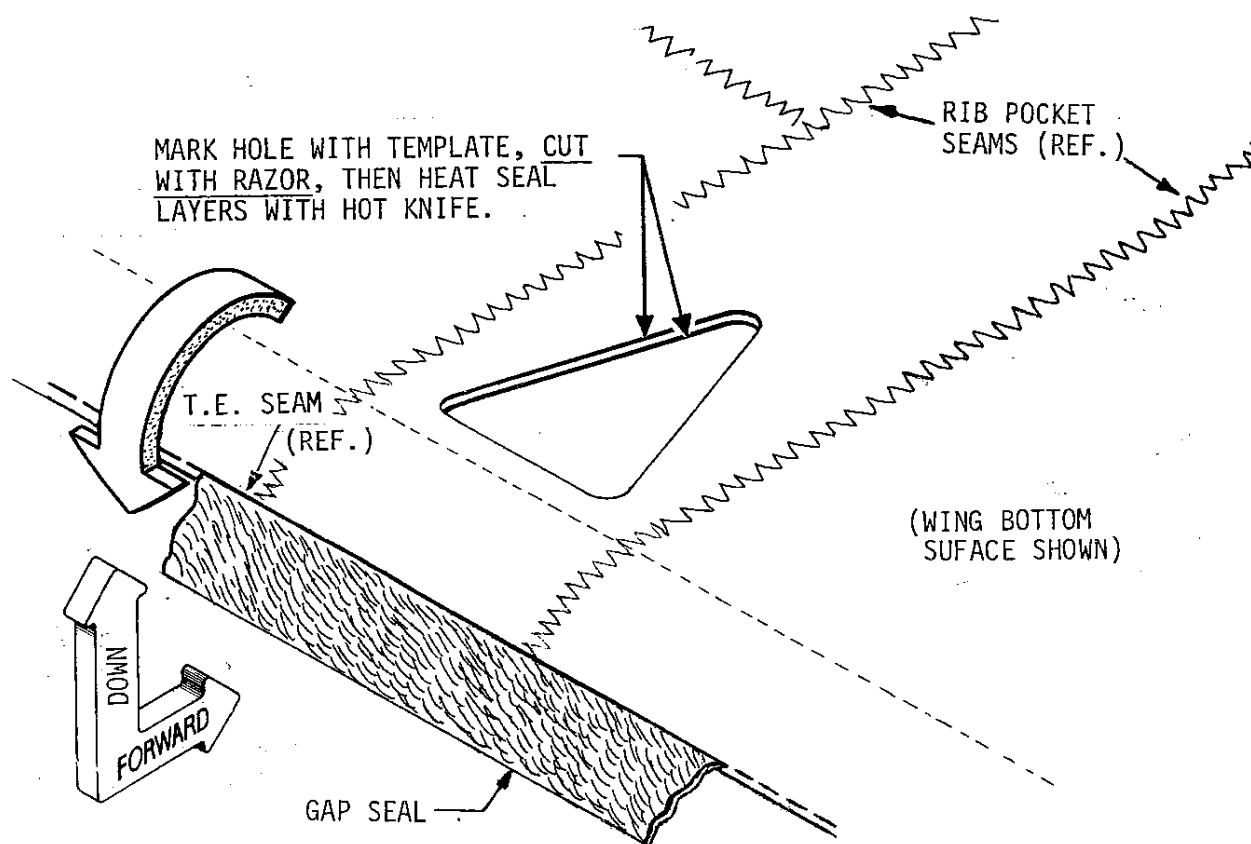


3. DO NOT HEAT CUT bolt insertion holes in fabric on outside of L.E. and T.E. spars for Grade 5's and forkbolts. Done at later step.

REPEAT ON OTHER WING

## RIB INSERT SLOT CUTTING

Refer to TEMPLATE (Page 80). Cut out Template "5" (RIB INSERT SLOT). You may wish to transfer template to poster board. Place template, as indicated, on wing bottom surface with template aft end on wing T.E. seam. Mark "cut out" section on fabric with pencil, cut and heat seal.



### IMPORTANT!

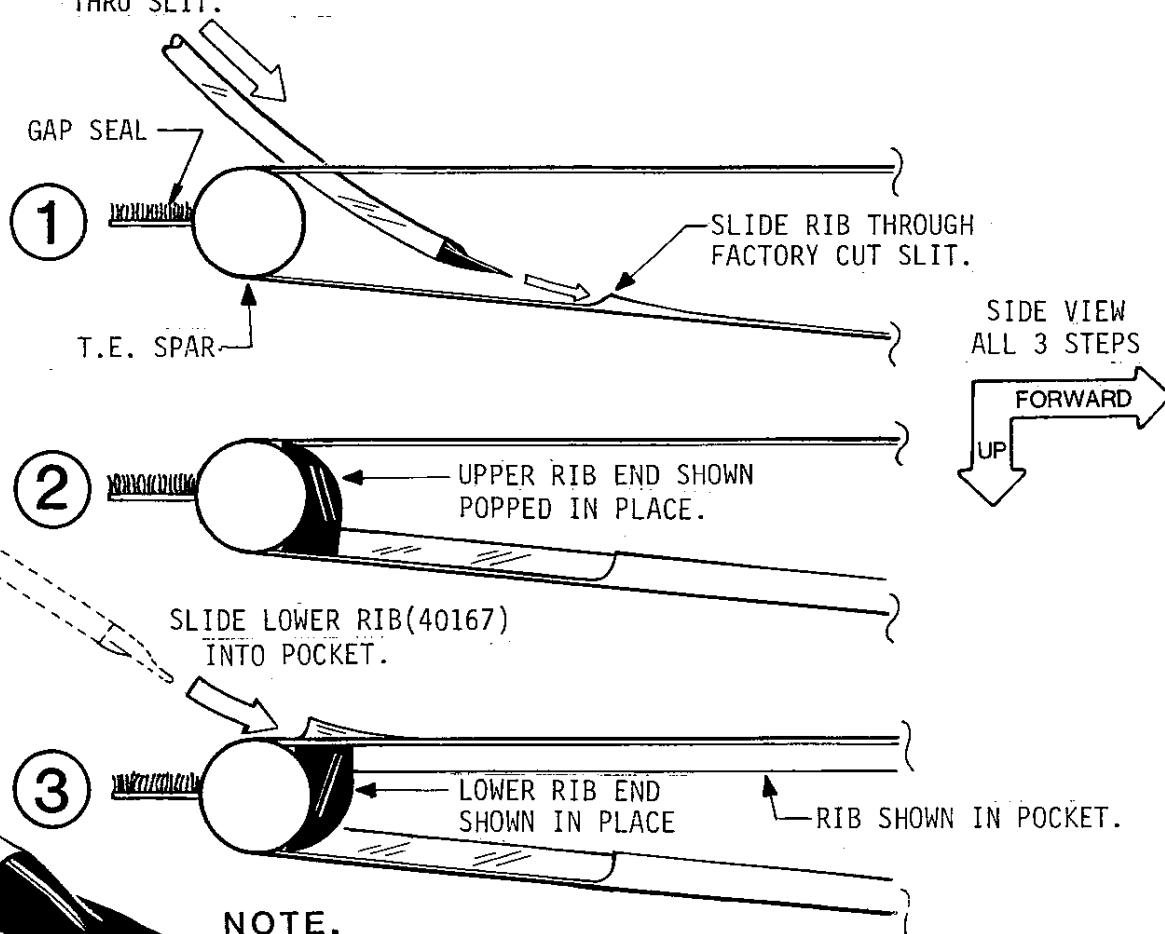
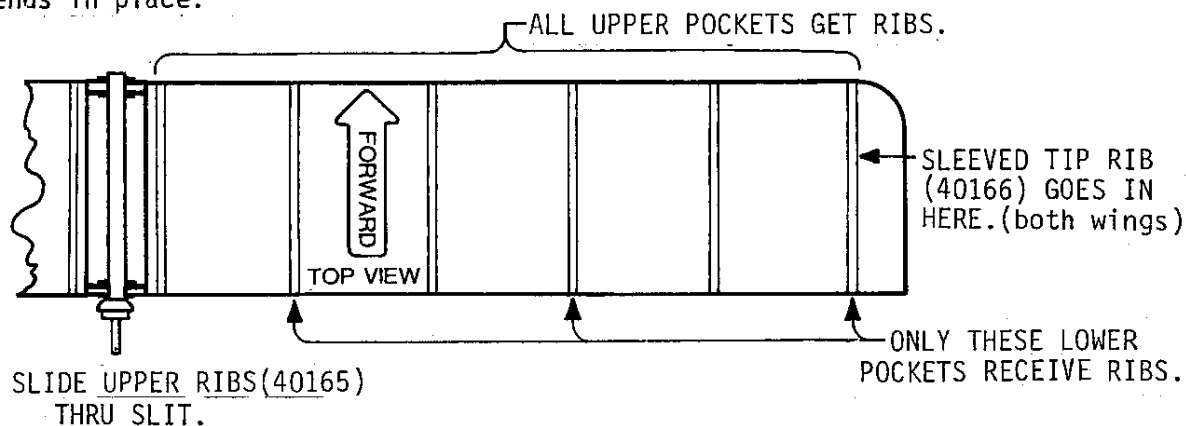
ALIGN TEMPLATE VERTICAL LINES WITH RIB POCKET SEAMS.

Repeat for a total of 6 slots in rib insertion positions on each wing aft end bottom surface.

## RIB INSERTING

The wing diagram below shows where to place ribs.

STEP "1": Insert ALL upper ribs by going thru SLIT, then slide ribs thru factory-cut slit as shown. NOTE: Upper wing tip pockets get sleeved tip ribs (40166). STEP "2": POP rib ends in place and push off to one side so lower ribs can be installed thru SLIT, also. STEP "3": Install lower ribs as shown and again, "POP" in place. Screwdriver may be used to PUSH rib ends in place.



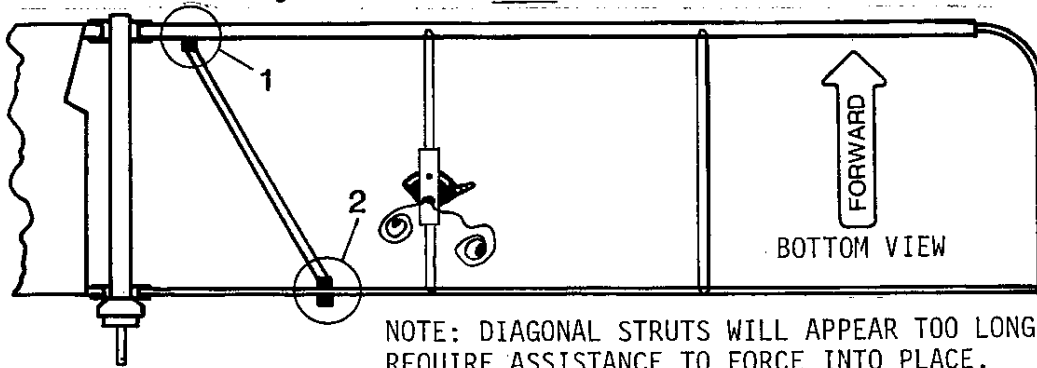
### NOTE.

Trim and file smooth the two TIP RIBS to keep tips from folding under as shown in drawing at left.

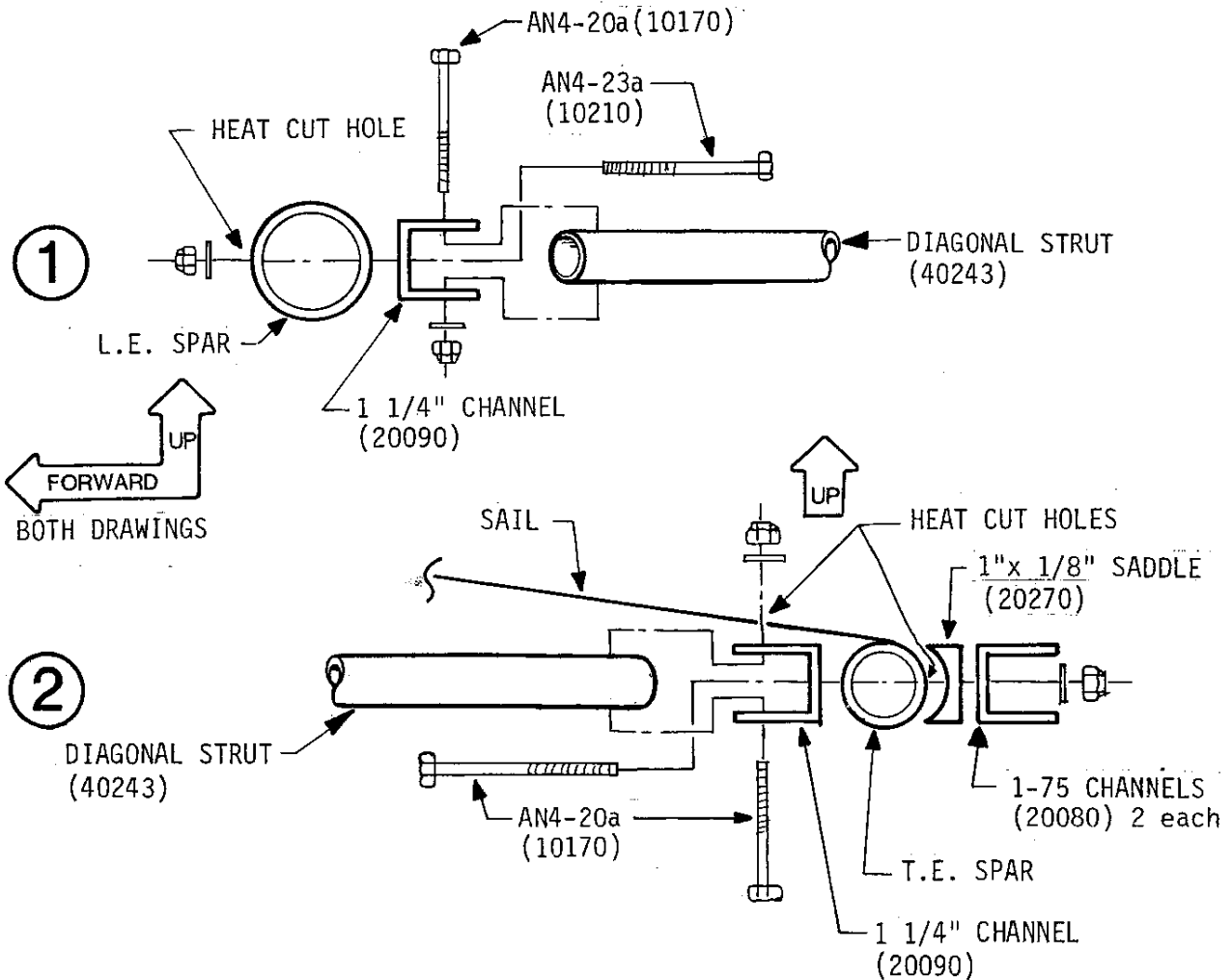
# DIAGONAL STRUTS

Pull buckles tight again making sure sail is very taut.

1. Locate holes in spar and heat cut for channel attach bolts.
2. Install channel on L.E. spar. Note: Do not install Diag. Strut yet.
3. Install channels on T.E. spar and heat cut holes through the top and the bottom of the sail for the AN4-16a bolt that will hold the Diag. Strut.
4. Install the Diagonal Strut. Note: Install T.E. end first.

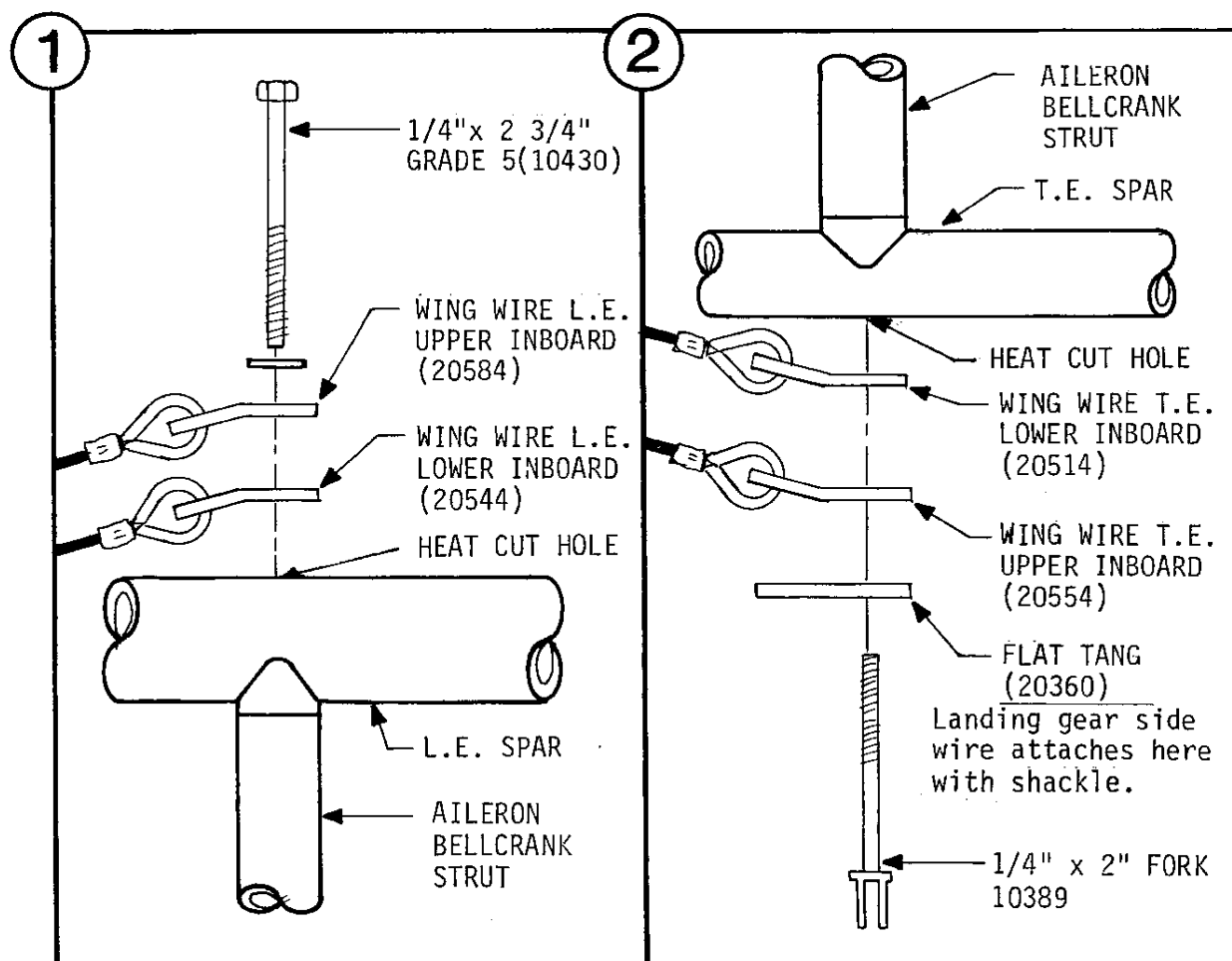
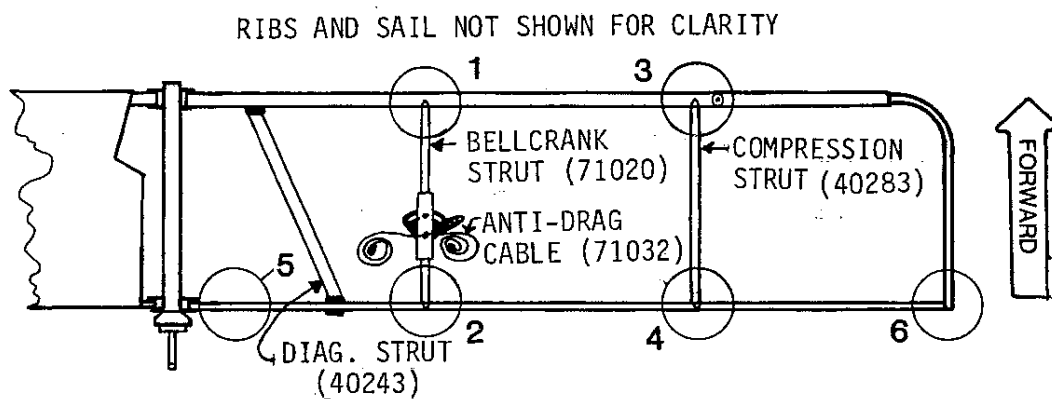


NOTE: DIAGONAL STRUTS WILL APPEAR TOO LONG AND MAY REQUIRE ASSISTANCE TO FORCE INTO PLACE.



## WING WIRE INSTALLATION BELLCRANK/COMPRESSION STRUT/

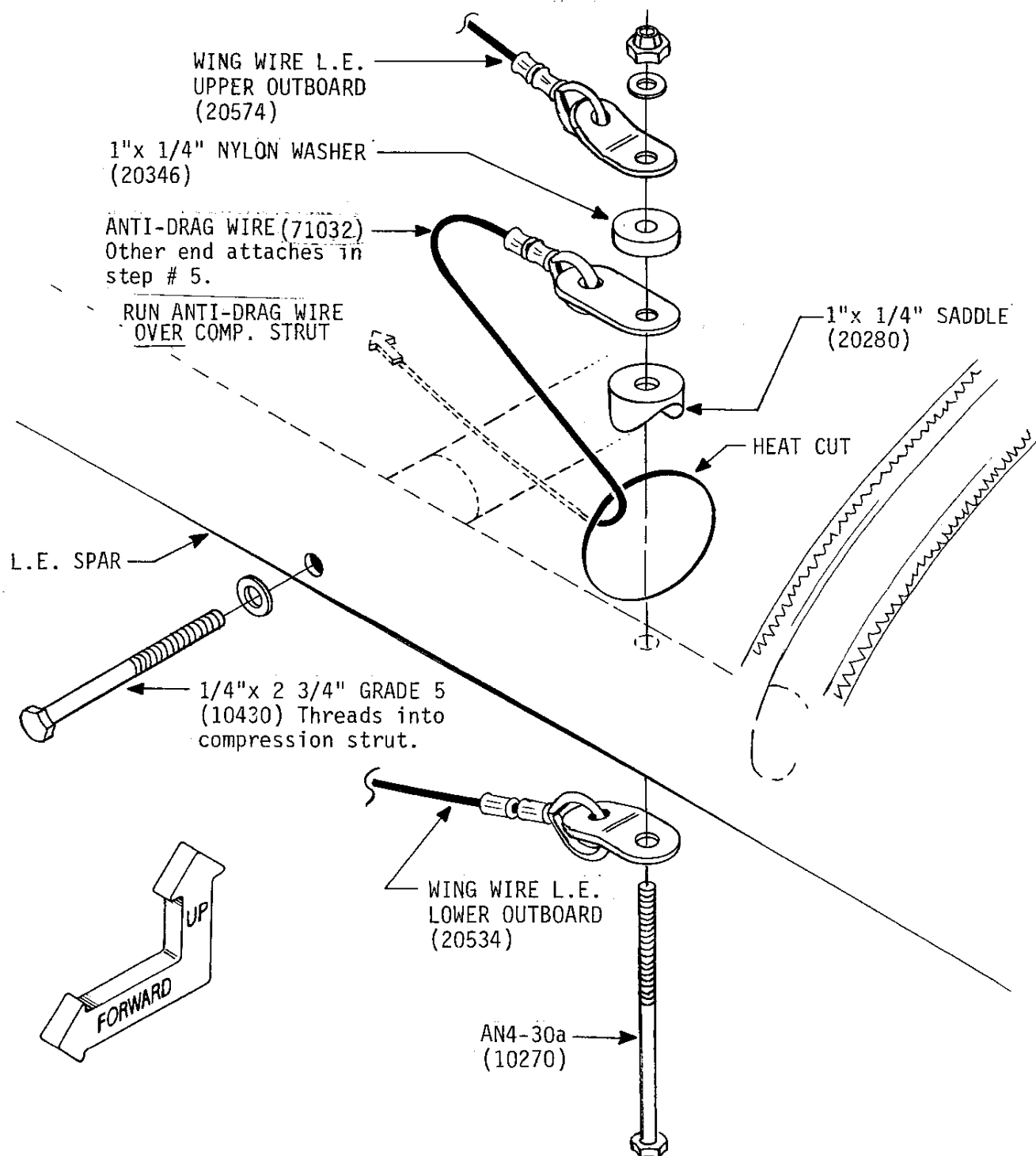
Heat cut holes for GRADE 5 BOLTS, then make sure compression and aileron bellcrank struts are in line with holes. Assemble hardware in the sequence shown below and in the following pages (Steps 1 - 5).





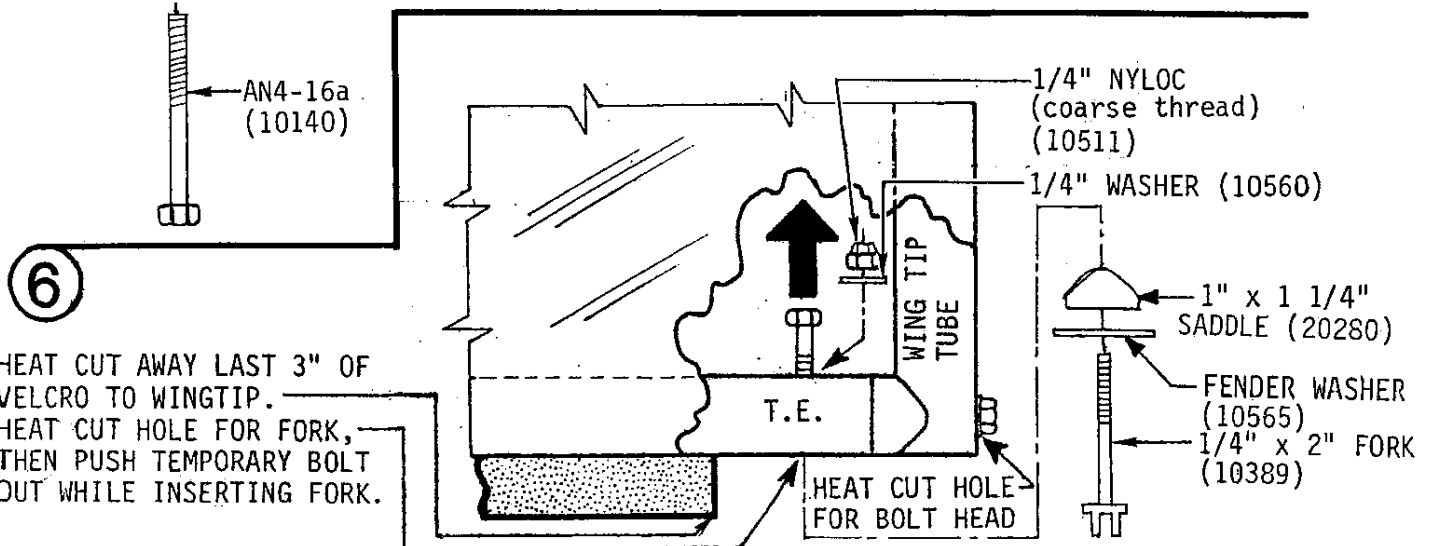
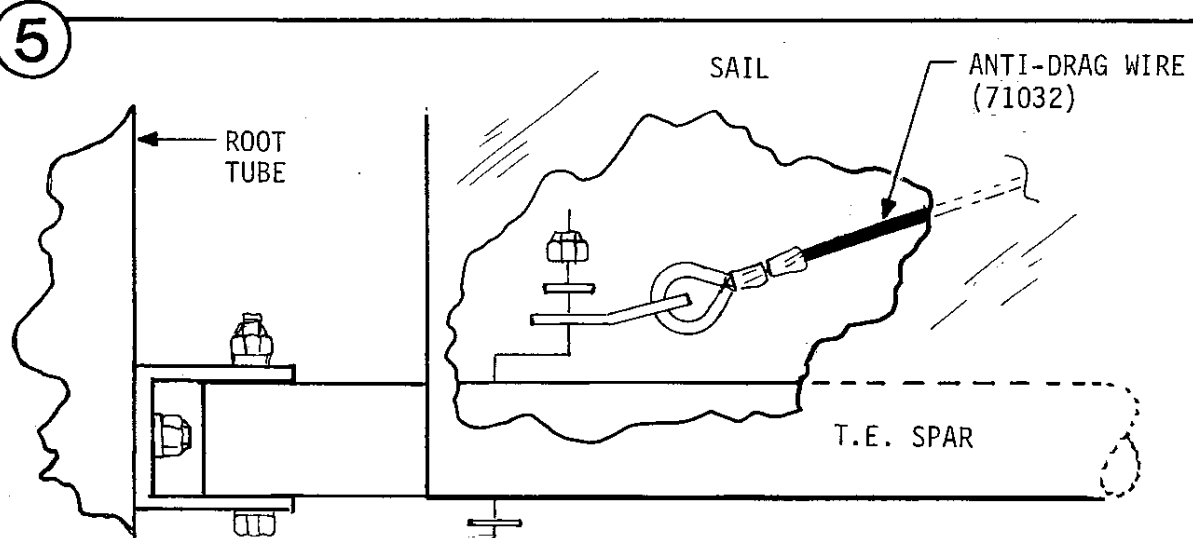
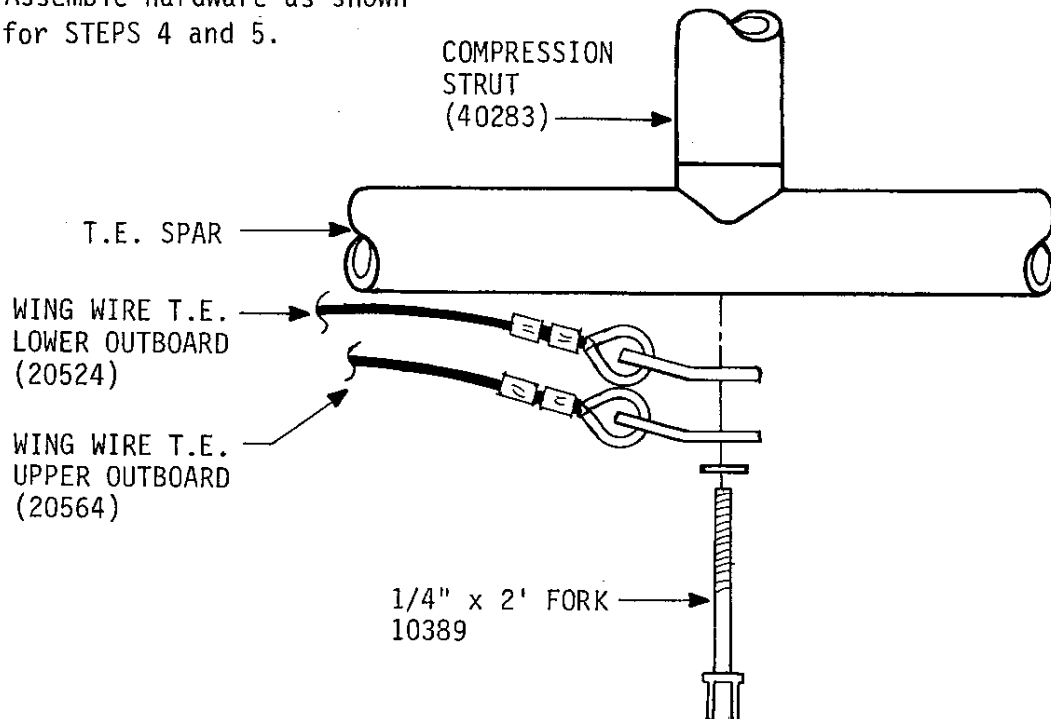
### WING WIRES / COMPRESSION STRUTS CON'T.

- 3** "VERY NEATLY" heat cut hole for wire hardware and assemble as shown.



## WING WIRES / COMPRESSION STRUTS CON'T.

- ④ Assemble hardware as shown for STEPS 4 and 5.



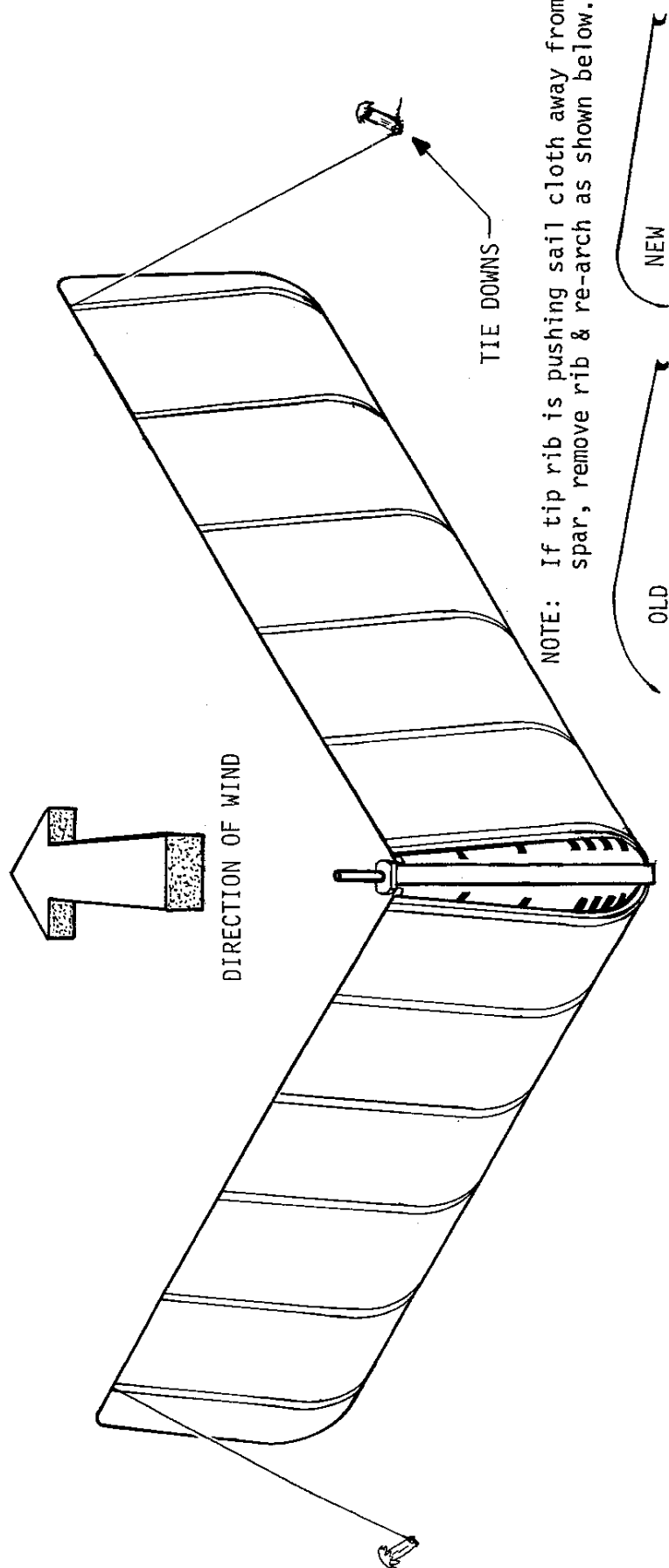
## WINGS TO NOSE TIPPING

UN-D0 the sail BUCKLES and ropes through the eyelets before starting the assembly below.

The wings should now be tipped up onto the nose for the next series of assemblies. Face wings into wind and at about a 90° angle so they will not blow over. Tie downs are recommended to keep wings in place.

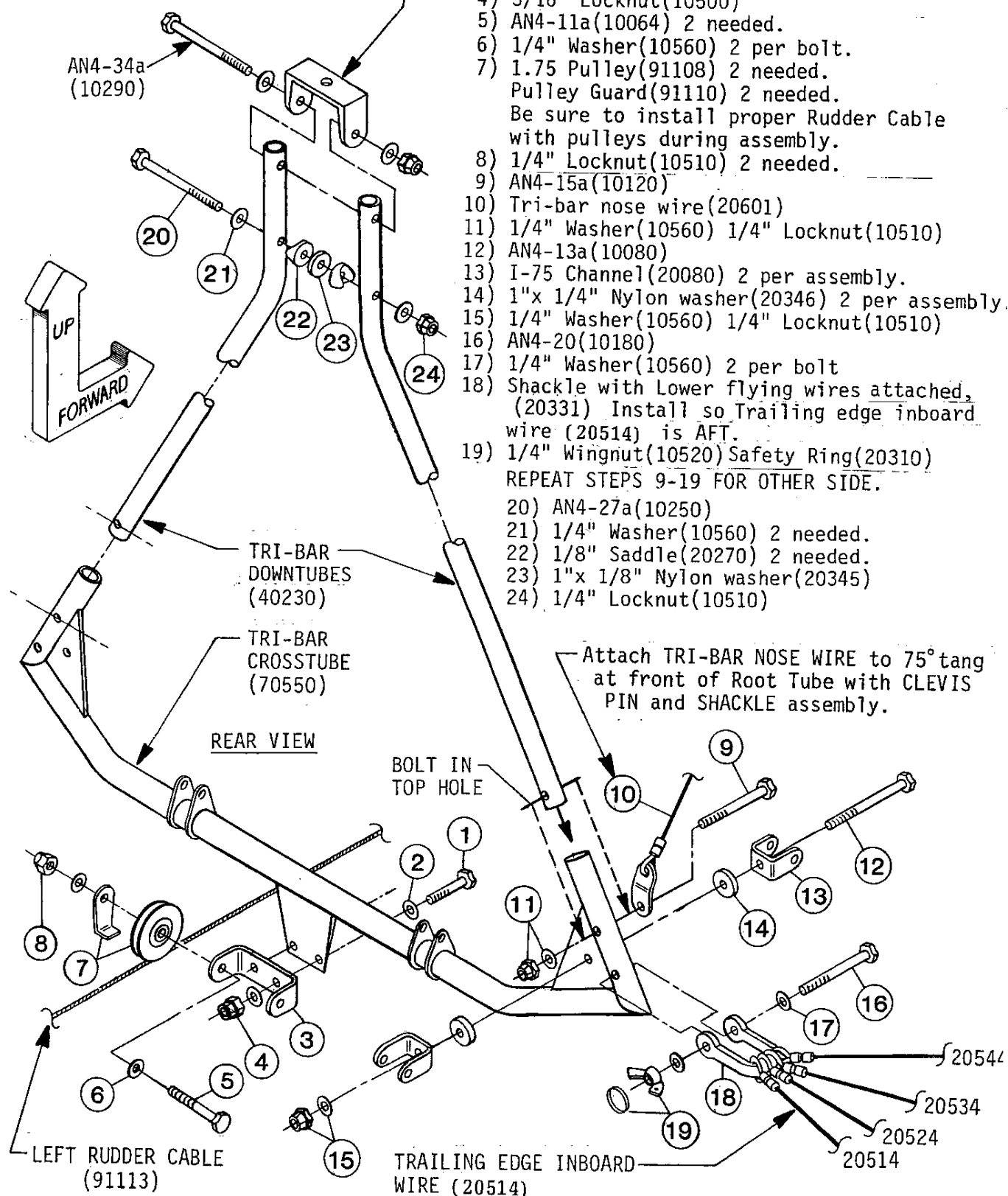
### IMPORTANT:

DAMAGE to the wing fabric will probably occur if you do not adhere to the following sequence: Prior to closing the outboard zipper, undo ALL the buckles AND open the two inboard zippers on that wing. CLOSE THE OUTBOARD ZIPPER FIRST. You may then re-close the buckles and inboard zippers in any order. This applies to the OUTBOARD zipper only; for preflight, you only need to open and close the inboard zippers, which presents no problem.



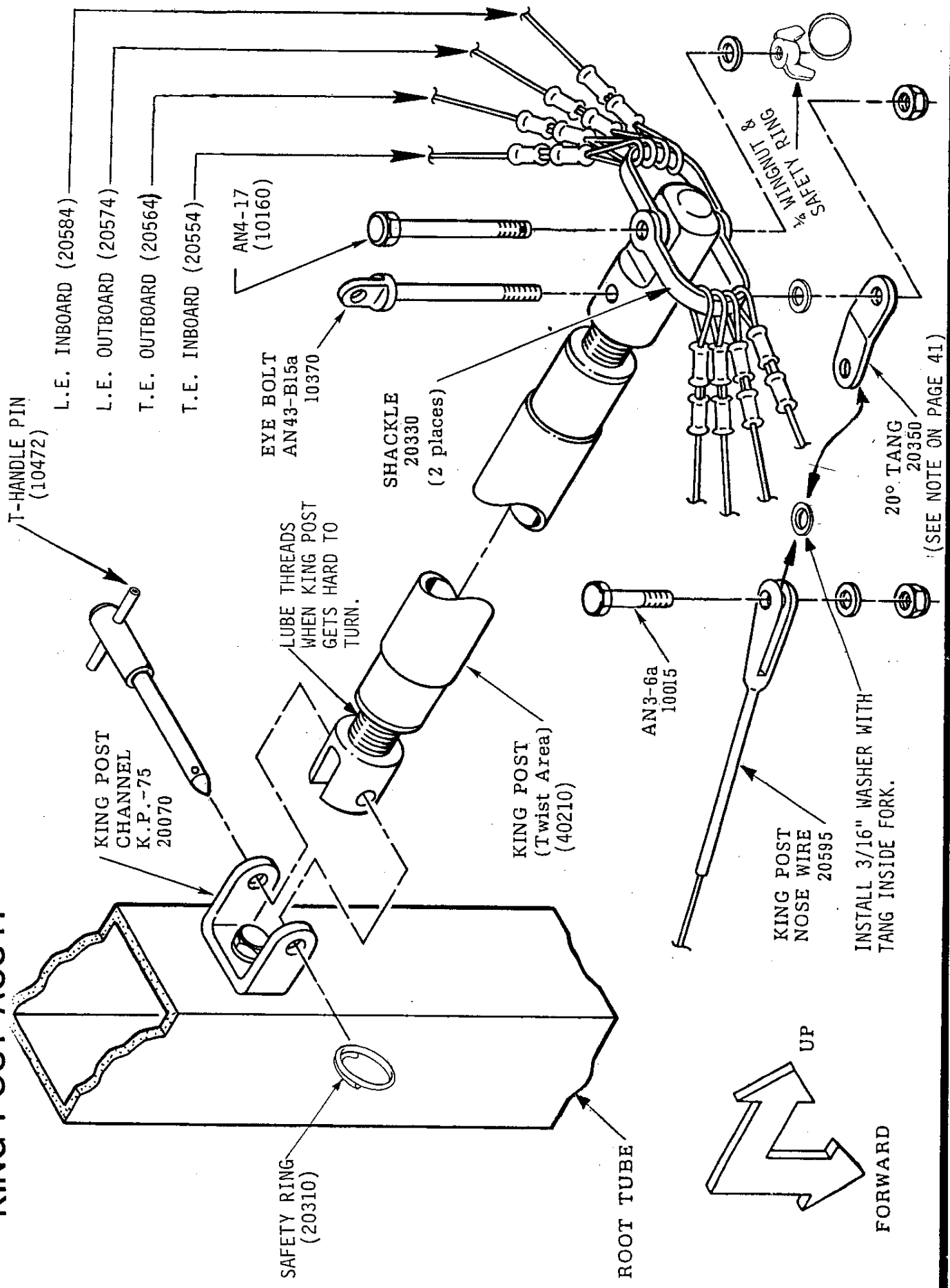
# TRI-BAR ASSEMBLY

Reinstall KING POST and TRI-BAR channels.  
Install TRI-BAR to aircraft.



- 1) AN3-5a(10010) 2 needed.
- 2) 3/16" Washer(10550) 2 per bolt.
- 3) Rudder pulley mount(91106)
- 4) 3/16" Locknut(10500)
- 5) AN4-11a(10064) 2 needed.
- 6) 1/4" Washer(10560) 2 per bolt.
- 7) 1.75 Pulley(91108) 2 needed.  
Pulley Guard(91110) 2 needed.  
Be sure to install proper Rudder Cable with pulleys during assembly.
- 8) 1/4" Locknut(10510) 2 needed.
- 9) AN4-15a(10120)
- 10) Tri-bar nose wire(20601)
- 11) 1/4" Washer(10560) 1/4" Locknut(10510)
- 12) AN4-13a(10080)
- 13) I-75 Channel(20080) 2 per assembly.
- 14) 1"x 1/4" Nylon washer(20346) 2 per assembly.
- 15) 1/4" Washer(10560) 1/4" Locknut(10510)
- 16) AN4-20(10180)
- 17) 1/4" Washer(10560) 2 per bolt
- 18) Shackle with Lower flying wires attached, (20331) Install so Trailing edge inboard wire (20514) is AFT.
- 19) 1/4" Wingnut(10520) Safety Ring(20310)  
REPEAT STEPS 9-19 FOR OTHER SIDE.
- 20) AN4-27a(10250)
- 21) 1/4" Washer(10560) 2 needed.
- 22) 1/8" Saddle(20270) 2 needed.
- 23) 1"x 1/8" Nylon washer(20345)
- 24) 1/4" Locknut(10510)

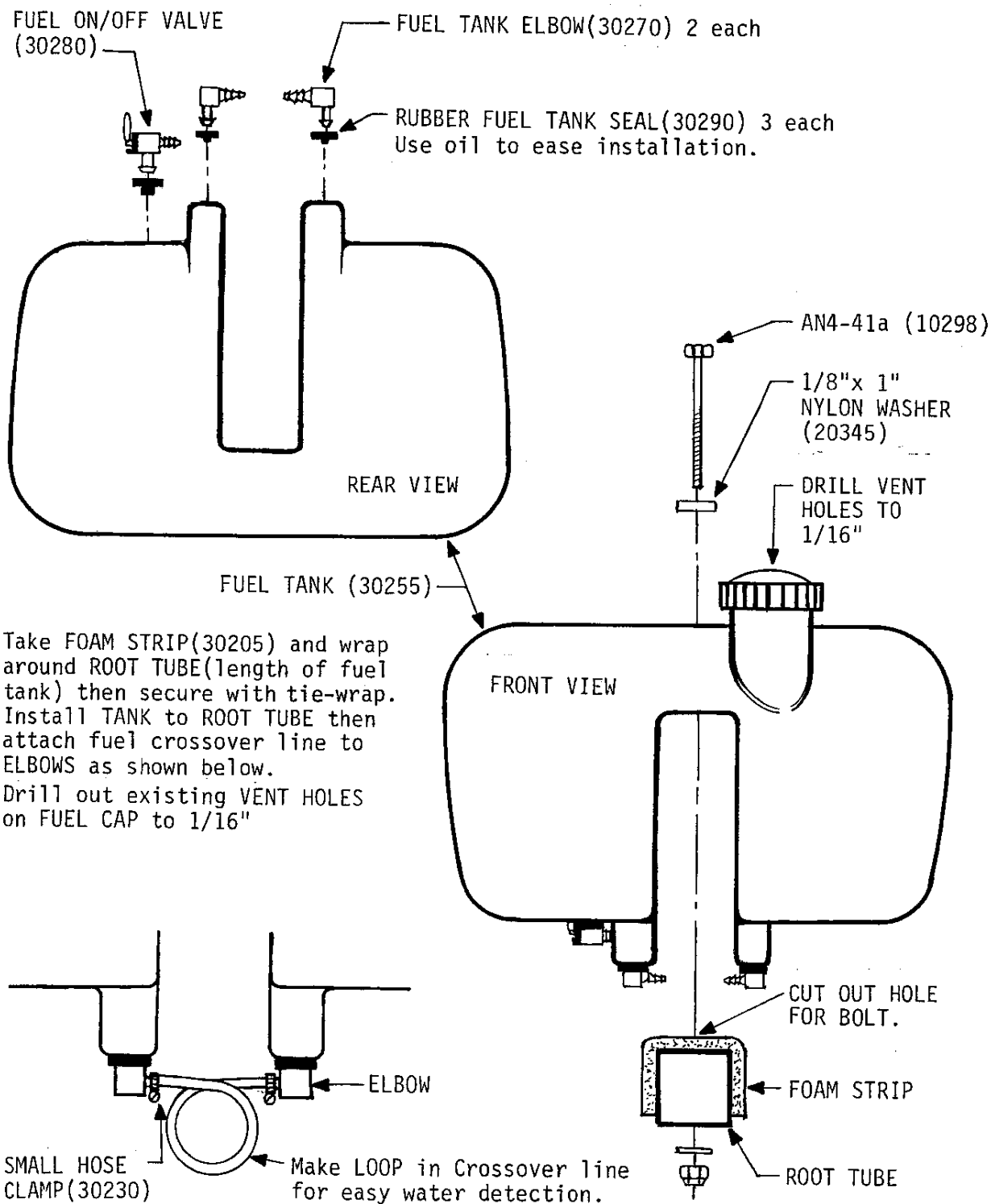
# KING POST ASSY.



(SEE NOTE ON PAGE 41)

## FUEL TANK ASSEMBLY

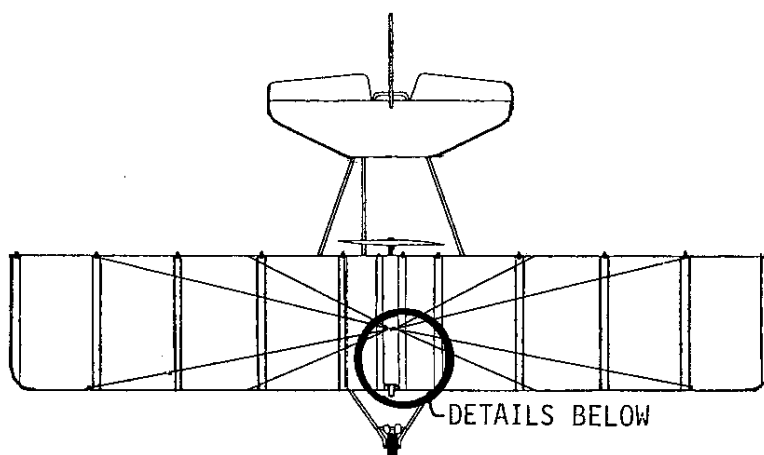
Install fuel fittings as shown below.



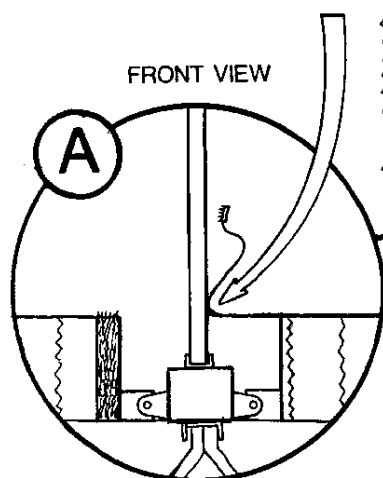
## VELCRO DOOR HEAT CUTTING

**KING POST:** Be sure that all buckles are tight, then pull velcro door over to KING POST and mark for cutting as shown in detail "A".

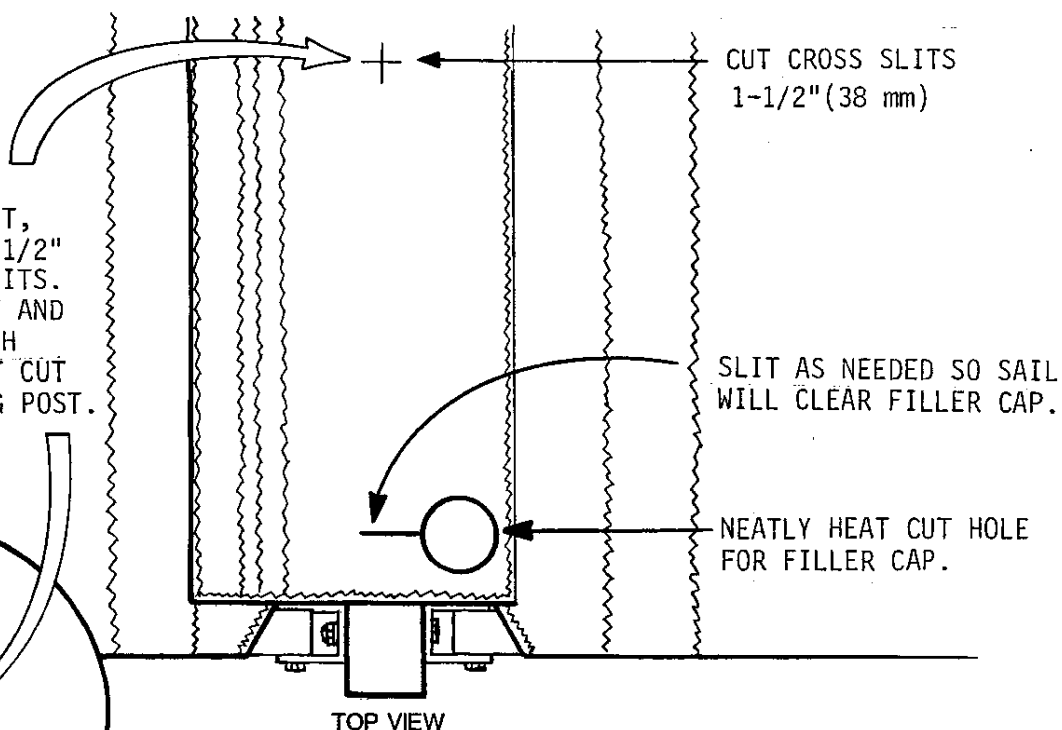
**FILLER CAP:** Neatly heat cut hole for filler cap and make slit as shown so sail will clear filler cap when being pulled over.



PULL VELCRO DOOR OVER TO KING POST, MARK AND MAKE 1-1/2" (38 mm) CROSS SLITS. REMOVE KING POST AND RE-INSERT THROUGH SLITS, THEN HEAT CUT HOLE TO FIT KING POST.



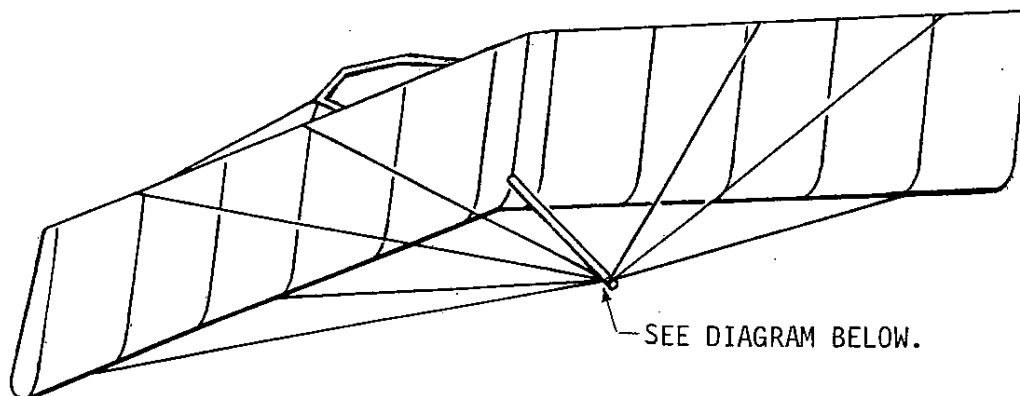
FUEL TANK NOT SHOWN FOR CLARITY.



**NOTE:** After heat cutting hole for kingpost, unscrew kingpost from upper fitting, install in cut out and screw back into upper fitting.

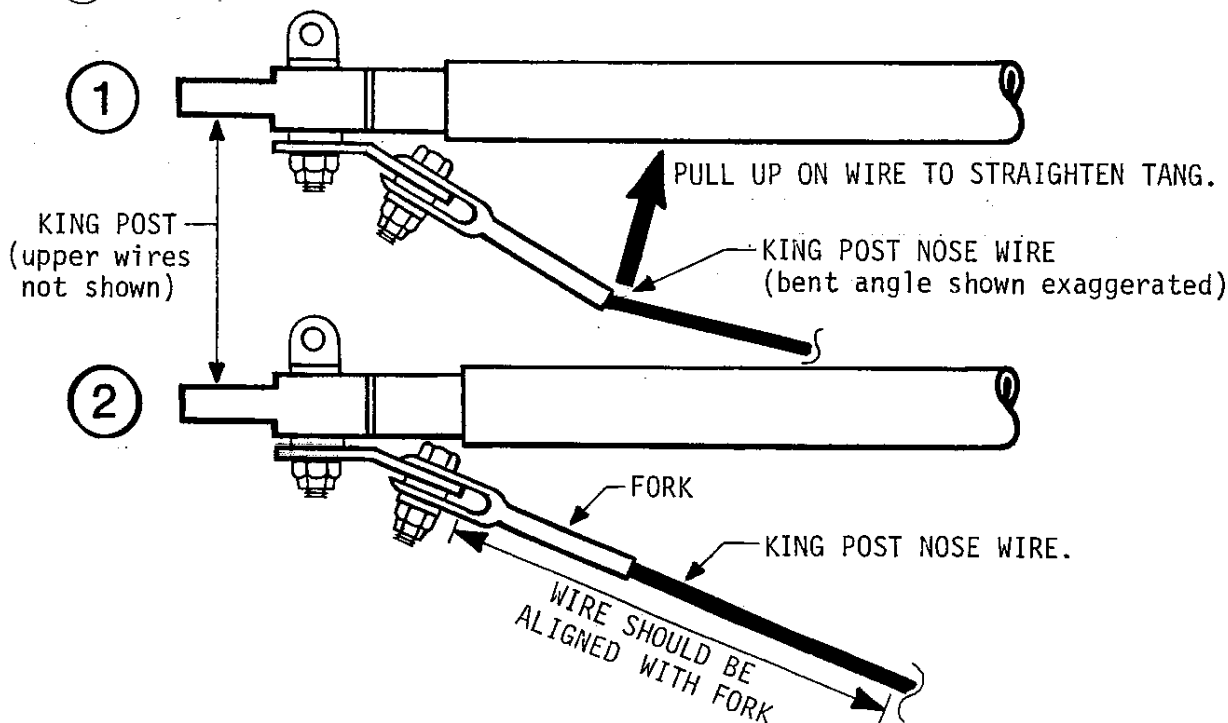
## REFERENCE DRAWING

1. WITH EVERYTHING PUT TOGETHER UP TO THIS POINT, THE PLANE SHOULD LOOK LIKE THE PICTURE BELOW. MAKE SURE WHEN INSTALLING THE KINGPOST THAT NO WIRE ENDS ARE TWISTED AROUND THE TANGS.
2. THE NEXT STEP WILL BE TO INSTALL THE MOTOR. REMEMBER TO INSTALL THE BOLTS FROM THE RIGHT SIDE OF THE PLANE SO THAT THE NUTS ARE ON THE LEFT SIDE AS YOU SIT IN THE PILOT'S SEAT, BECAUSE THE AILERON BELLCRANK MOUNT WILL GO ON HERE ALSO. SEE NEXT PAGE.



The procedure below will eliminate stress on the KING POST NOSE WIRE due to the angle of the TANG.

- ① Screw the KING POST out so all the wires are tight then simply pull up on the wire so tang will start to straighten out.
- ② TANG should be bent at angle so KING POST NOSE WIRE and its FORK are parallel.



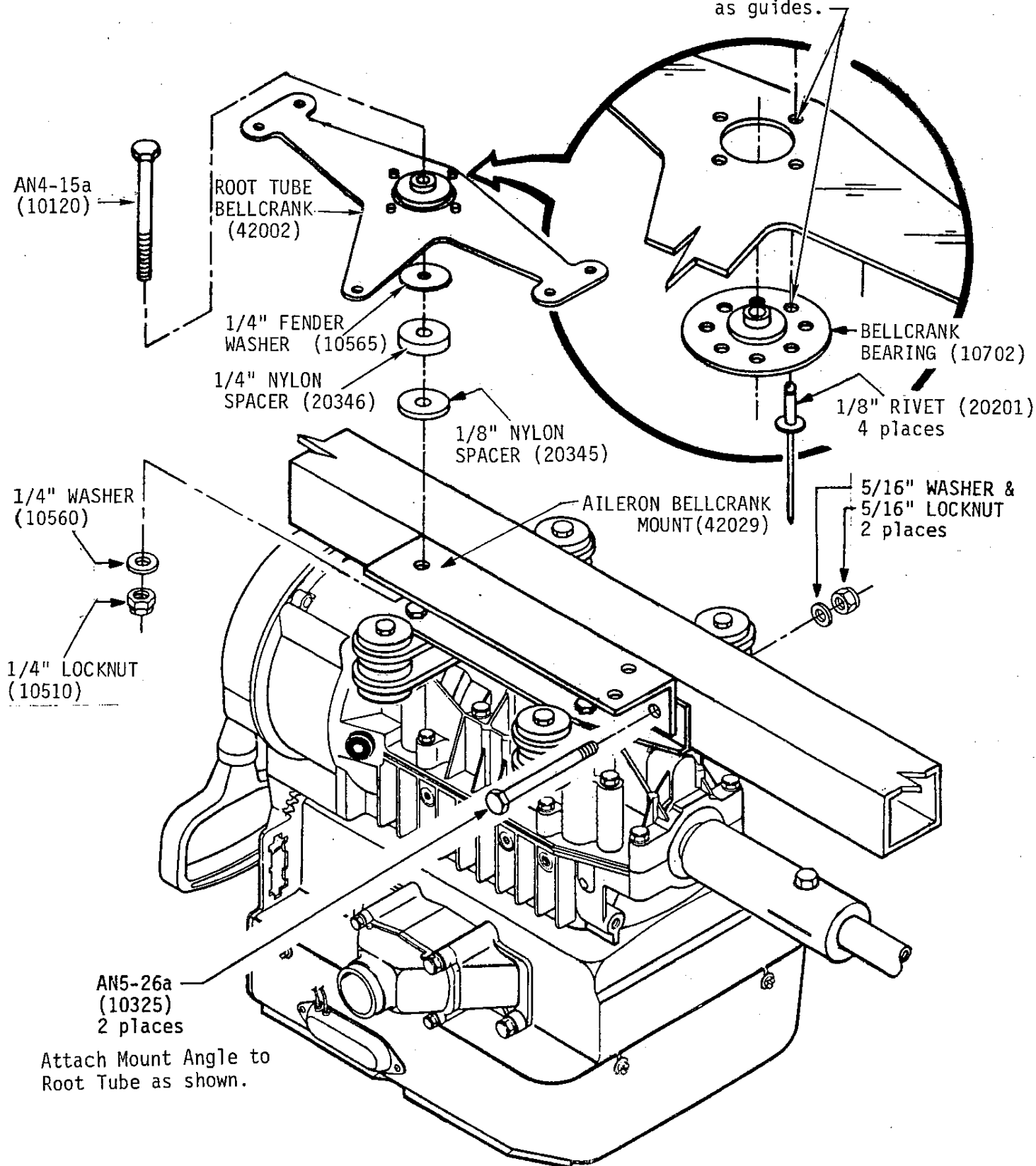


# ROOT TUBE BELLCRANK ASSEMBLY

48

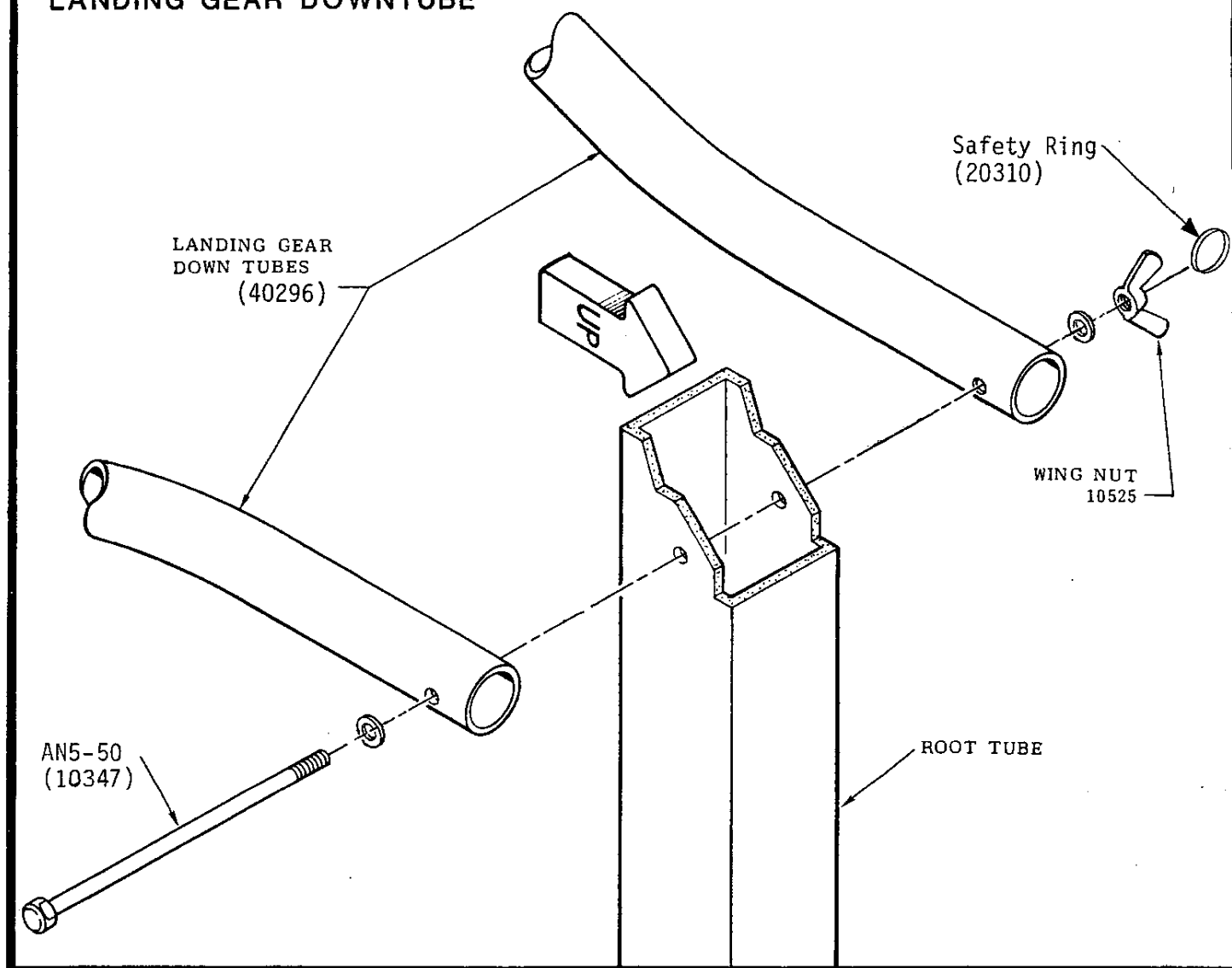
Install Root Tube Bellcrank with attached bearing (face down) to Aileron Bellcrank Mount with hardware shown.

Drill 1/8" holes at 4 places using perimeter holes at 90° as guides.



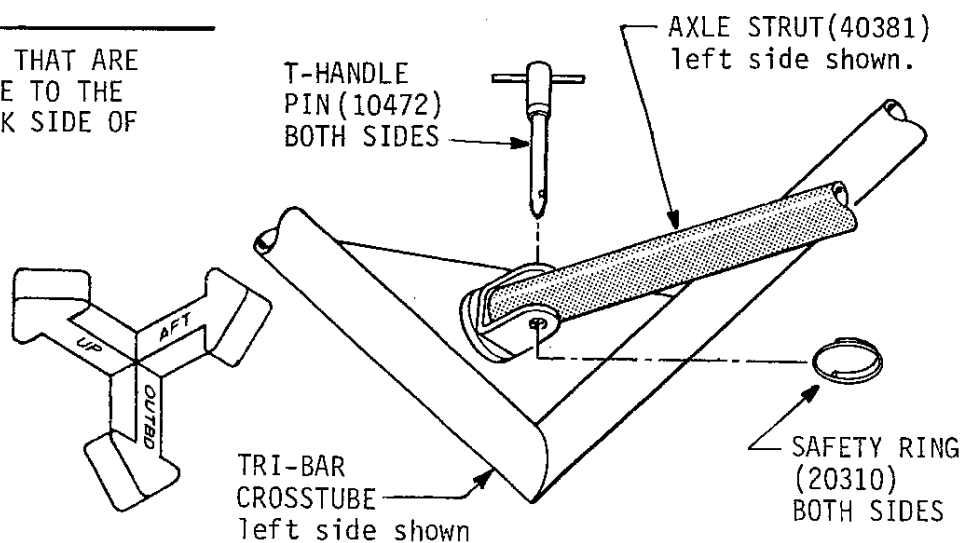
# LANDING GEAR / AXLE STRUT ATTACHMENT

## LANDING GEAR DOWNTUBE

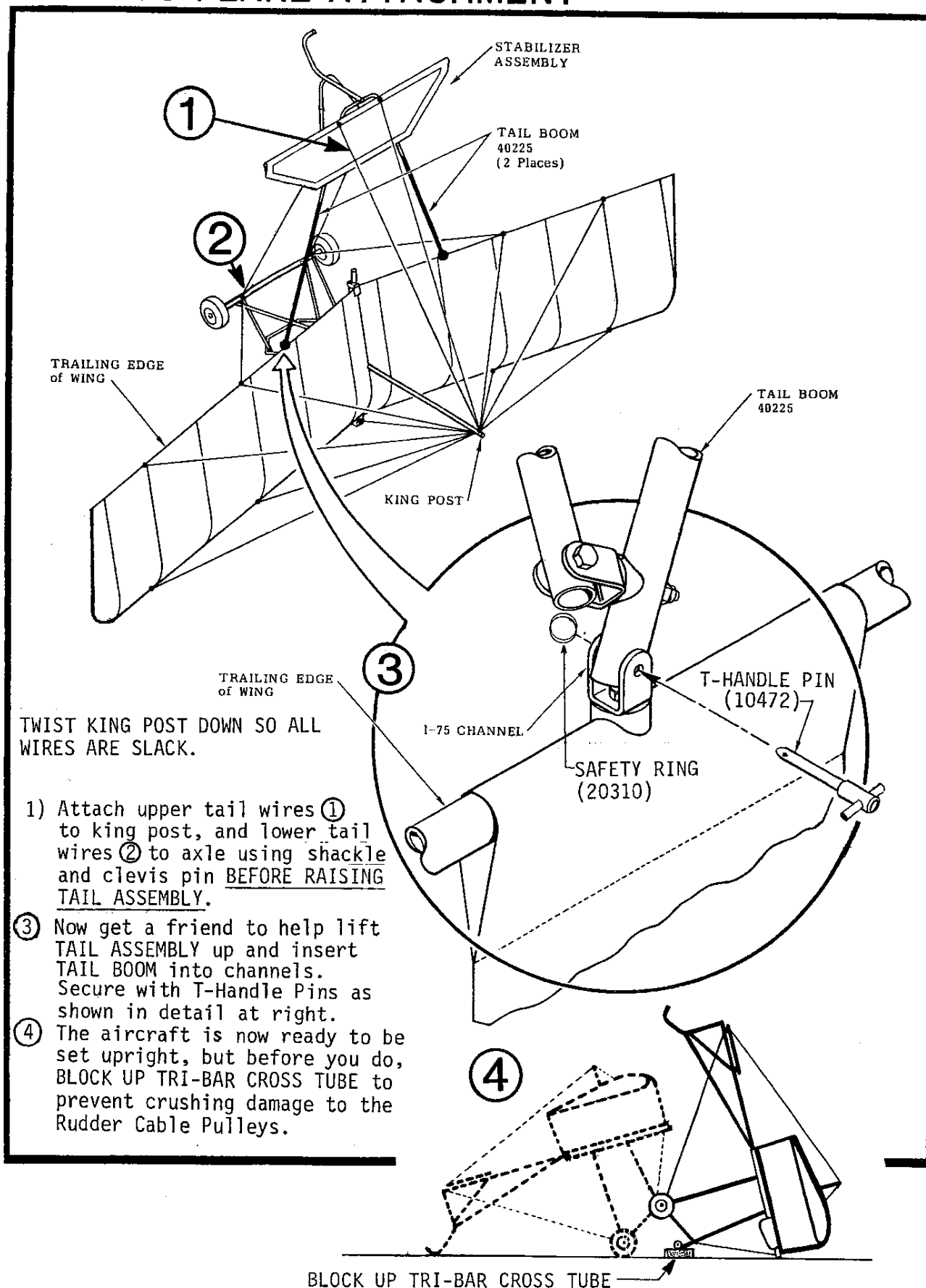


## AXLE STRUT

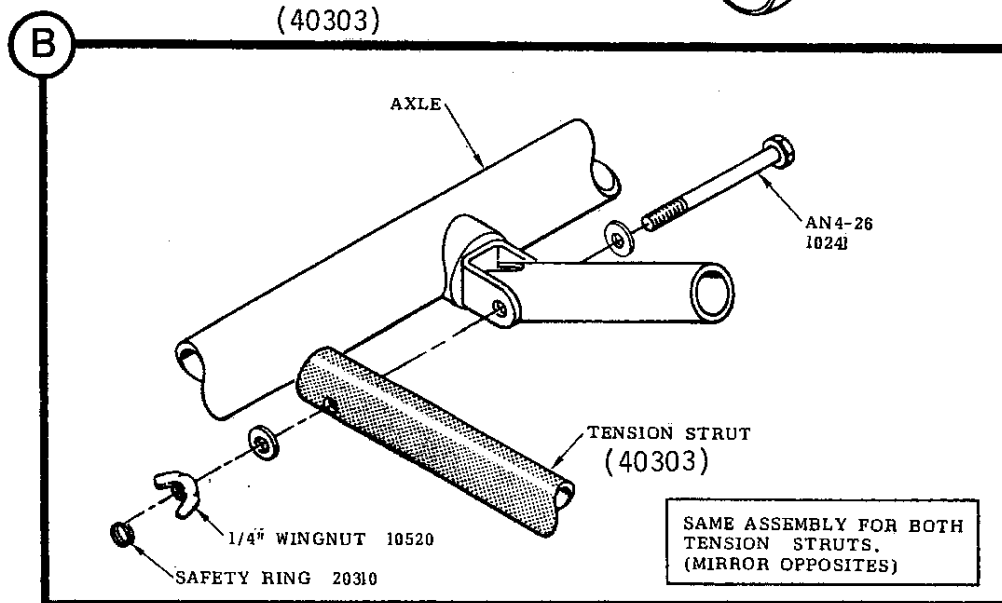
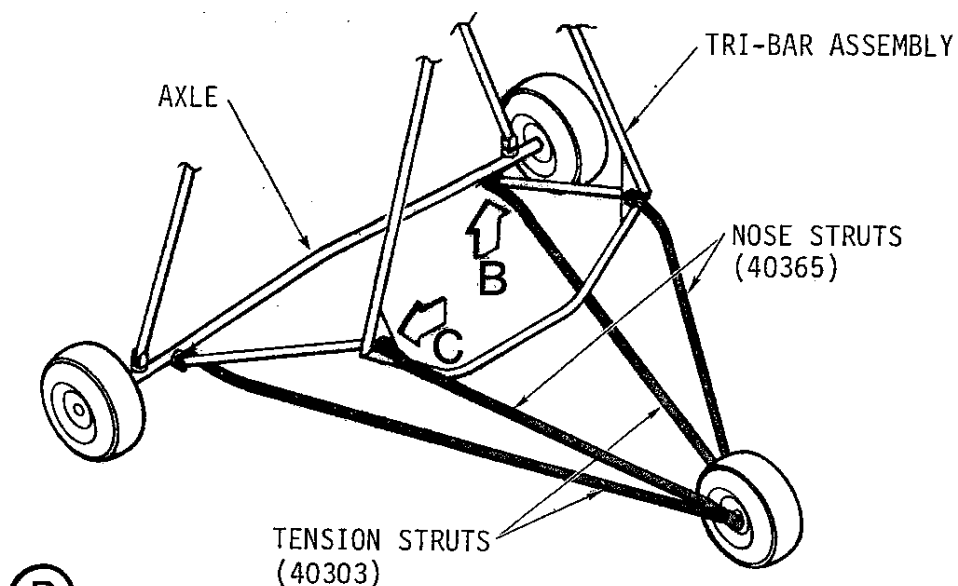
INSTALL BOTH AXLE STRUTS THAT ARE ATTACHED TO THE MAIN AXLE TO THE I-75 CHANNELS ON THE BACK SIDE OF THE TRI-BAR CROSSTUBE.



# TAIL TO PLANE ATTACHMENT



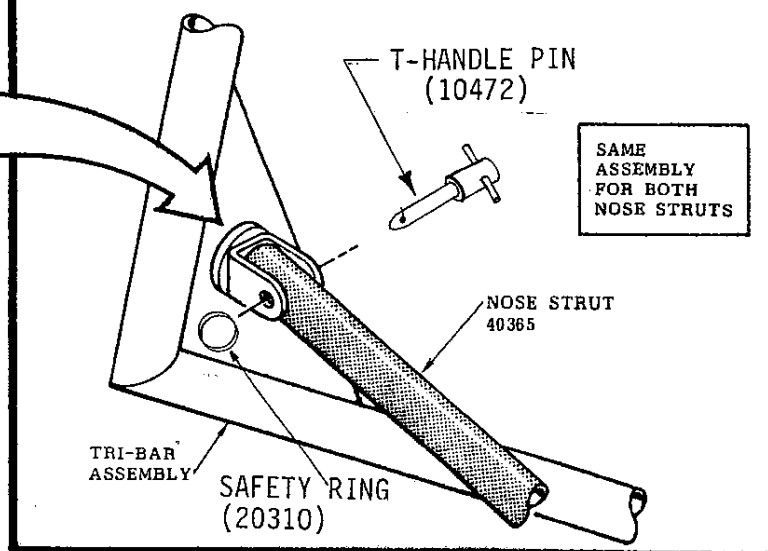
# NOSE GEAR ATTACH.



File down and DEBURR both NOSE STRUTS as shown so they may clear the channel bolt heads.

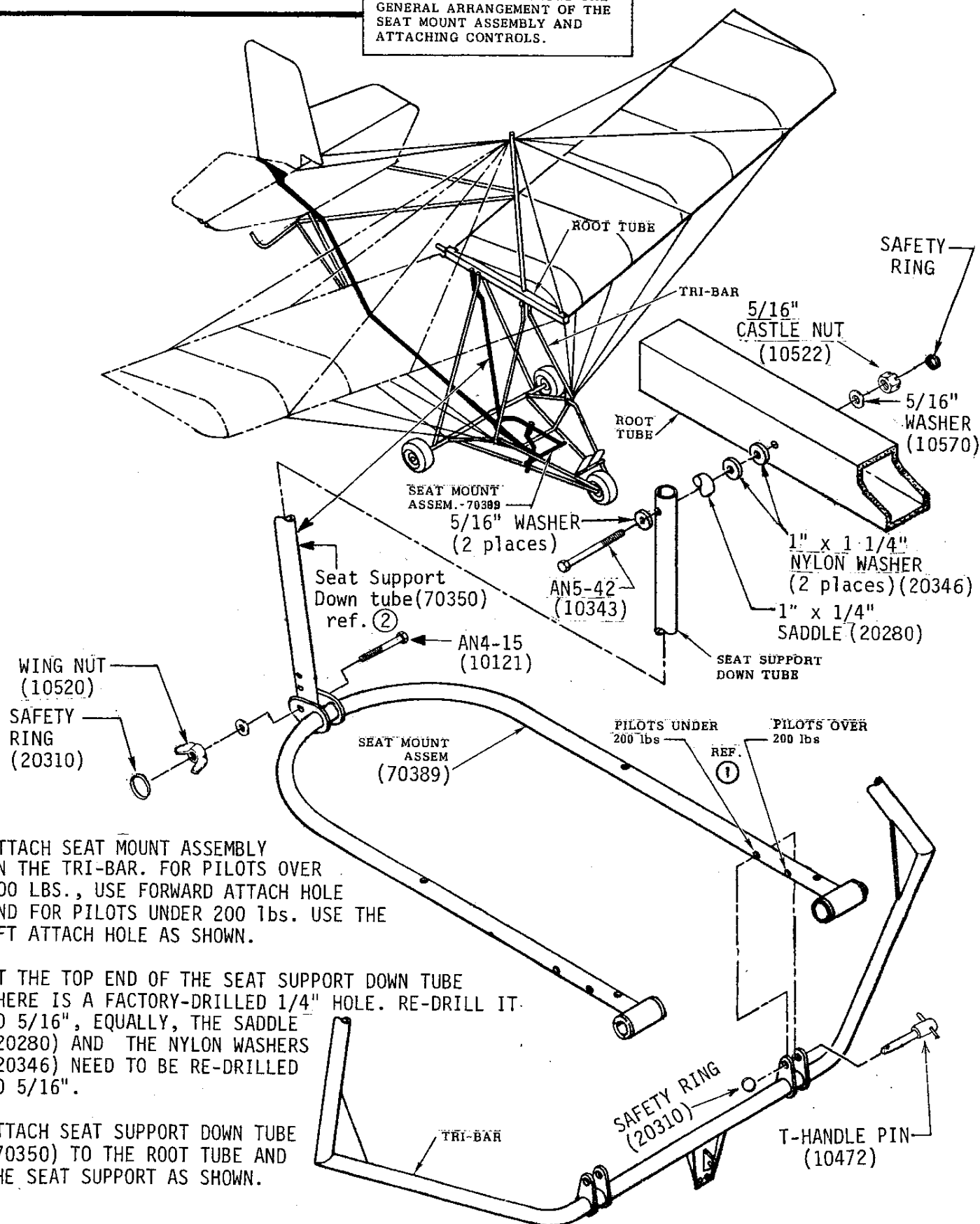


FILE AND DEBURR



# SEAT SUPPORT TUBE

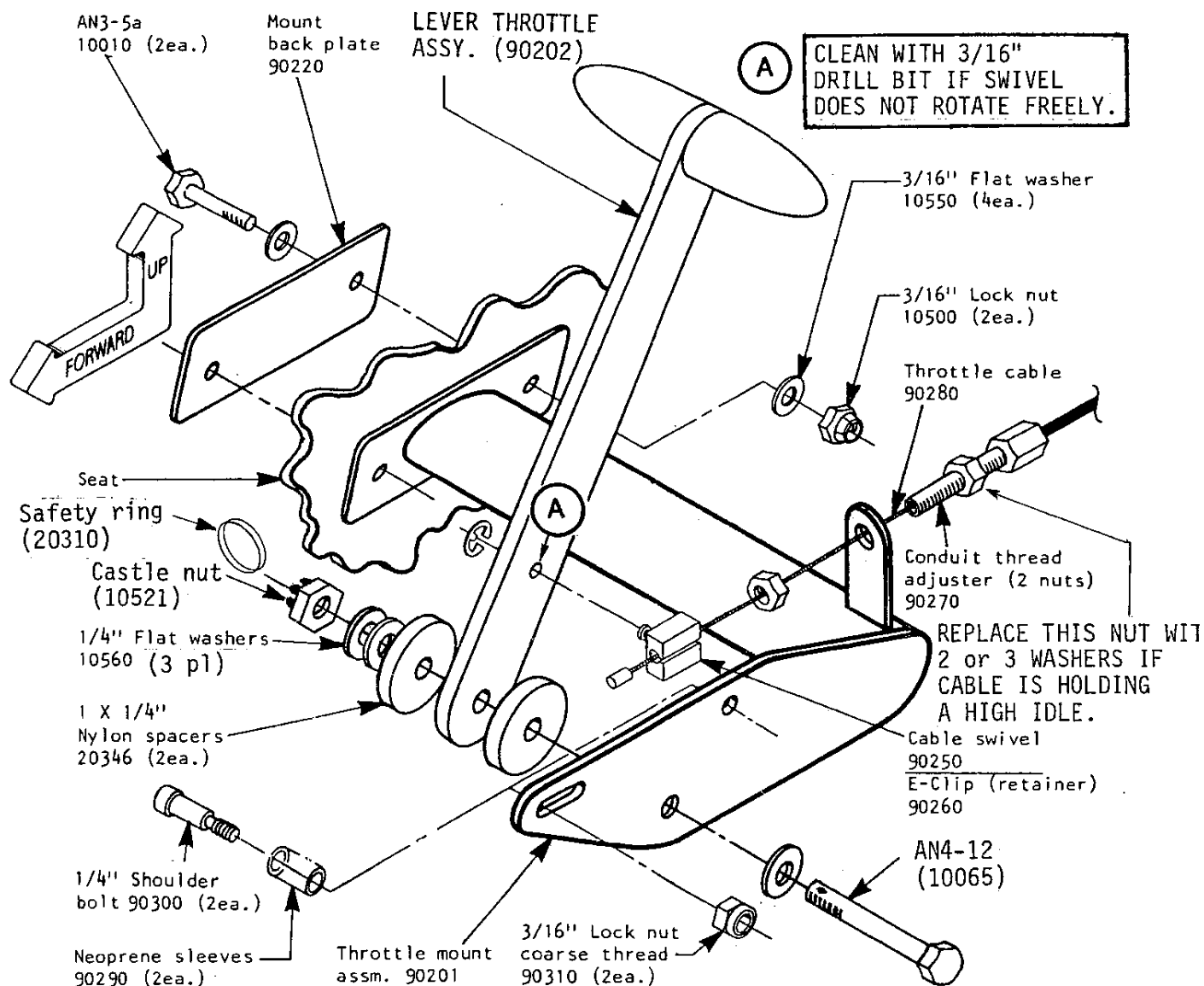
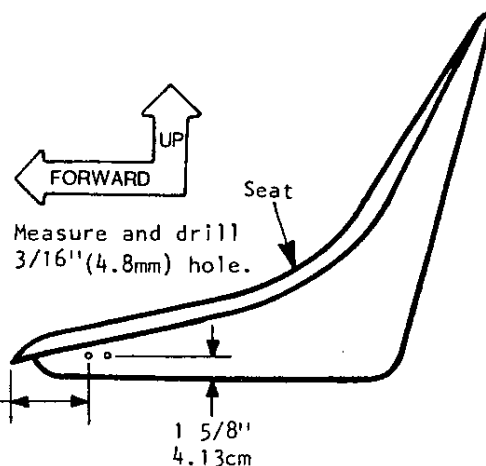
THIS ILLUSTRATION SHOWS THE GENERAL ARRANGEMENT OF THE SEAT MOUNT ASSEMBLY AND ATTACHING CONTROLS.



- ① ATTACH SEAT MOUNT ASSEMBLY ON THE TRI-BAR. FOR PILOTS OVER 200 LBS., USE FORWARD ATTACH HOLE AND FOR PILOTS UNDER 200 lbs. USE THE AFT ATTACH HOLE AS SHOWN.
- ② AT THE TOP END OF THE SEAT SUPPORT DOWN TUBE THERE IS A FACTORY-DRILLED 1/4" HOLE. RE-DRILL IT TO 5/16", EQUALLY, THE SADDLE (20280) AND THE NYLON WASHERS (20346) NEED TO BE RE-DRILLED TO 5/16".
- ③ ATTACH SEAT SUPPORT DOWN TUBE (70350) TO THE ROOT TUBE AND THE SEAT SUPPORT AS SHOWN.

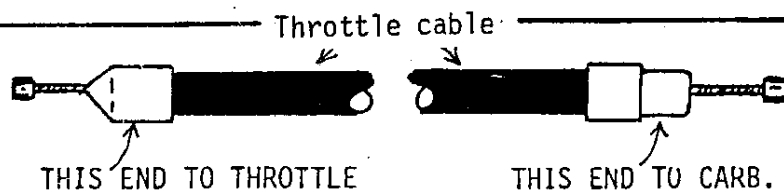
# THROTTLE ASSY.

Drill and assemble as shown. (Leave cable and conduit adjuster for last.) For cable installation, place Throttle lever fully aft and insert cable slide into cable swivel. Pull conduit adjuster aft until throttle cable is taut. Tighten down conduit nuts and now place throttle lever as forward as cable allows. Adjust forward shoulder bolt to rest against throttle lever and tighten.



## NOTE:

Tighten castle nut until desired friction is obtained and secure with safety ring thru "slot" in nut and hole in bolt.

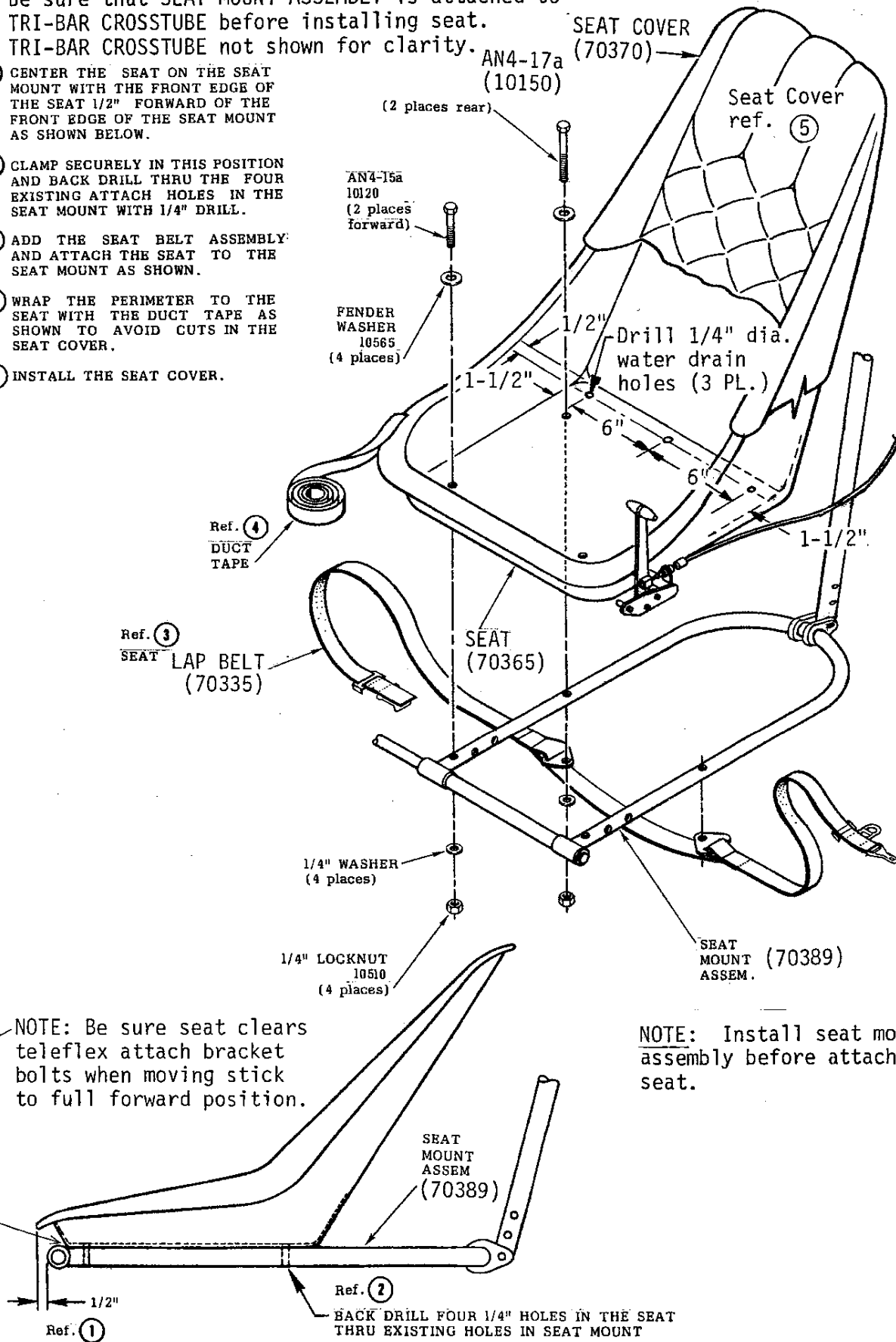


# SEAT MOUNT ASSEMBLY

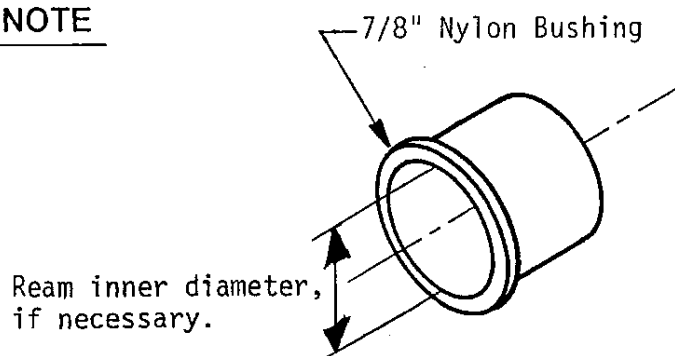
54

Be sure that SEAT MOUNT ASSEMBLY is attached to TRI-BAR CROSSTUBE before installing seat. TRI-BAR CROSSTUBE not shown for clarity.

- ① CENTER THE SEAT ON THE SEAT MOUNT WITH THE FRONT EDGE OF THE SEAT 1/2" FORWARD OF THE FRONT EDGE OF THE SEAT MOUNT AS SHOWN BELOW.
- ② CLAMP SECURELY IN THIS POSITION AND BACK DRILL THRU THE FOUR EXISTING ATTACH HOLES IN THE SEAT MOUNT WITH 1/4" DRILL.
- ③ ADD THE SEAT BELT ASSEMBLY AND ATTACH THE SEAT TO THE SEAT MOUNT AS SHOWN.
- ④ WRAP THE PERIMETER TO THE SEAT WITH THE DUCT TAPE AS SHOWN TO AVOID CUTS IN THE SEAT COVER.
- ⑤ INSTALL THE SEAT COVER.



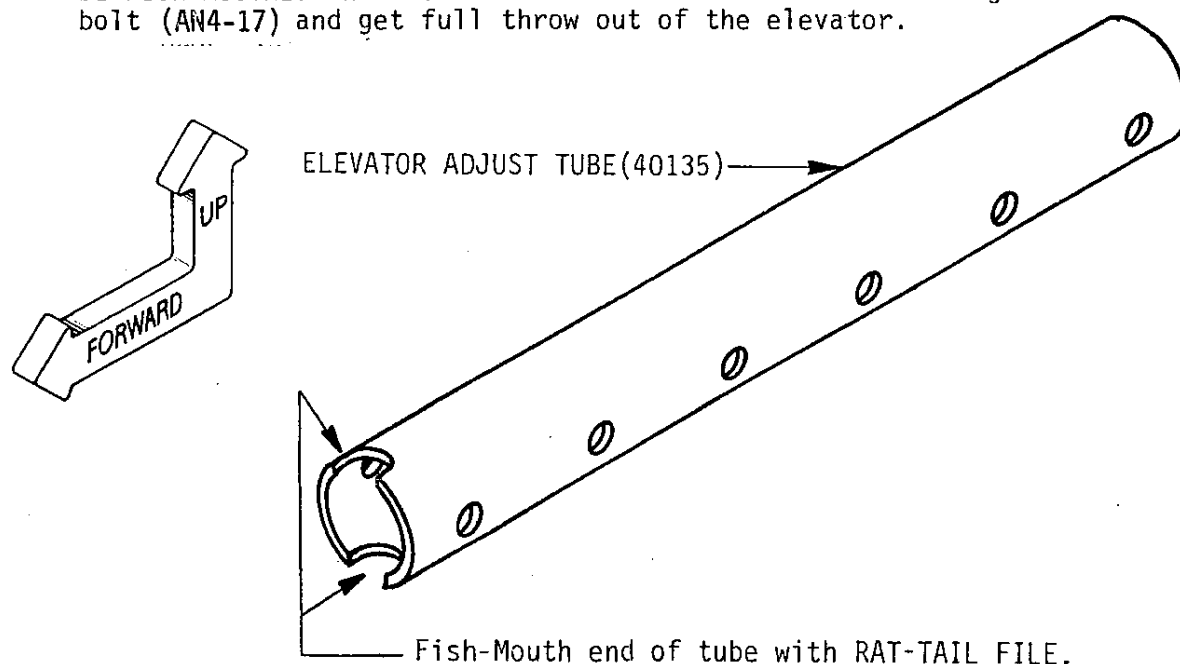
## 7/8" NYLON BUSHING NOTE



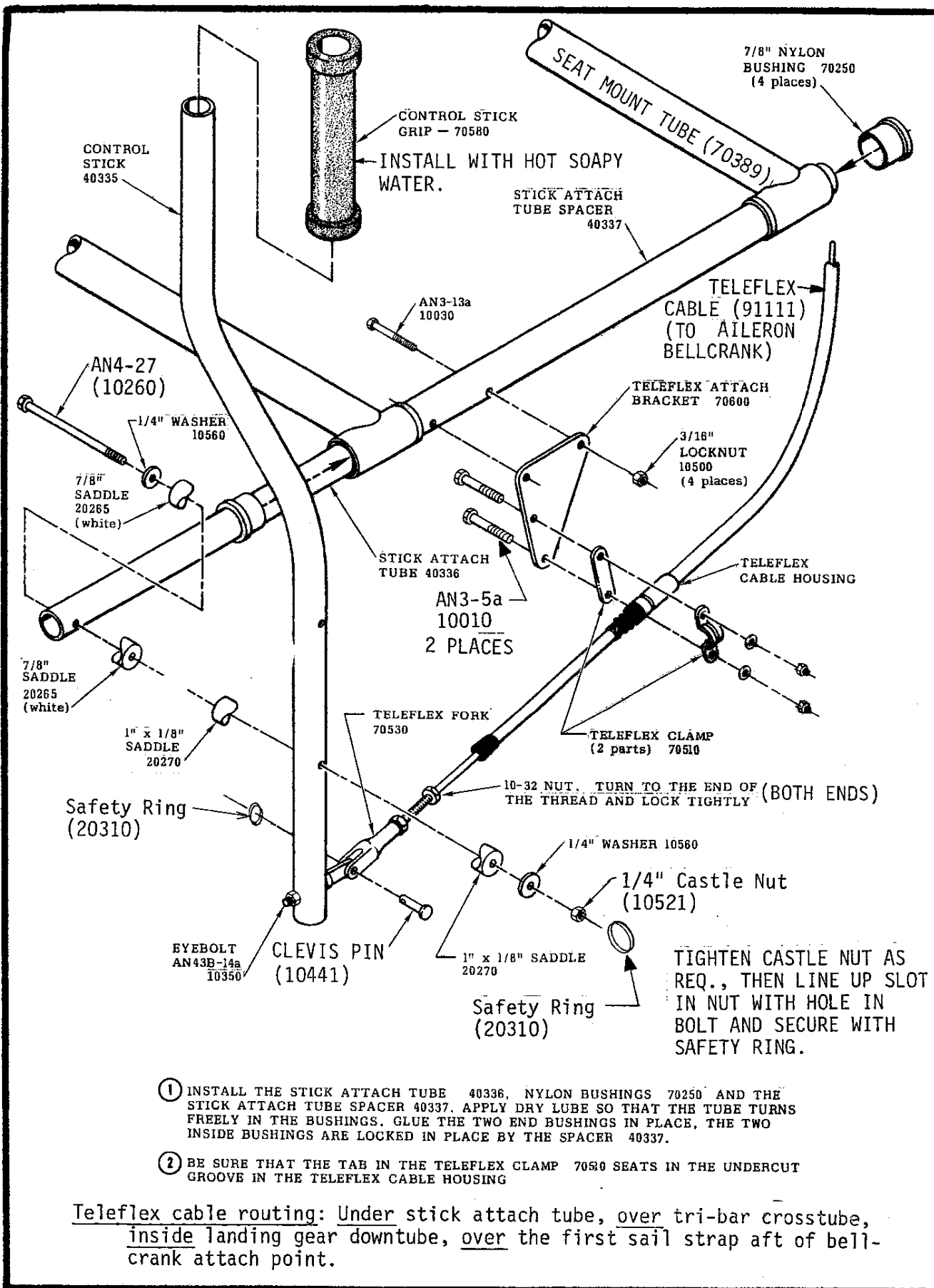
The 7/8" NYLON BUSHINGS (#70250) are used in the SEAT MOUNT (#70389) and the FOOT PEDAL (# 70230) ASSEMBLIES. After the bushings have been inserted into their respective positions, if either the STICK ATTACH TUBE (#40336) or the FOOT PEDAL MOUNT TUBE (#40430) will not rotate freely, it will be necessary to REAM the INSIDE of the nylon bushing. Use a rat-tail file or coarse sand paper wrapped around a 3/4" dia. (or so) wood dowel until the inserted tube moves freely.

## PUSH/PULL ADJUST TUBE PREPARATION

The front end of the "ELEVATOR ADJUST TUBE" (40135) must be FISH-MOUTHED in order to clear the I-75 Channel mounting bolt (AN4-17) and get full throw out of the elevator.







**IMPORTANT!** SLIDE PUSH/PULL TUBE THROUGH PUSH/PULL SAFETY CABLE BEFORE ASSEMBLING HARDWARE. SEE PAGE 20.

TO ELEVATOR CONTROL  
ARM - 70070

ELEVATOR  
PUSH-PULL  
TUBE - 70170

AN4-14  
10110

AN4-17  
10160

ELEVATOR  
ADJUST TUBE  
40135

NYLON WASHER  
20340  
5/8" x 1/16"  
(2 places)

1/4" WINGNUT  
10520

Safety Ring  
20310

Safety Ring  
20310

Castle nut  
10521

1-75 CHANNEL  
20080

20345  
1" x 1/8"  
NYLON  
WASHER

1" x 1/8"  
SADDLE  
20270

GRIP  
70580

CONTROL STICK  
40335

AN4-15  
10121

Seat Mount  
Assembly  
70389

Castle  
nut  
10521

1" x 1/8"  
SADDLE  
20270

Safety Ring  
20310

The ELEVATOR and RUDDER may now be put on the aircraft.  
For ELEVATOR see ELEVATOR ASSEMBLY.  
For RUDDER see TAIL SKID ASSEMBLY/RUDDER ASSEMBLY.

**A**

Use these holes for ELEVATOR STICK ADJUST.  
Holes are 1/2" increments for fine adjustment.

NOTE: BE SURE YOU HAVE FULL DOWN AUTHORITY  
WHEN ADJUSTING THE PUSH/PULL TUBE.

NOTE: TIGHTEN CASTLE NUTS AS REQ.  
THEN LINE UP SLOTS IN NUT  
WITH HOLE IN BOLT AND SECURE  
WITH SAFETY RING.

## MUFFLER ASSY.

FIG. A Assemble hardware below by sequence and notes.

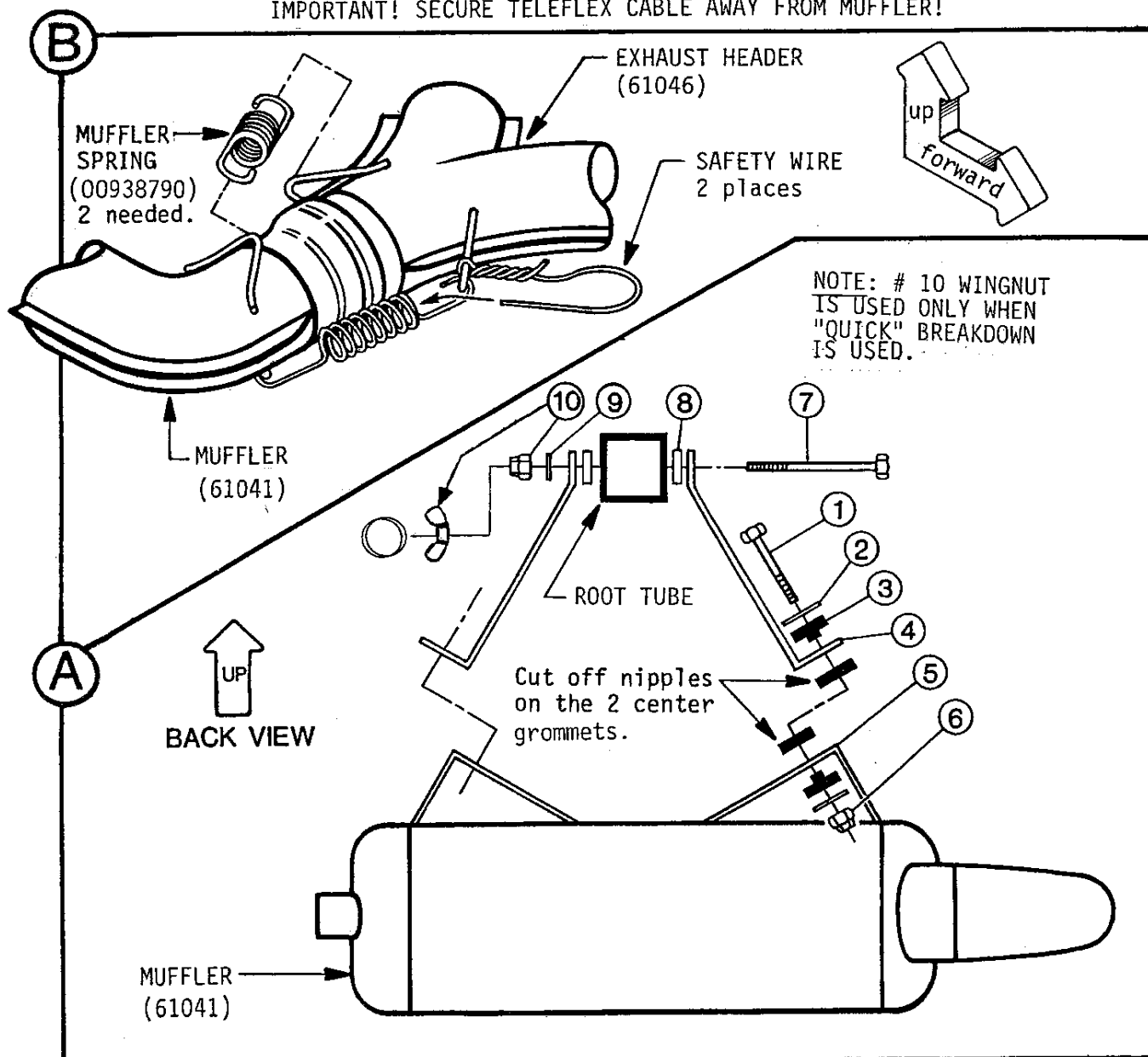
- 1) AN5-21a (10331)
- 2) Fender washer (10600) 2 needed.
- 3) Rubber grommet (30380) 4 needed.  
Note direction of first and last nipples. Cut off center nipples.
- 4) Muffler attach strap (61042)
- 5) Muffler bracket.
- 6) 5/16" Locknut (10540)  
Repeat steps 1-6 for other side.

- 7) AN4-27 (10260). Use FIRST HOLE AFT of seat support down tube hole. Assemble hardware as shown.

- 8) 1"x 1/8" Nylon washer (20345) 2 reqd.
- 9) 1/4" Washer (10560)
- 10) 1/4" Locknut (10510) or Wingnut (10520)

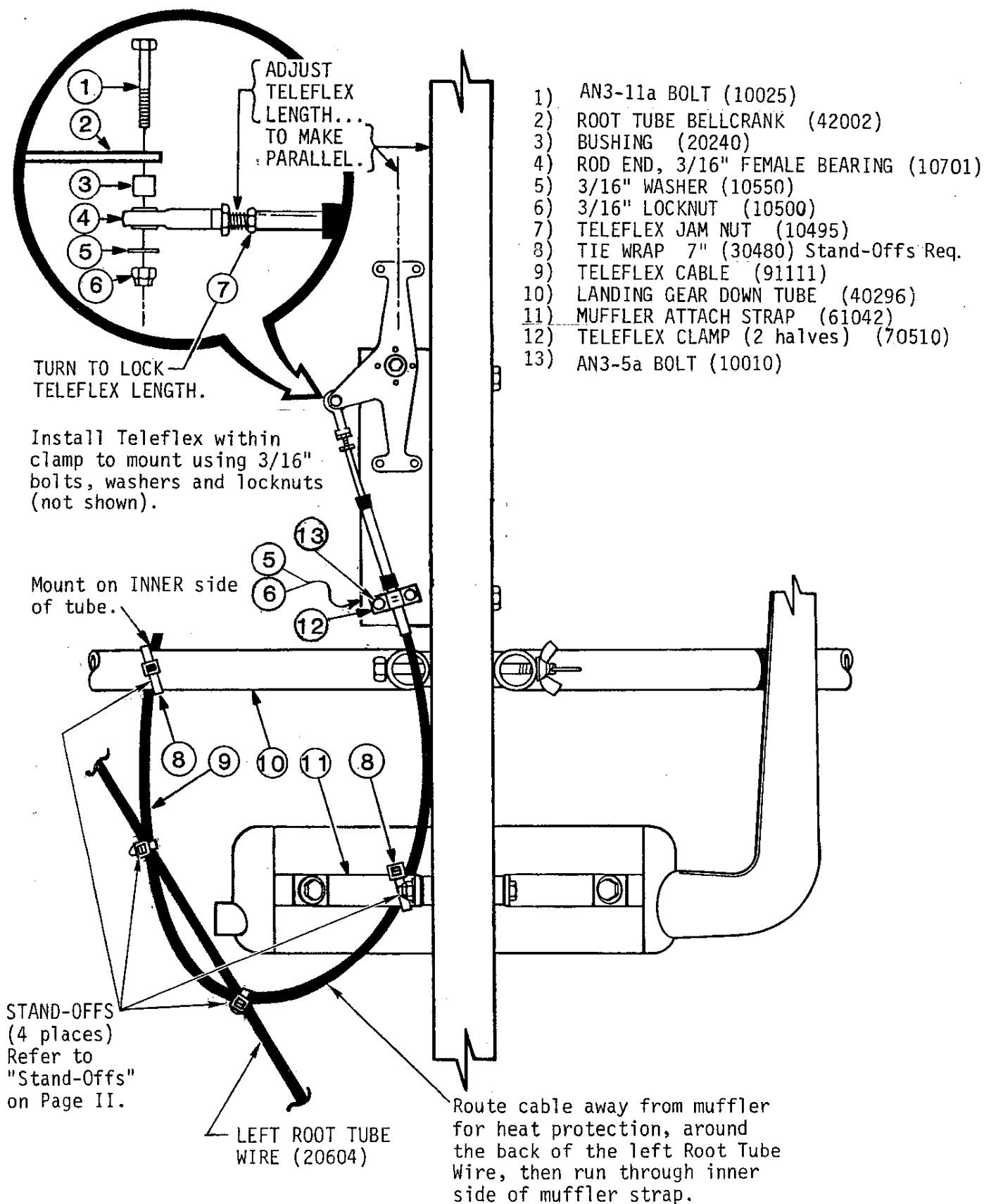
FIG. B Take MUFFLER and join together to EXHAUST HEADER, attach SPRINGS to tabs then SAFETY WIRE to tabs and route wire down through center of SPRINGS and fasten to tabs at other end.

IMPORTANT! SECURE TELEFLEX CABLE AWAY FROM MUFFLER!



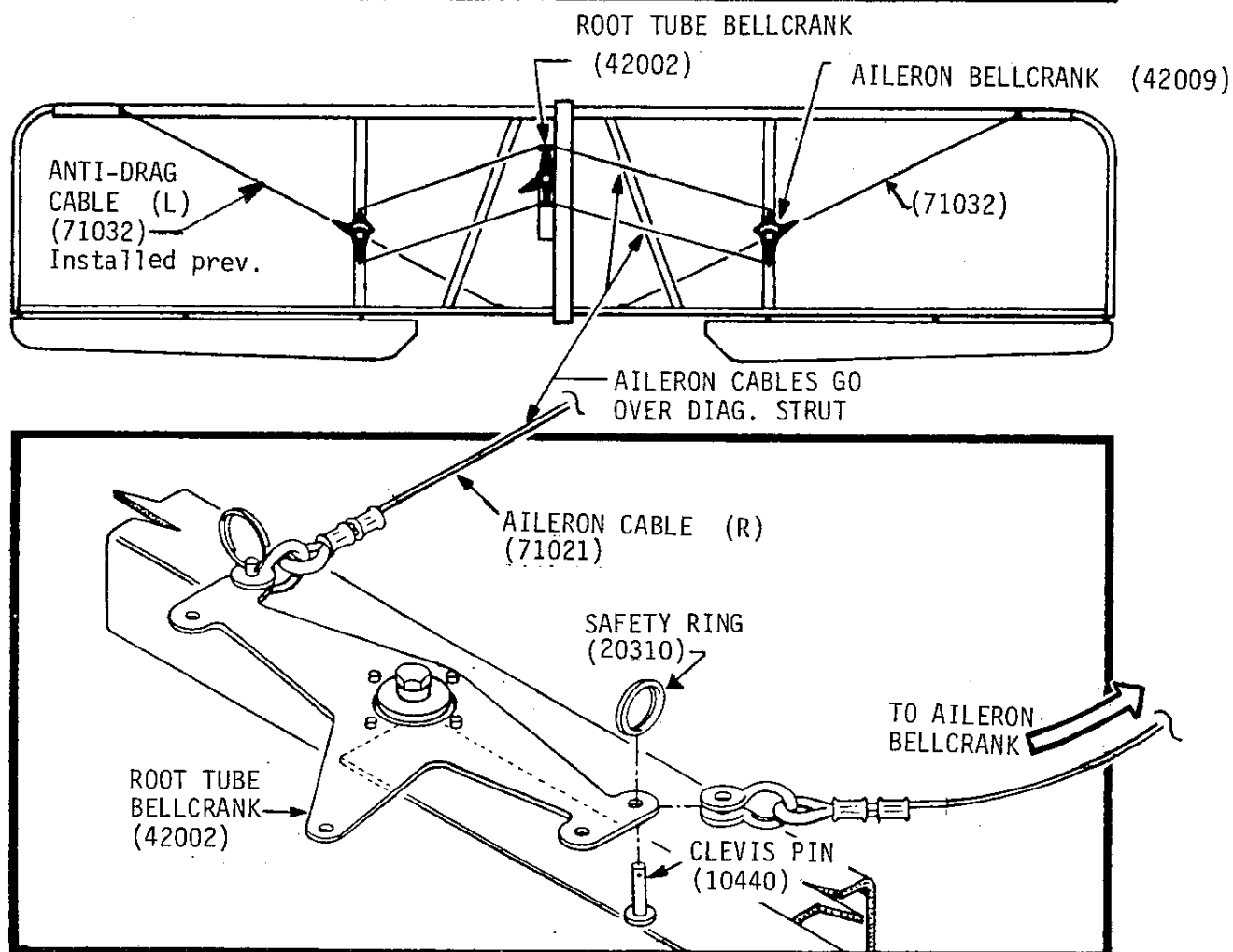
# AILERON INSTALLATION

## ROOT TUBE BELLCRANK/TELEFLEX INSTALLATION



# AILERON INSTALLATION (CONT'D)

## AILERON CABLE ATTACHMENT



LEFT SIDE AILERON CABLES  
AND TELEFLEX ASSY. NOT  
SHOWN FOR CLARITY.

Uncoil cables hanging from Aileron Bellcrank. Pass them through wing surfaces (and over diagonal strut) to Root Tube Bellcrank.

"AVOID CROSSING CABLES" Connect them to the appropriate left/right, fore/aft position on the Root Tube Bellcrank with clevis pins and safety rings, as shown.

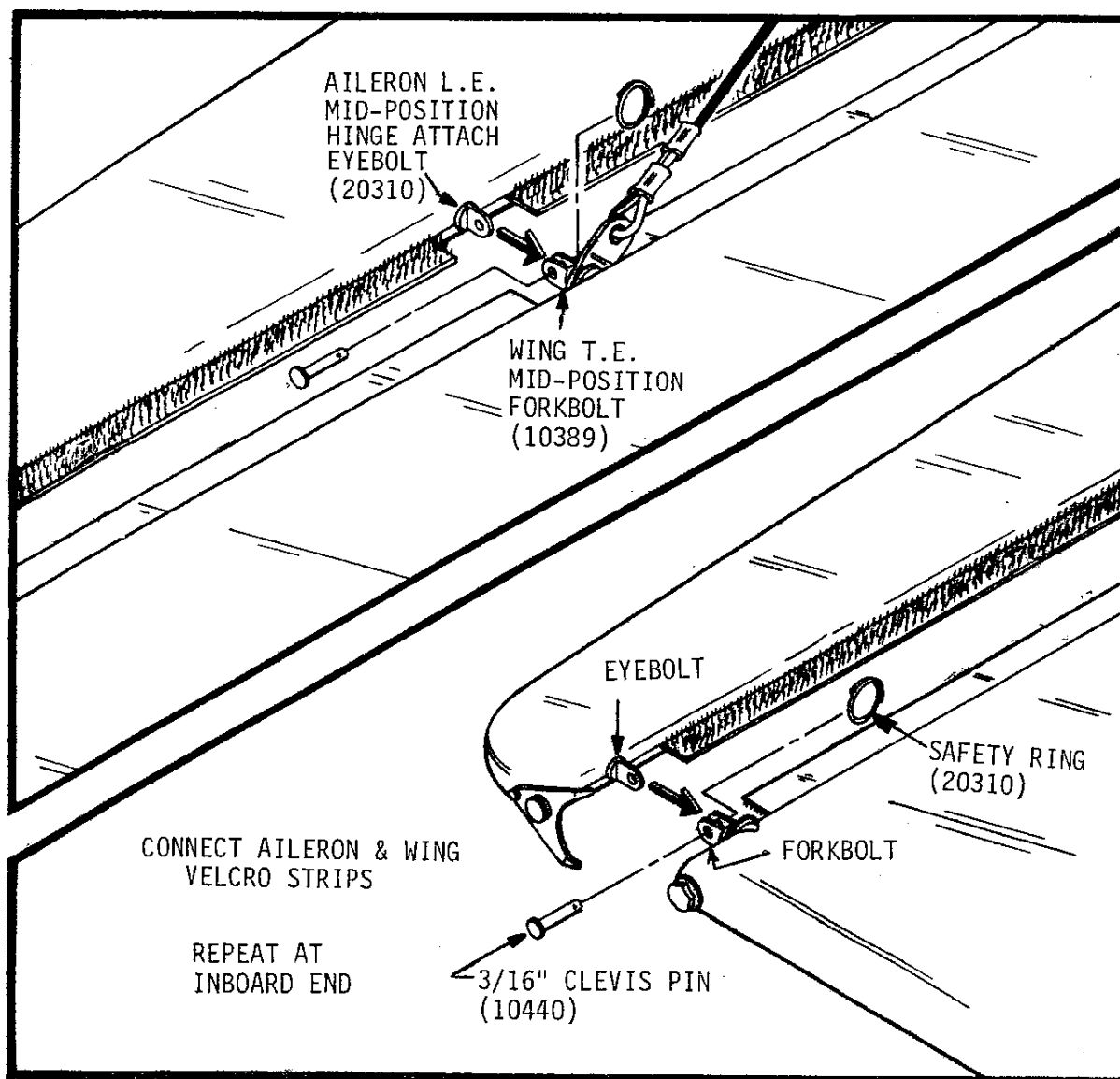
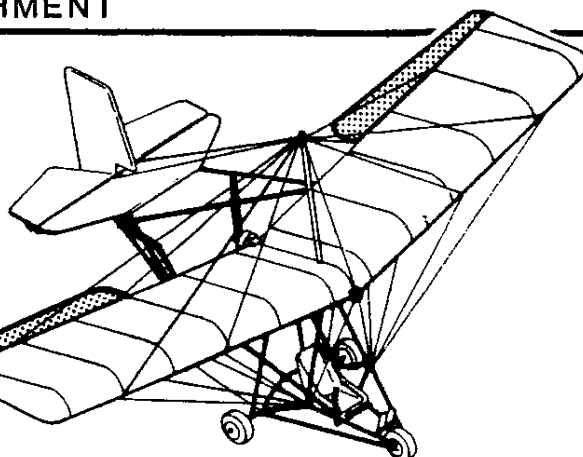
**REPEAT ON OTHER WING**

# AILERON INSTALLATION (CONT'D.)

## AILERON TO WING ATTACHMENT

Attach aileron to wing at mid-position Aileron L.E. eyebolt and Wing T.E. mid-position forkbolt with clevis pin and safety ring.

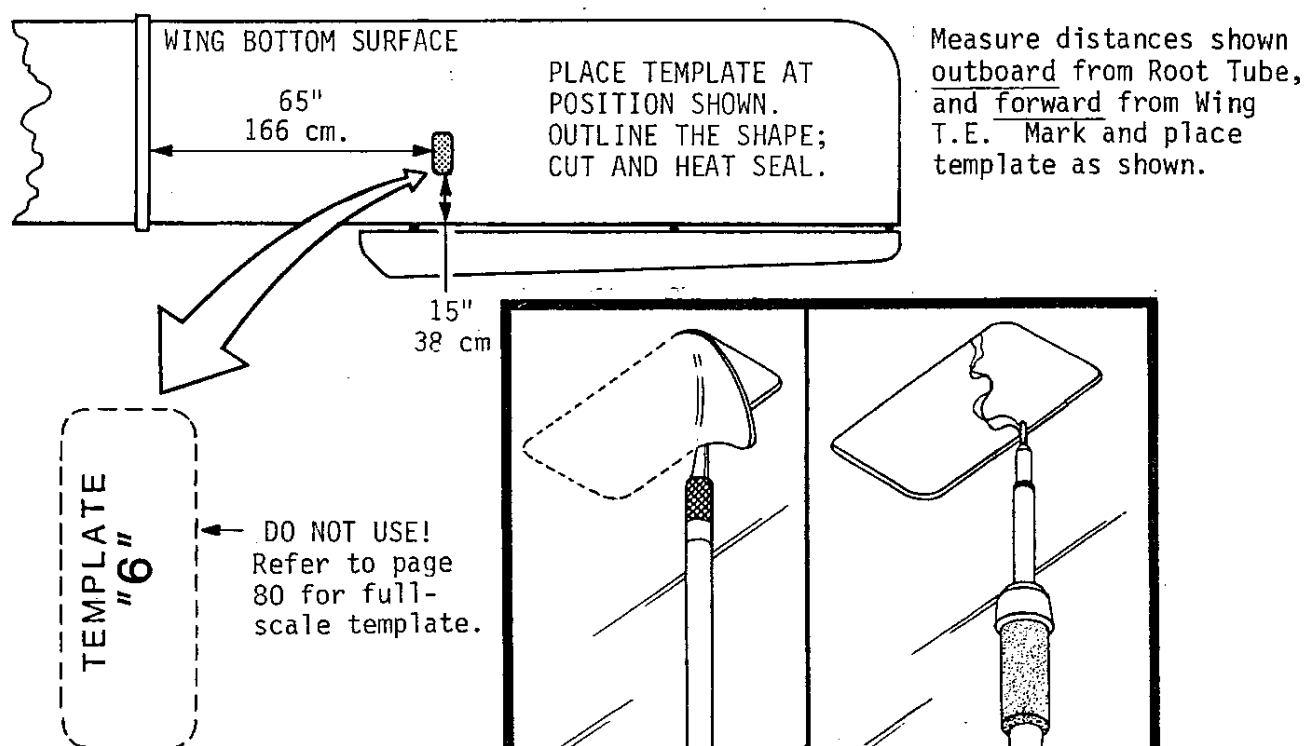
REPEAT at inboard and outboard ends.  
(MID- AND OUTBOARD SHOWN)



REPEAT ON OPPOSITE SIDE

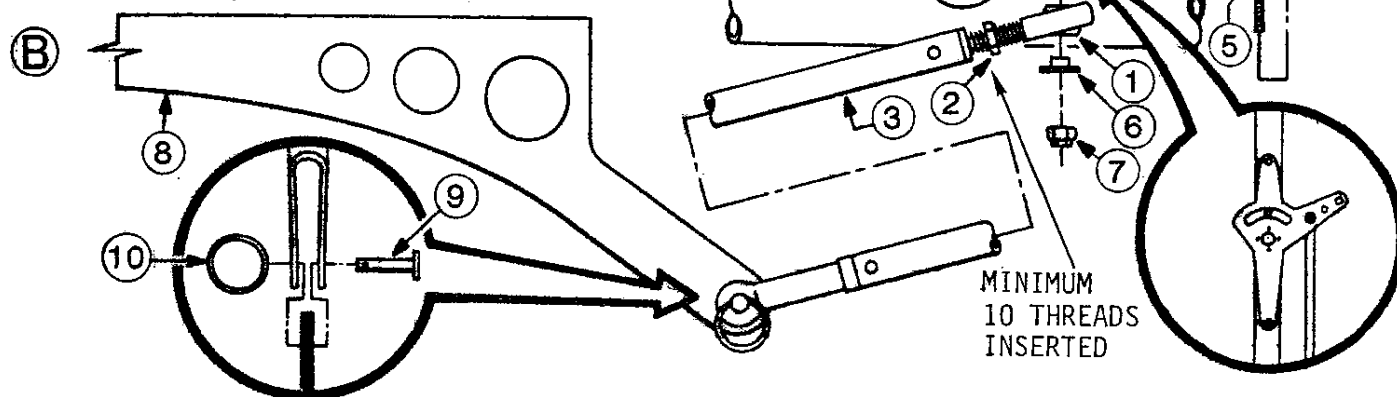
# AILERON INSTALLATION (CONT'D.)

## PUSHROD ASSEMBLY INSTALLATION



- Ⓐ Rotate Male Rod End Bearing a MINIMUM of 10 threads onto Pushrod Assembly. Insert rod through slot (above) and attach to innermost hole on Root Tube Bellcrank.

- Ⓑ Connect Push Rod Assembly aft end (w/fork) to Aileron Horn with clevis pin and safety ring.



- 1). 10700 MALE ROD END BEARING
- 2). 10631 1/4" JAM NUT
- 3). 71022 PUSHROD ASSEMBLY
- 4). 42009 AILERON BELLCRANK
- 5). 10025 AN3-11a BOLT

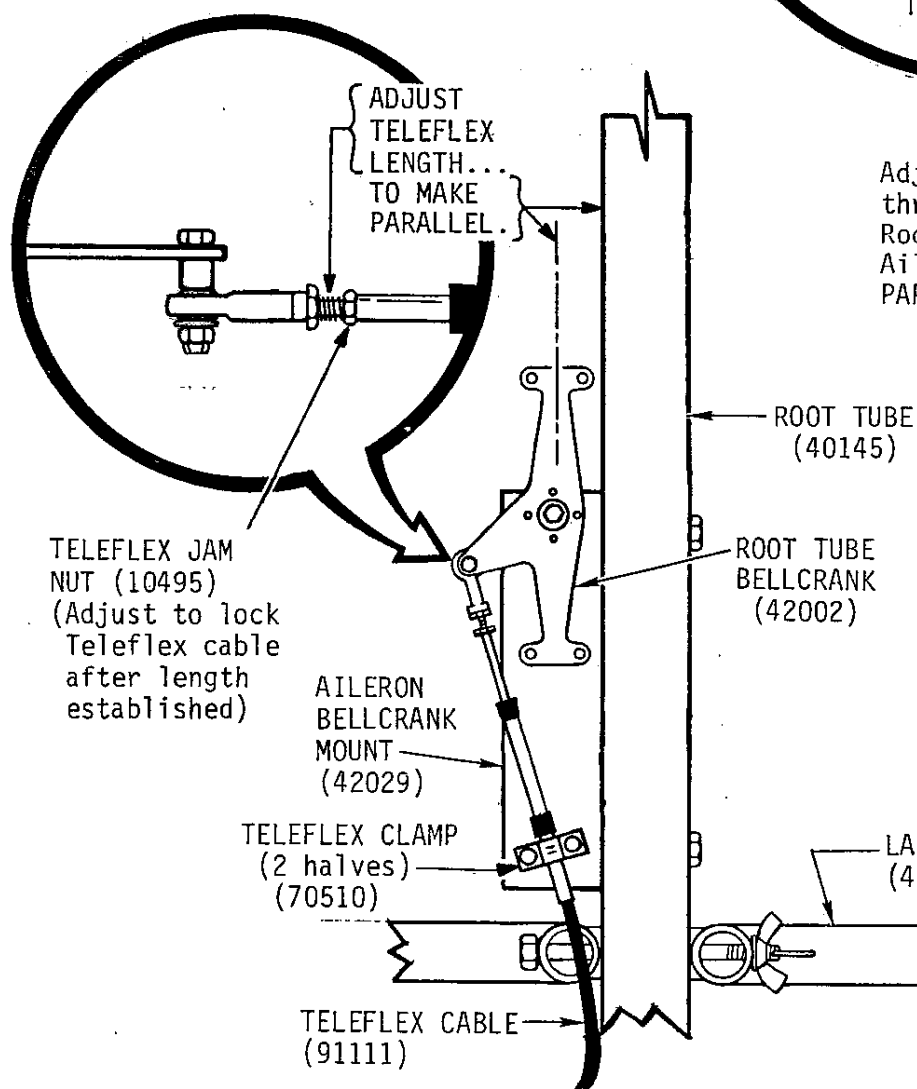
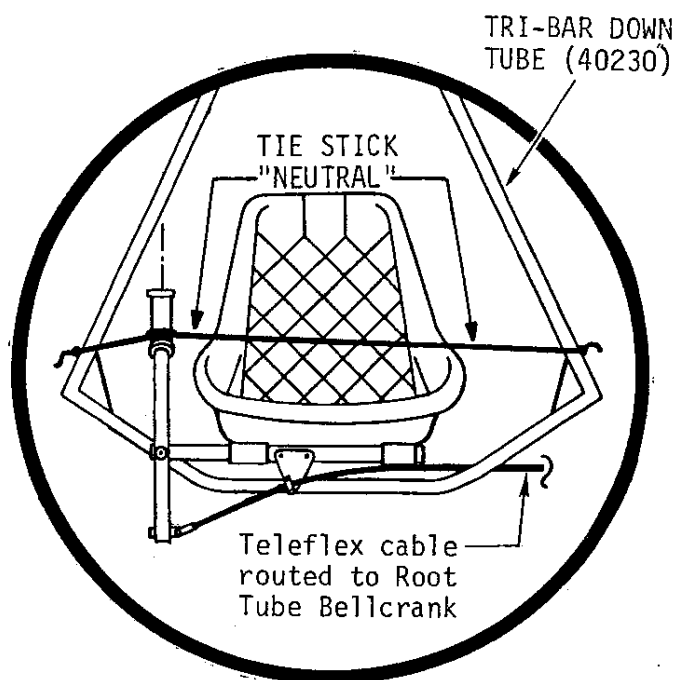
- 6). 20241 'T' BUSHING
- 7). 10516 3/16" THIN LOCKNUT
- 8). 71018 AILERON HORN
- 9). 10440 3/16" CLEVIS PIN
- 10). 20310 SAFETY RING

REPEAT ON OTHER WING

# AILERON INSTALLATION (CONT'D)

## ROOT TUBE BELLCRANK/TELEFLEX ADJUSTMENT

Tie Control Stick in "neutral" position with separate rope to each Tri-Bar Down Tube, as shown, (or have helper hold stick in position).



Adjust amount of Teleflex thread-travel into female Rod End Bearing until Aileron Bellcrank is PARALLEL to Root Tube.

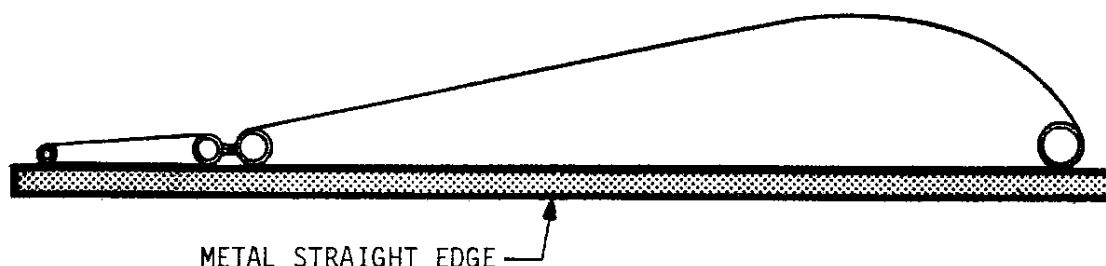
(NOTE: IF ROPES ARE USED, KEEP THEM TIED FOR FOLLOWING STEP ON NEXT PAGE.)



## AILERON INSTALLATION (CONT'D.)

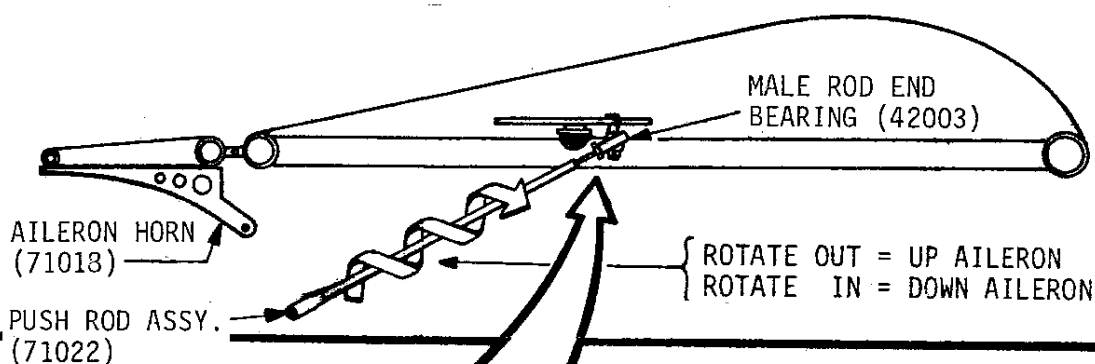
### AILERON DEFLECTION ADJUSTMENT

- ① BEGIN WITH STICK HELD "NEUTRAL." Initially, ailerons may be deflected up or down. PURPOSE: to create same chord (a flat, continuous line) along both wing and aileron bottom surfaces.

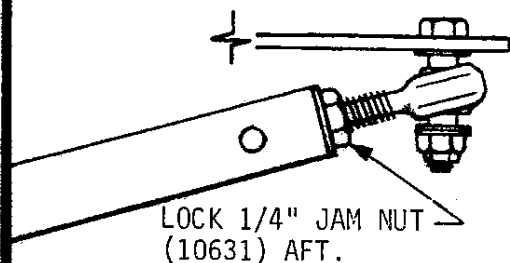


- ① Place long metal straight edge along both wing and aileron bottom surface to determine amount of aileron up or down deflection.
- ② Temporarily disconnect aft end of Push Rod Assembly from Aileron Horn. Rotate rod in directions (shown below) to adjust up or down.

- ② NOTE: PUSH ROD ASSEMBLY MUST HAVE A MINIMUM OF 10 THREADS OF ROD END BEARING INSTALLED.



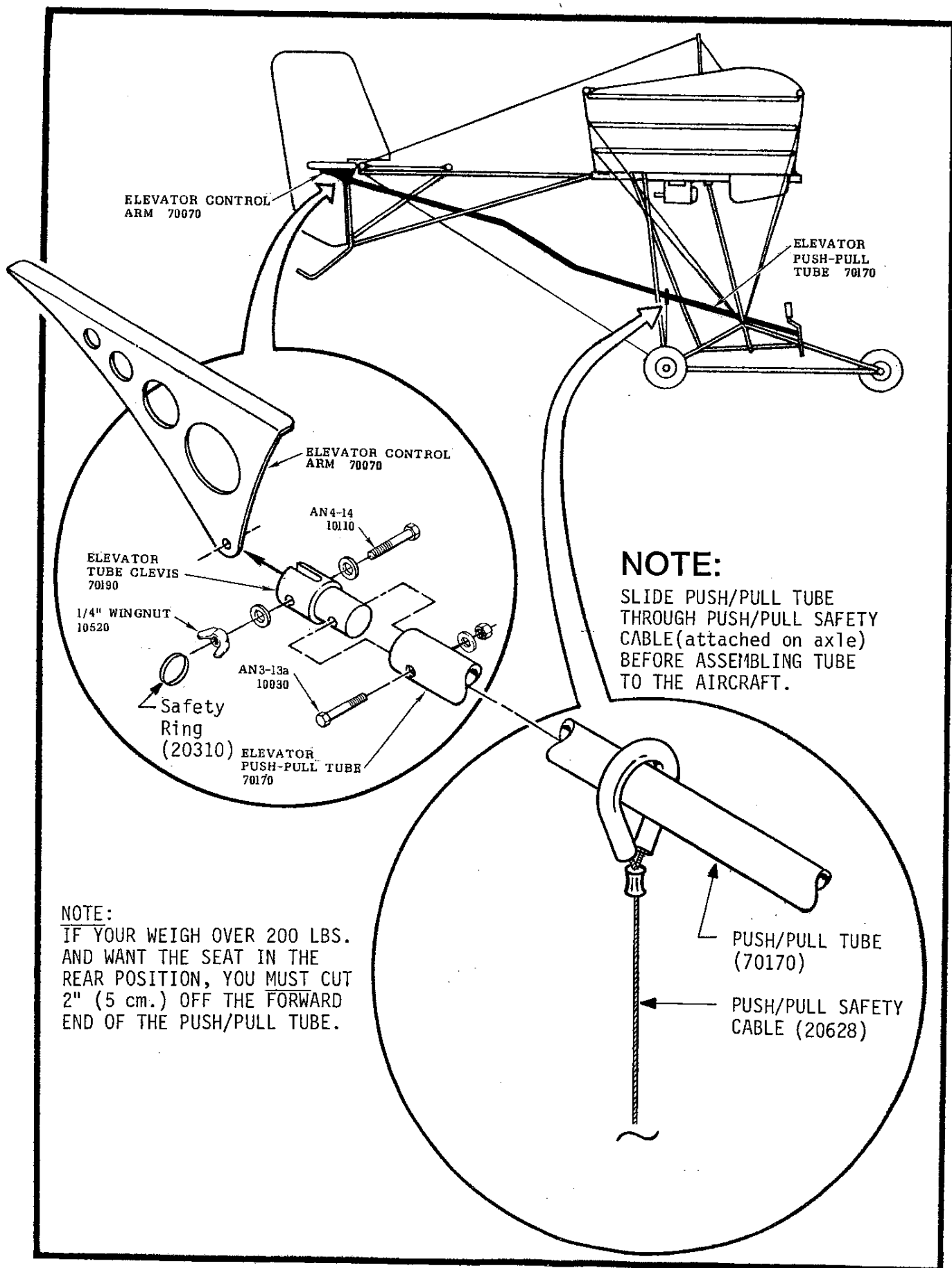
- ③ WITH BOTTOM SURFACES ALIGNED...



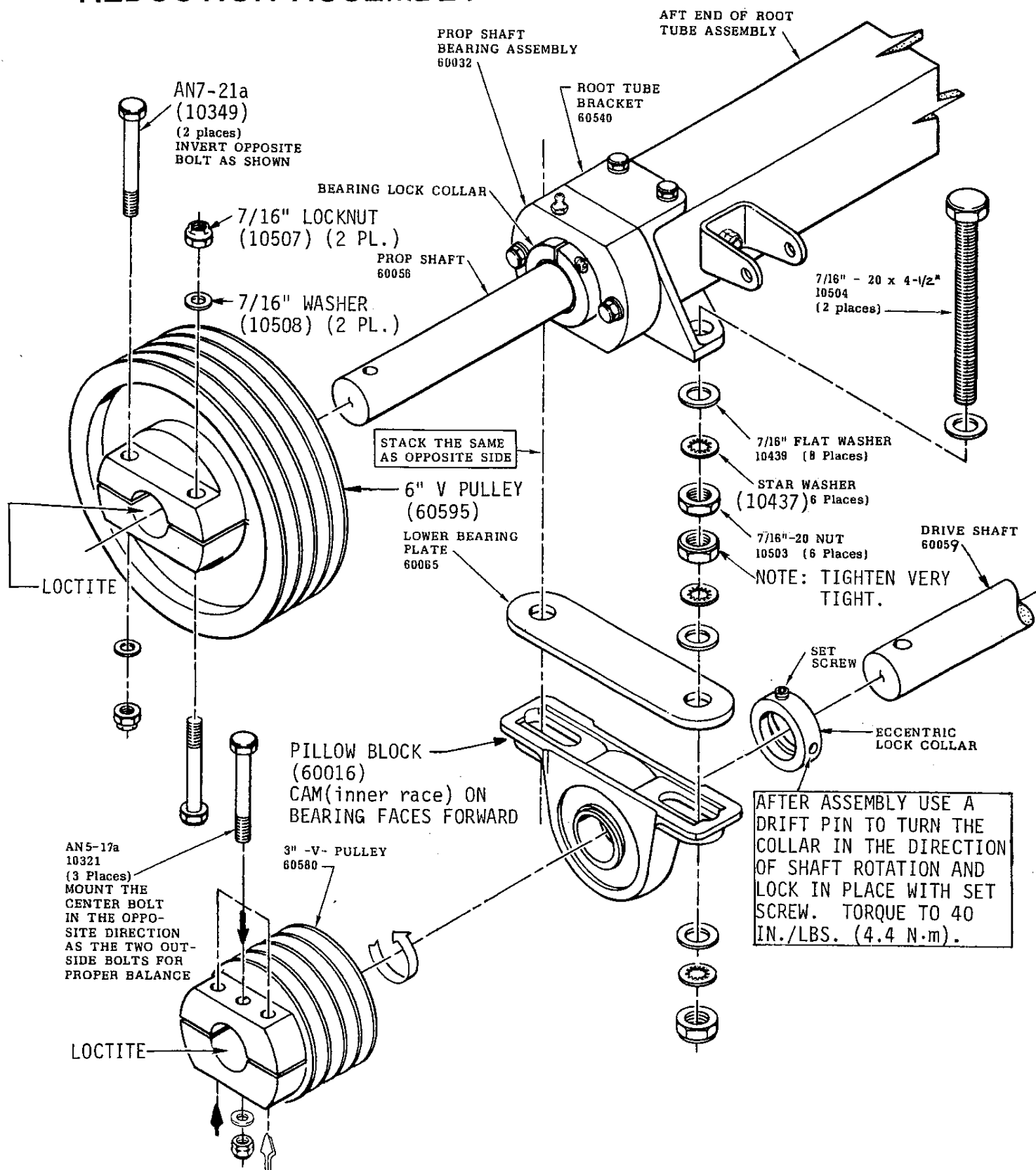
- ③ Reconnect Push Rod Assembly aft (fork) end to Aileron Horn. Check wing/aileron alignment. REPEAT UNTIL STRAIGHT. When adjustment is complete, rotate Jam Nut aft to "lock" Push Rod Assembly length.

REPEAT ON OTHER WING

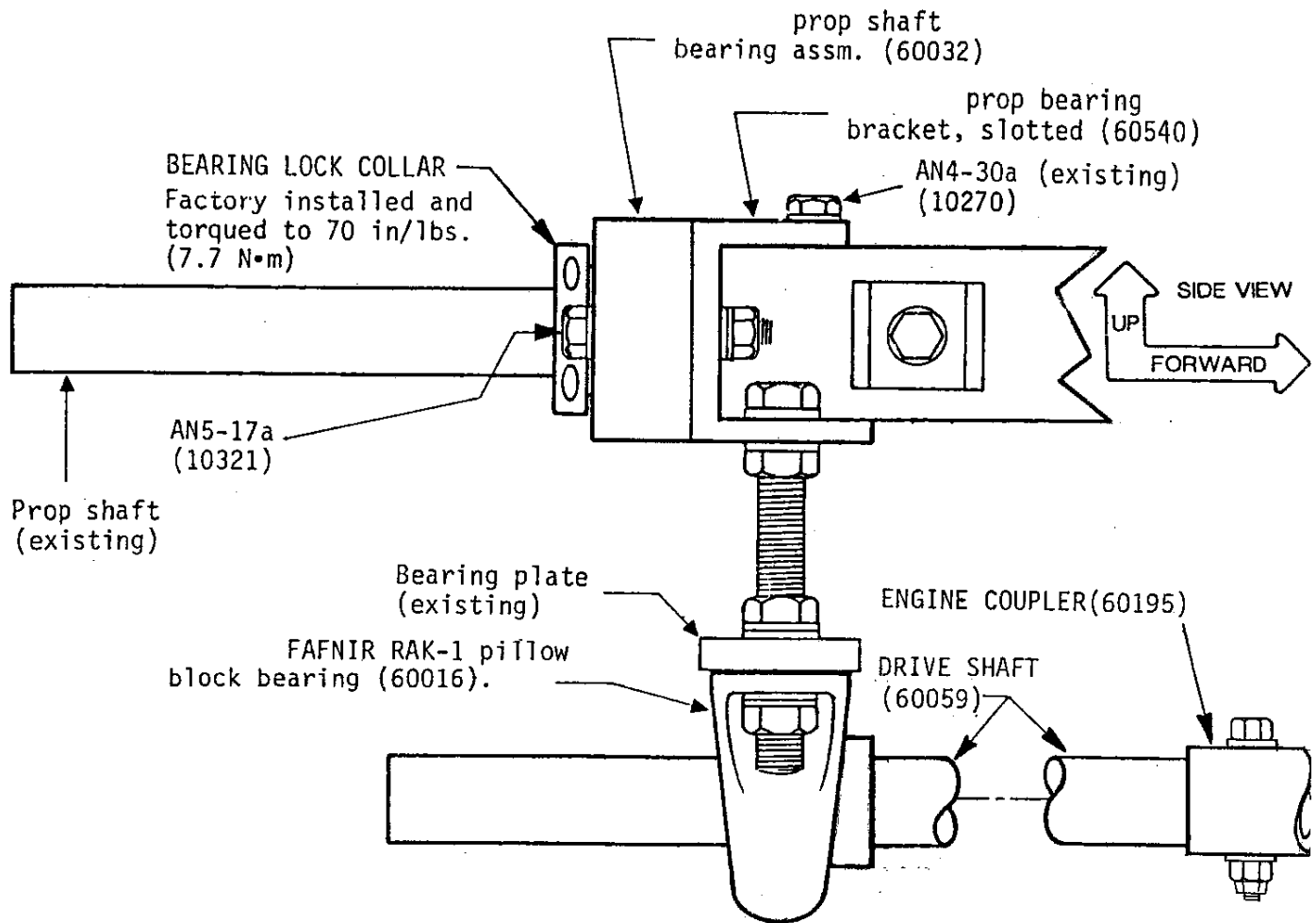
(NOTE: Subsequent flight testing may show a tendency for the airplane to favor a slight roll in one direction or the other with the control stick held in neutral position. This characteristic simply indicates the need for additional fine-tuning of aileron deflection.)



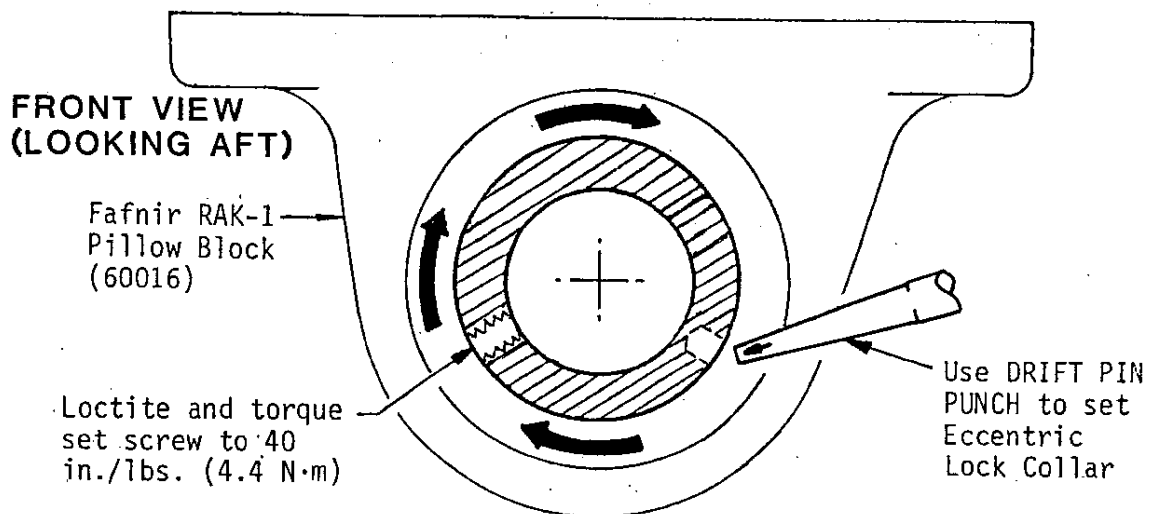
## REDUCTION ASSEMBLY

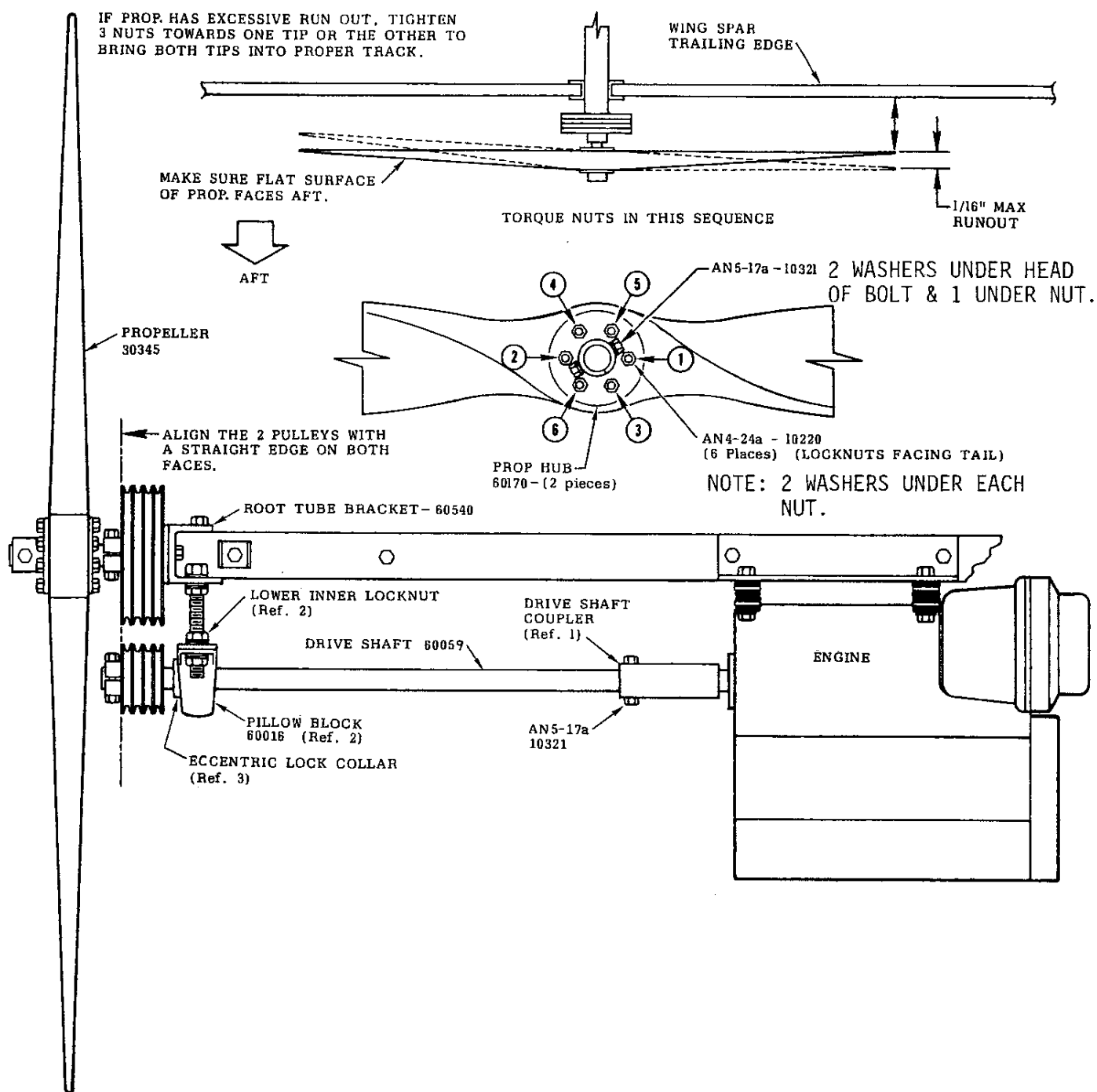


# DRIVESHAFT/BEARING ASSEMBLY



**IMPORTANT:** Rotate Eccentric Lock-Collar in DIRECTION OF SHAFT ROTATION (clockwise, when standing in front of Pillow Block Bearing looking aft.)





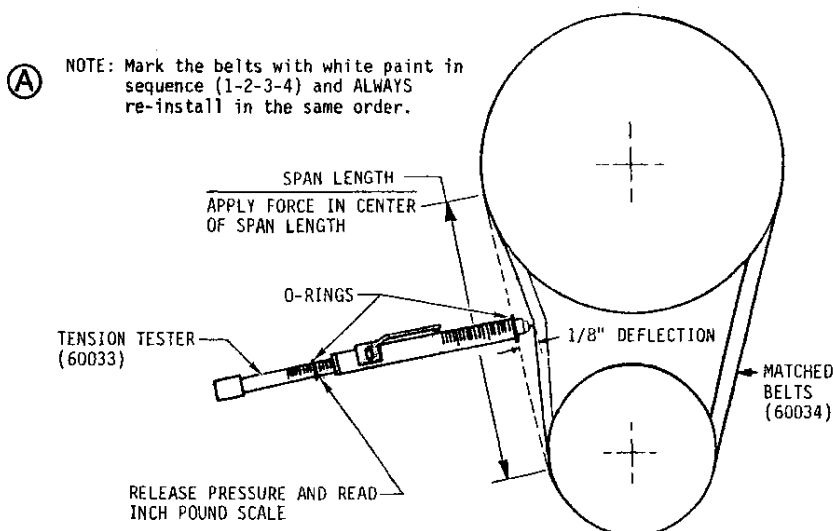
1. APPLY LOCTITE TO THE INNER BORE OF THE 6" PULLEY AND SLIDE IT ONTO THE PROP. SHAFT. MOUNT BELTS AND ALIGN THE 2 PULLEYS WITH A STRAIGHT EDGE AS SHOWN. ATTACH PULLEY WITH 2 BOLTS MOUNTED IN OPPOSITE DIRECTIONS (FOR BALANCE).
2. ADJUST BELT TENSION AND LOCK PILLOW BLOCK IN PLACE.
3. ATTACH PROP AS SHOWN AND TORQUE NUTS.

**IMPORTANT! READ COMPLETE SEQUENCE  
BEFORE ATTEMPTING ASSEMBLY**

1. Locate the Tension Tester (60033) supplied with the kit. Read the instructions for its use in illustration 'A' below. Now refer to illustrations 'D' and 'E' in the Engine Mount Procedure. Adjust the tension on the Reduction Drive Belts (60034) very carefully, starting loose and tightening gradually. The distance between the underside of the Root Tube Bracket (60540) and the upper surface of the Lower Bearing Plate (60065) should be equalized by adjusting the Lower Inner Jam Nuts. While adjusting, repeatedly use the Tension Tester as illustration 'A' until the exact tension is achieved.

illustration 'A'

- A1. Look at the Tension Tester (60033). Notice that it consists of a narrow shaft which will push into a thick shaft. See that when pushed, the narrow shaft has a spring resistance. Notice that both shafts have measured graduations on them. The thick one has inches and centimeters. The narrow has pounds and kilograms. Notice that both shafts have rubber "O" Rings on them. Push the narrow shaft "O" Ring down to its zero mark. Position the thick shaft "O" Ring 1/8" from the tip of the thick shaft. The Tension Tester is now set for use. Readjust the "O" Rings before each test.
- A2. Position the tip of the thick shaft in the center of the aft Belt span length (see illustration 'A' on next page) and the tip of the narrow shaft in the palm of your hand. Apply pressure through your hand to the Belt until the "O" Ring on the thick shaft touches the adjacent Belt. Release the pressure.
- A3. The "O" Ring on the narrow shaft will have been moved back from Zero by the pressure.
- A4. Read the pounds/kg. measurement. Carefully adjust the Belt tension until the narrow shaft "O" Ring shows a reading of 8 lb. (3.6 kg.). The Reduction Drive Belts are correctly tensioned.
- A5. After 30 minute break-in, re-adjust to 6 lb. (2.72 kg.).



## **BEARING LUBRICATION**

NOTE: TOO MUCH GREASE IS AS BAD AS NOT ENOUGH.

BOTH drive shaft and prop shaft bearing MUST BE PERIODICALLY RELUBRICATED to assure long life. The bearings should be lubricated EVERY 50 HOURS OF OPERATION and 30 HOURS IF OPERATED IN EXTREME DIRT/DUST ENVIRONMENT.

REMOVE the propeller and use EXTREME CAUTION as the bearings ideally should be lubricated while in operation (run engine at idle and DO NOT OVERSPEED).

Feed the specified lubricant into the bearing SLOWLY until a slight "bead" (of lubricant) forms around the seal.

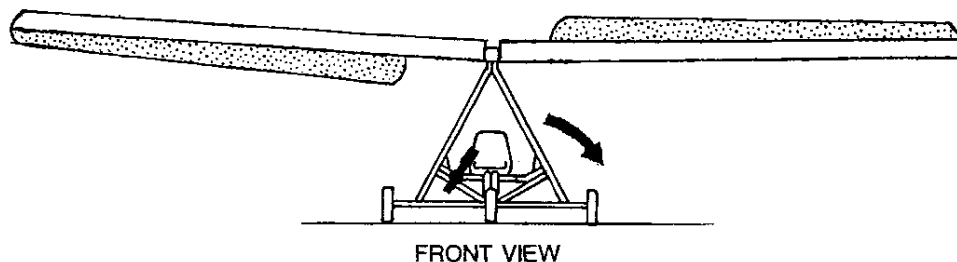
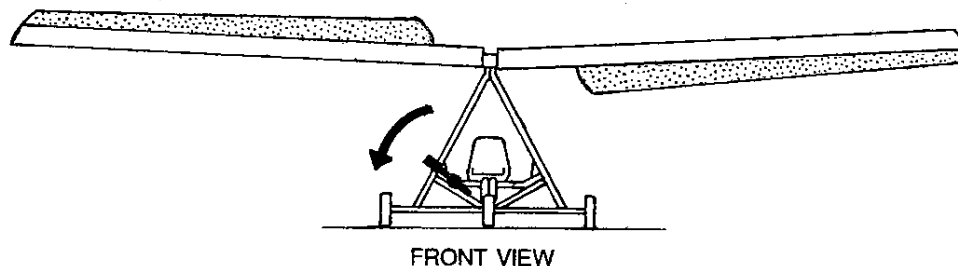
PROPER LUBRICATION OF BEARINGS PREVENTS EXCESSIVE WEAR OF PARTS, PROTECTS BALL RACES, BALLS, ETC. FROM CORROSION AND HELPS IN DISSIPATING INTERNAL HEAT.

### **USE SPECIFIED LUBRICANT ONLY!**

USE ONLY A LUBRICANT CONFORMING TO A NLGI GRADE II CONSISTENCY, IDEALLY A LITHIUM BASED LUBRICANT.

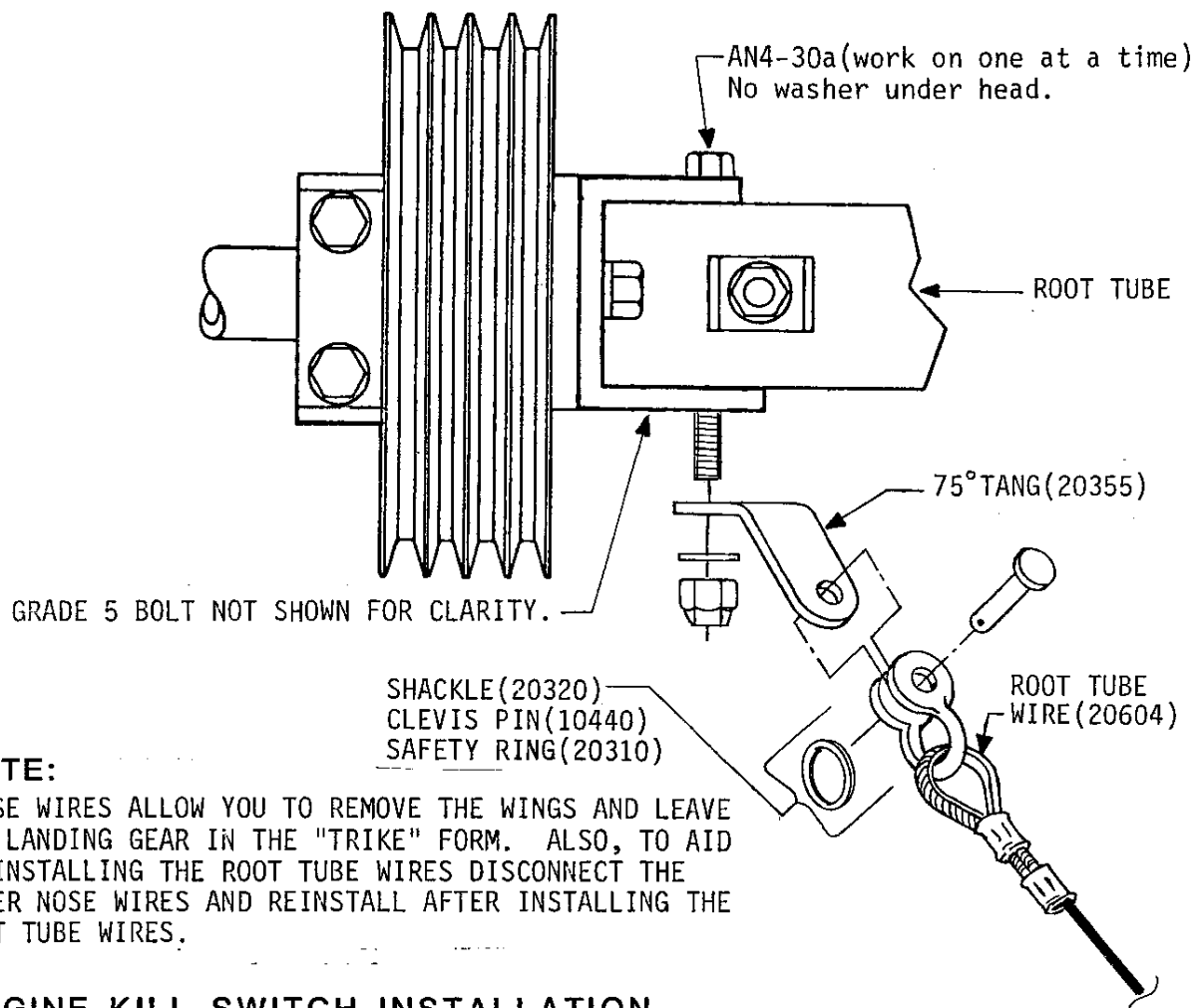
## **AILERON SYSTEM CHECK-IMPORTANT!**

You need to check and see if your aileron system is properly assembled by moving the control stick from one side to the other. The ailerons of course, should acuate in opposite directions, but just as important is when the control stick is to the right, the right aileron should be "UP" and vice versa for the control stick moved to the left. If this is not the case, you must correct the linkage problem before going on to the next assembly.



## ROOT TUBE WIRE / KILL SWITCH ASSY.

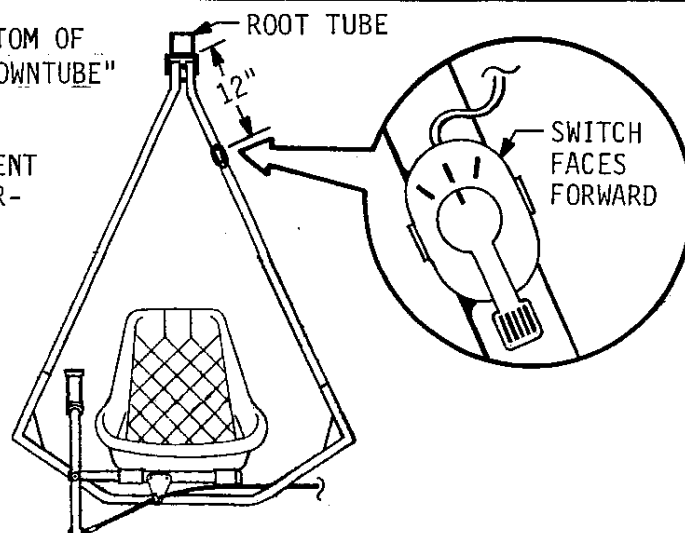
Remove, work on, and reassemble AN4-30a BOLTS one at a time.  
Take off all washers and reassemble hardware as shown.



## ENGINE KILL SWITCH INSTALLATION

MEASURE 12"(30. cm.) FROM THE BOTTOM OF THE ROOT TUBE DOWN THE "TRI-BAR DOWNTUBE" AND INSTALL KILL SWITCH.

KILL SWITCH FACES FORWARD TO PREVENT ACCIDENTAL TURNING OFF BY INTERFERENCE FROM HELMET OR PULL STARTER HANDLE ON THE ENGINE.

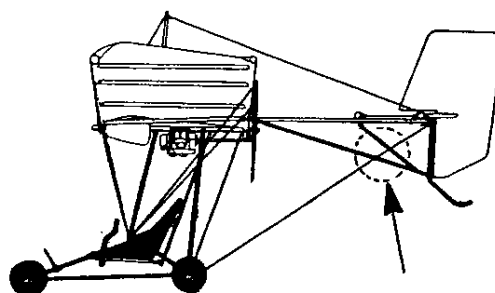




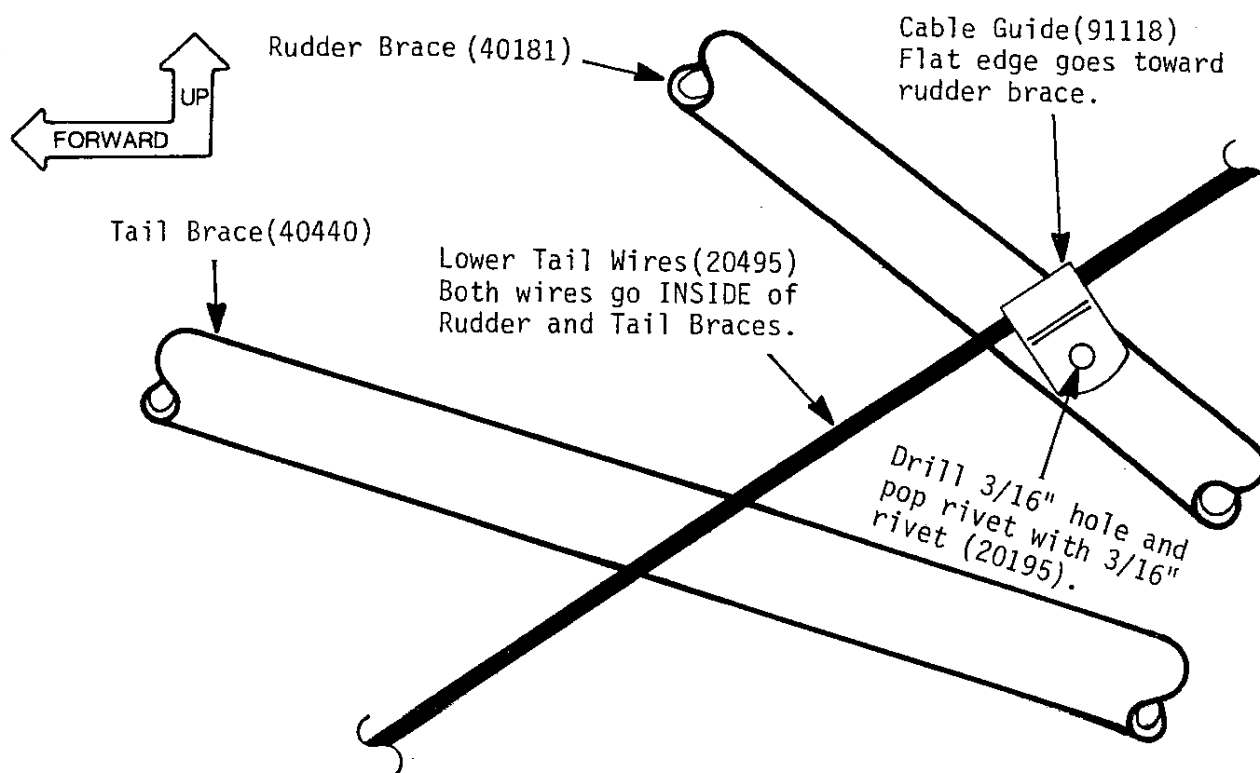
## CABLE GUIDE ASSY.

With plane in a completed state as if ready to fly and king post tightend, the following assembly can now be done.

Make sure Lower tail wires are inside the two braces as shown. Slip on cable guide(91118) with the flat edge toward rudder brace. Line up hole so it is over center of tube and drill and rivet as described below.



SEE DETAILED DRAWING BELOW

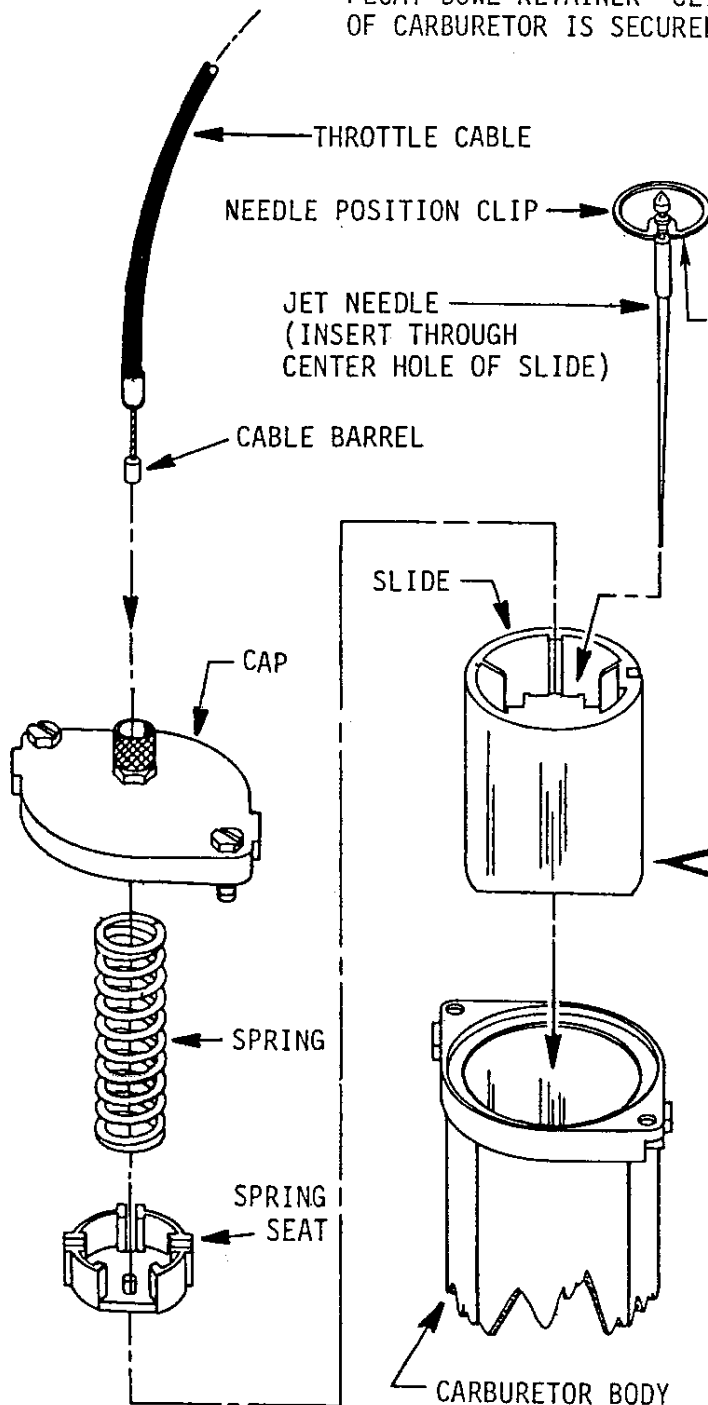


# THROTTLE CABLE ASSY.

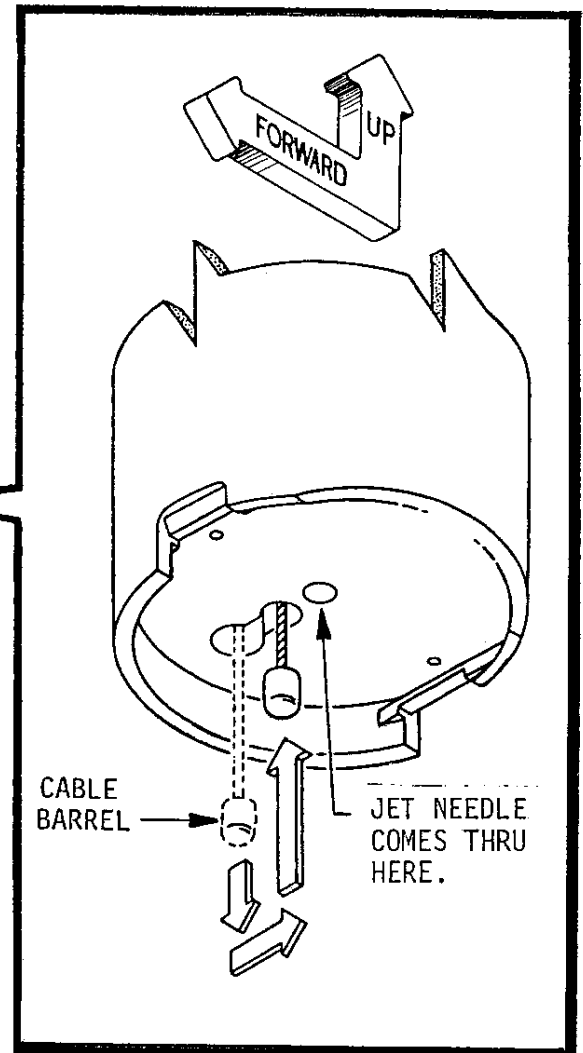
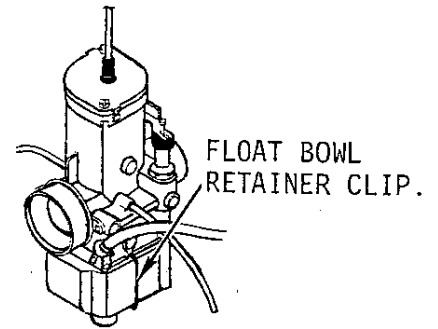
73

Route throttle cable up the TRI-BAR down tube and secure with plastic tie wraps. take off CAP of CARBURETOR. (be careful of SPRING popping out.) Insert JET NEEDLE down through center hole of slide, then take CABLE BARREL and insert it through hardware as shown. Secure CABLE BARREL in SLIDE as SHOWN in detail on right. Take completed assembly and set into CARBURETOR BODY, then secure Cap with screws. After assembly is complete, install AIR FILTER (60000). See fuel system Assembly on page 21.

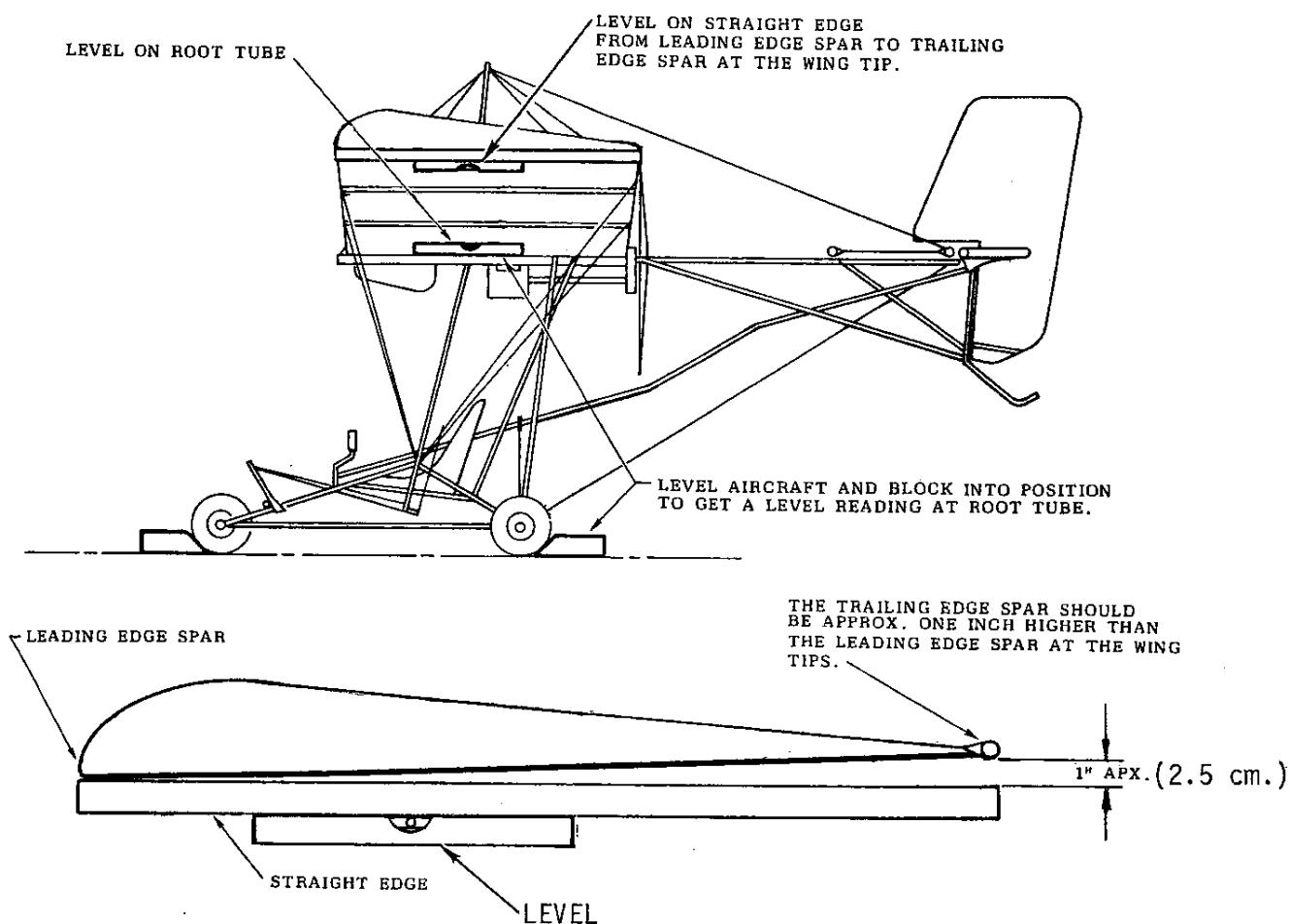
NOTE: BE SURE TO CHECK AND SEE THAT FLOAT BOWL RETAINER CLIP ON BOTTOM OF CARBURETOR IS SECURELY IN PLACE.



Attach CLIP in center slot. For LEANER setting place clip in upper slot. For RICHER setting place clip in lower slot.



# WING WASHOUT



- ① LEVEL AND BLOCK THE AIRCRAFT AS SHOWN ABOVE TO GET A LEVEL READING ACROSS THE ROOT TUBE FORWARD AND AFT.
- ② USE SAME LEVEL ON A STRAIGHT EDGE TO GET READING AT WING TIPS FORWARD AND AFT. AS SHOWN ABOVE.

CORRECT WING WASHOUT IS AN IMPORTANT FACTOR IN THE STALLING CHARACTERISTICS AND LOW SPEED HANDLING OF YOUR AIRCRAFT. WASHOUT IS SET AT THE FACTORY THROUGH PRECISE WIRE LENGTHS; HOWEVER, IT SHOULD BE CHECKED BEFORE FLIGHT TO BE CERTAIN THAT THE ANGLES ARE WITHIN FACTORY SPECIFICATIONS.

- ③ MAKE SURE THE KING POST IS ADJUSTED AND ALL THE SLACK IS OUT OF THE WIRES.
- ④ CHECK ALL WIRES FOR IMPROPER LOCATION, TWIST ETC.

WASHOUT AT THE TRAILING EDGE APX. 1"

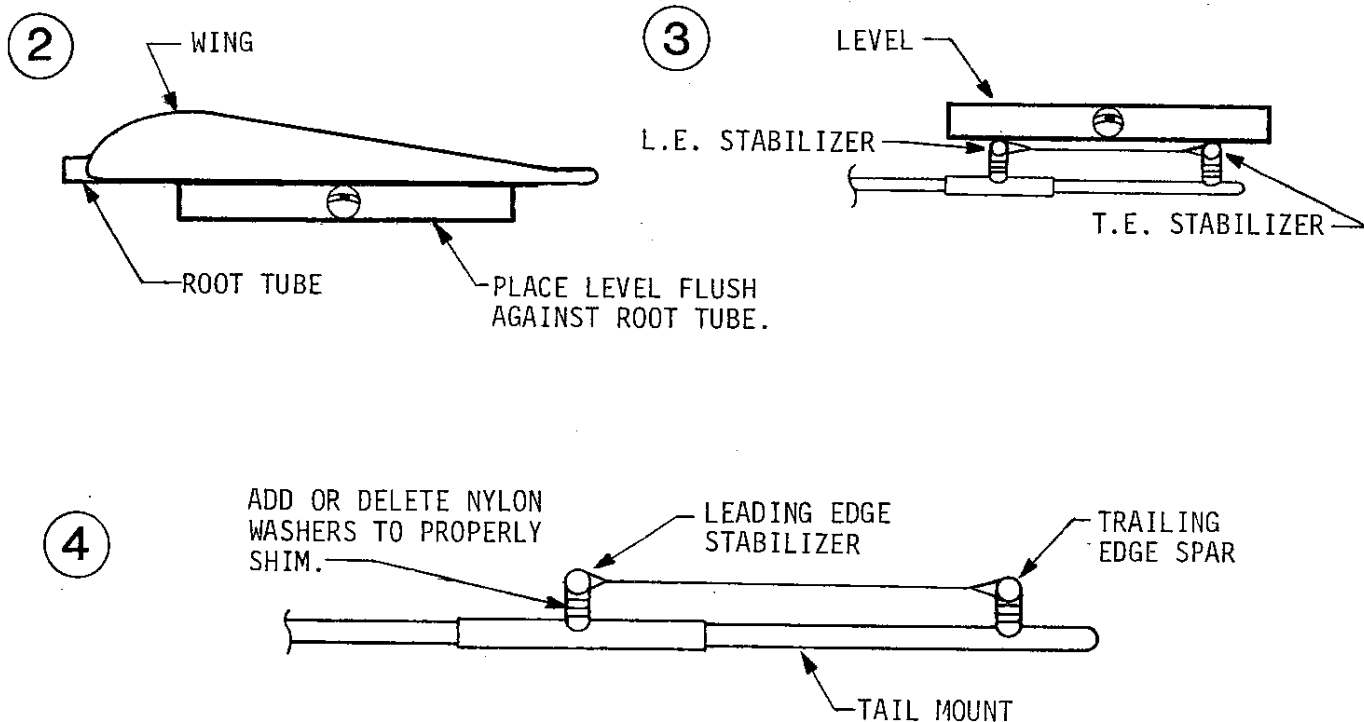
IF PROBLEMS OCCUR FEEL FREE TO CONTACT YOUR DEALER.

## WING/STABILIZER INCIDENCE

- 1) MAKE SURE KING POST IS ADJUSTED SO ALL SLACK IS OUT OF THE WIRES.
- 2) PLACE LEVEL ON THE UNDERSIDE OF THE ROOT TUBE AND BLOCK UP MAIN AXLE UNTIL ROOT TUBE IS LEVEL.
- 3) PLACE LEVEL ON TOP OF STABILIZER. STABILIZER LEADING EDGE SHOULD BE LEVEL WITH THE TRAILING EDGE.
- 4) IF STABILIZER IS NOT LEVEL THEN ADD OR DELETE NYLON WASHERS TO THE LEADING EDGE TO PROPERLY SHIM AND MAKE STABILIZER LEVEL.

LONGER AN40-a BOLTS AND 1/4" NYLON WASHERS ARE PROVIDED IN THE KIT FOR THIS PROCEDURE.

NOTE: DO NOT NEGLECT THIS PROCEDURE. IT HAS AN EFFECT ON FLIGHT PERFORMANCE.



Flight testing will determine whether or not the following procedure is necessary. Flight at normal cruise speed with hands off the stick will demonstrate whether the plane favors a pitch up or a pitch down attitude. If so, SHIM STABILIZER accordingly. To correct for upward pitch, ADD washers to L.E. STABILIZER. To correct for downward pitch, ELIMINATE washers from L.E. STABILIZER. See above for details.

To tune the carburetor you will be concerned with 5 adjustments:

1. Main Jet
2. Idler Jet
3. Idler Adjustment Screw
4. Air Regulating Screw
5. Jet Needle and Clip

The main jet in the carburetor will vary in size depending on altitude and atmospheric conditions in your local area. Contact your dealer regarding normal main jet size for your location.

### START UP

Close the throttle and depress the choke lever. Start the engine and as it warms up release the choke.

Let the engine warm up for approximately 5 minutes then run at full throttle for about 15 seconds to "clean out engine".

Back off the throttle and adjust the idle adjustment screw to a fast idle, approximately 2000 R.P.M. not so fast; however, that the plane wants to taxi away.

Now adjust the air regulating screw to get a smooth idle.

If the idle runs rough, it is either too "rich" or too "lean". Too rich a mixture will cause heavy smoking and a too lean mixture will cause the engine to want to die out. To correct this, turn your attention to the idler jet. For a too "rich" mixture (smoking) install a smaller numbered idler jet. If the engine runs "lean" install a larger numbered jet.

Now turn to full throttle and mid-range tuning.

Your concern here will be the "main jet". This jet is similar to the idler jet with regards to running too rich or too lean. Generally, use the largest main jet that the engine will run smoothly on. It is advised that a head temperature gauge be used and with the engine at full throttle or at mid-range (1/2 to 3/4 throttle). The temperature should not exceed 400° F. in a 4-5 minute run-up.

If the temperature exceeds 400° F. during this run-up procedure change the holding plate "clip" on the jet needle to a lower groove on the jet needle.

If at full throttle the engine "4 cycles" (fires every other time) or emits heavy blue or black smoke or stutters, change the main jet to a smaller size. If the engine R.P.M. increases when the throttle is backed off slightly from full throttle, the main jet is too small. This causes overheating and could lead to piston seizure.

If at full throttle the engine R.P.M. drops when the throttle is backed off slightly, the main jet is correct or slightly large. This is acceptable.

# ROTAX 377 & 503 ENGINE BREAK-IN PROCEDURE

The break-in period must be done with the engine on the aircraft and loaded with the prop. Tie off AXLE (NOT TAIL) to secure aircraft from rolling forward or place aircraft up against bldg. Be CAUTIOUS of persons and objects in the PROP BLAST AREA.

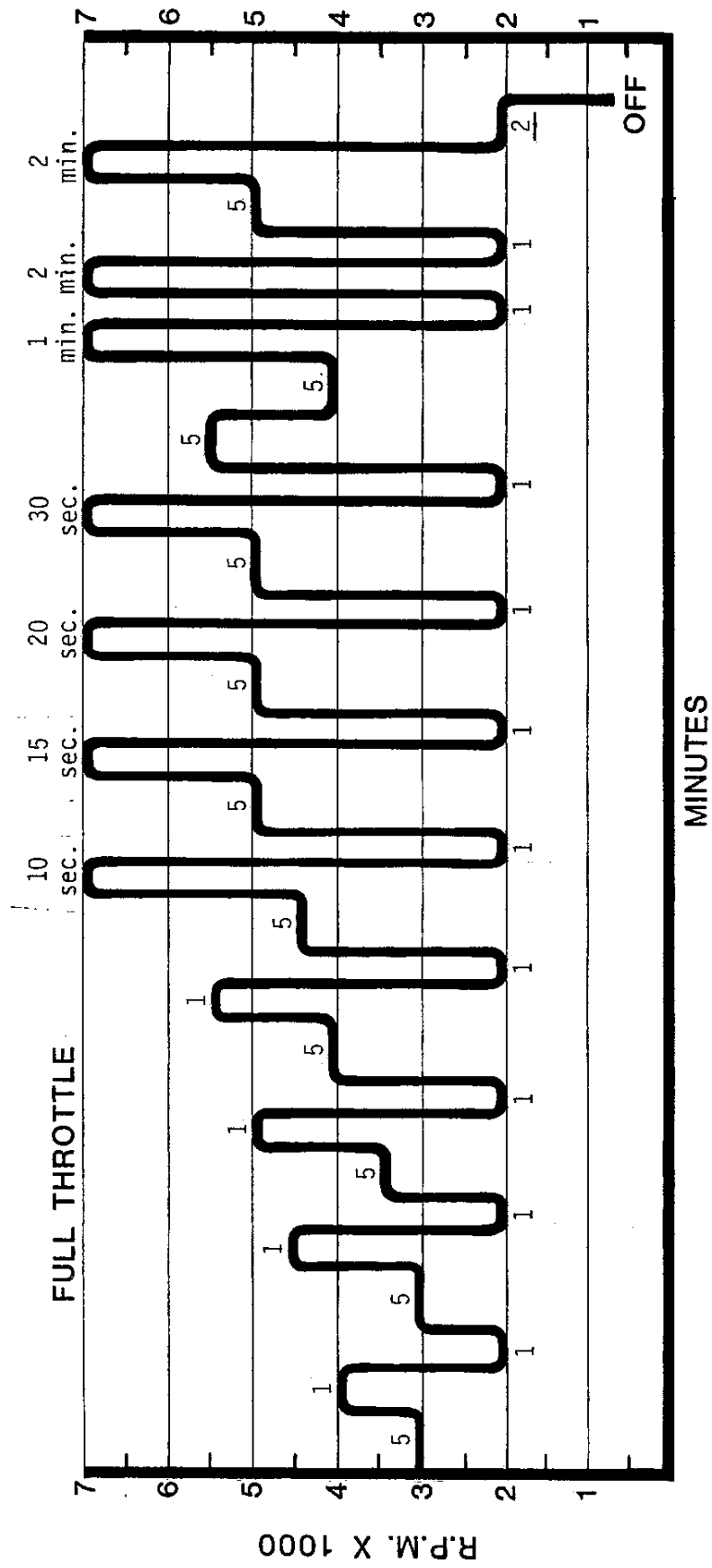
Use the graph below for break-in time/R.P.M.  
 Use a BIA TCW rated oil with the fuel.  
 The FUEL to OIL mixture ratio should be 50 to 1.  
 (ENGLISH) 5 gal. FUEL to 12.8 oz. OIL  
 (METRIC) 20 liters FUEL to 400 milliliters OIL.

CAUTION! During break-in when the engine heats up it will want to accelerate from about 5000 R.P.M. to 6000 R.P.M. The engine will be running DANGEROUSLY LEAN and may burn up. The throttle must be reduced back to 5000 R.P.M. every time the engine wants to speed up.

## IMPORTANT

After engine cools re-torque cylinder heads to 220 in. lbs. (24.5 N-m)

A final note is to adjust the idle after break-in to approx. 2000 R.P.M. Adjust SMALL SCREW for smooth idle and adjust the LARGE SCREW for idle speed.

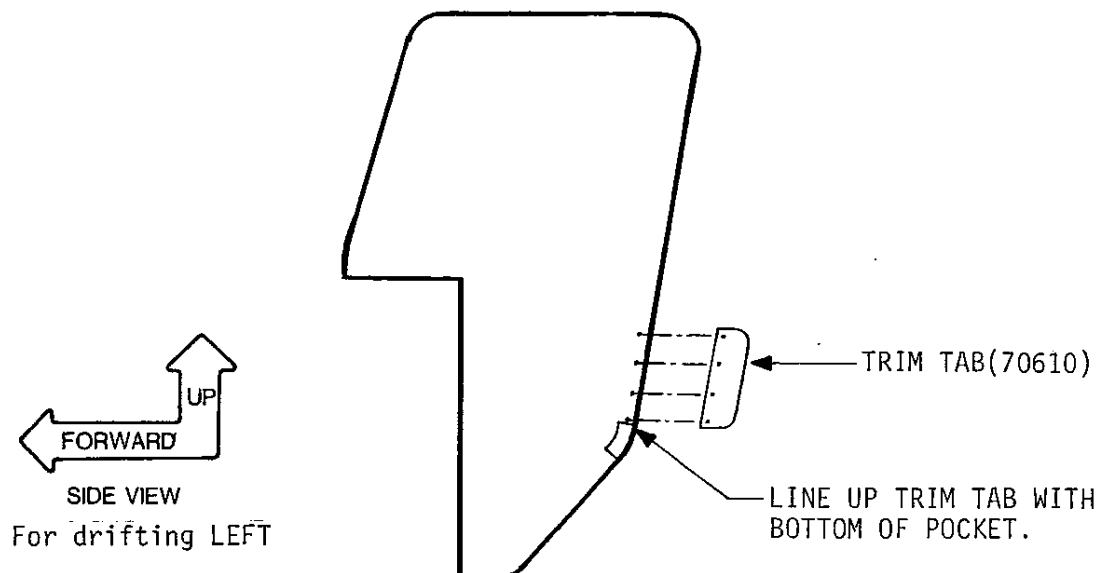


## TRIM TAB

### NOTE.

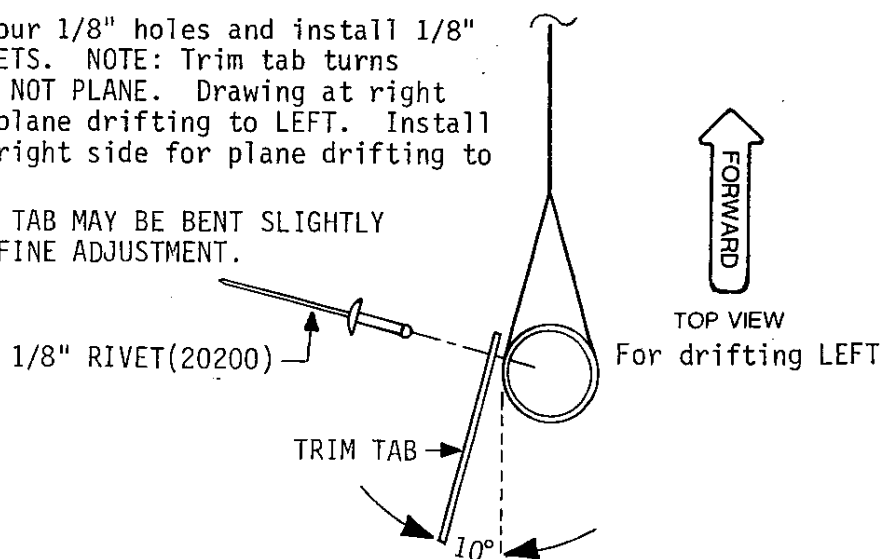
It may not be necessary to install TRIM TAB. The aircraft must first be flown to see if it wants to DRIFT off center with feet off PEDALS.

If drifting does occur, then install TRIM TAB as shown below.



Drill four 1/8" holes and install 1/8" POP RIVETS. NOTE: Trim tab turns RUDDER, NOT PLANE. Drawing at right is for plane drifting to LEFT. Install TAB on right side for plane drifting to right.

TRIM TAB MAY BE BENT SLIGHTLY FOR FINE ADJUSTMENT.



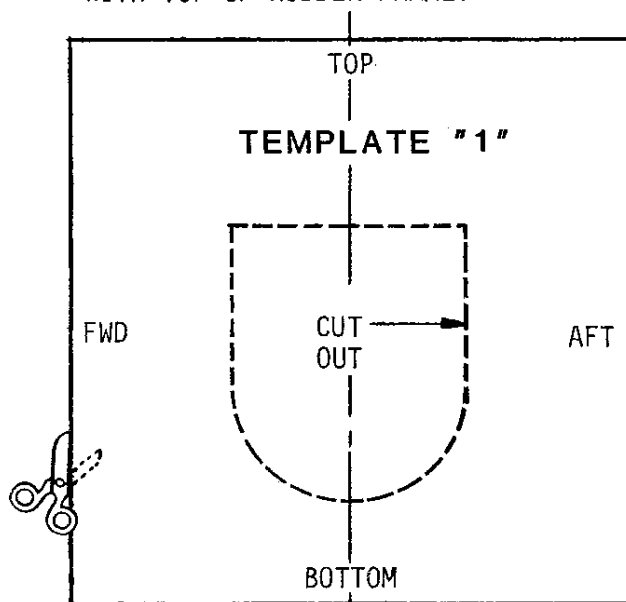
### KING POST NOTE:

IT IS NOT UNUSUAL FOR THE KING POST TO "BACK OFF" ONE OR TWO TURNS AFTER THE FIRST TWO OR THREE FLIGHTS. THIS IS DUE TO BOTH THE TANGS AND THIMBLES "SETTLING". AS THEY FIND THEIR FINAL POSITION AFTER A FEW FLIGHTS, THIS WILL NO LONGER OCCUR. ALWAYS CHECK THE KING POST AFTER EACH FLIGHT.

# TEMPLATES

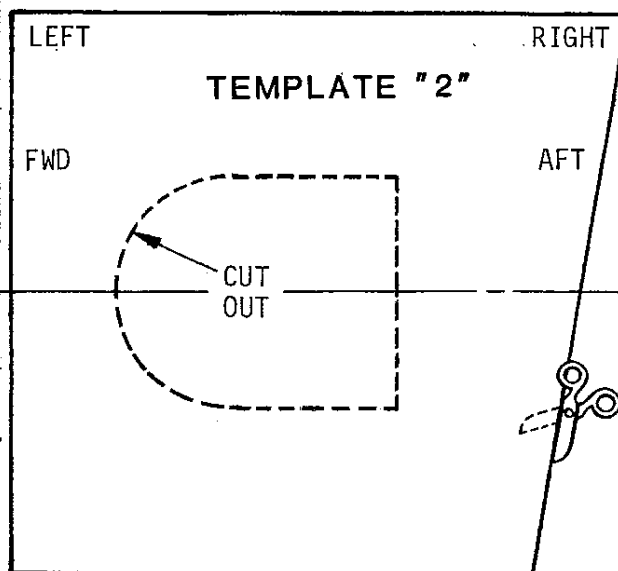
## RUDDER TEMPLATES

PLACE TOP OF TEMPLATE IN LINE WITH TOP OF RUDDER FRAME.



POSITION IN LINE WITH CENTERLINE OF RUDDER L.E. ON LEFT SIDE ONLY.

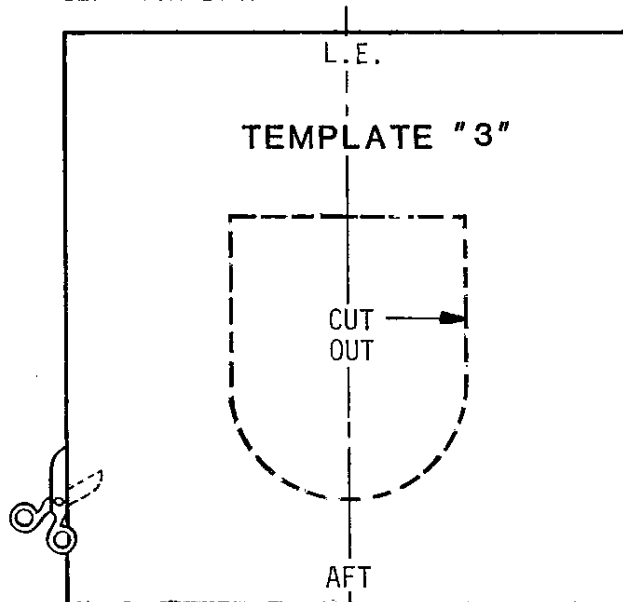
PLACE RIGHT SIDE OF TEMPLATE IN LINE WITH RUDDER FRAME T.E.



POSITION IN LINE WITH RUDDER COMPRESSION STRUT CENTERLINE ON LEFT SIDE ONLY.

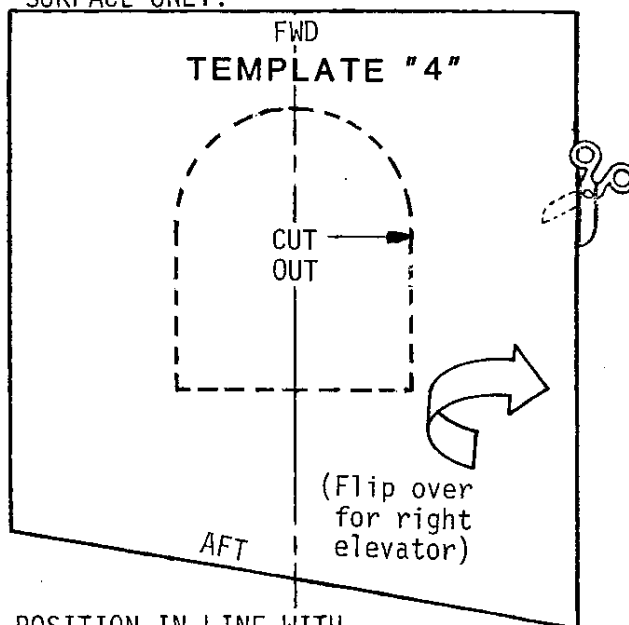
## ELEVATOR TEMPLATES

PLACE TEMPLATE IN LINE WITH ELEVATOR L.E.



POSITION IN LINE WITH CENTERLINE OF ELEVATOR COMPRESSION STRUT. (2 PL. EACH SIDE)

PLACE TEMPLATE "ANGLED" SIDE IN LINE WITH LEFT ELEVATOR T.E. ON BOTTOM SURFACE ONLY.



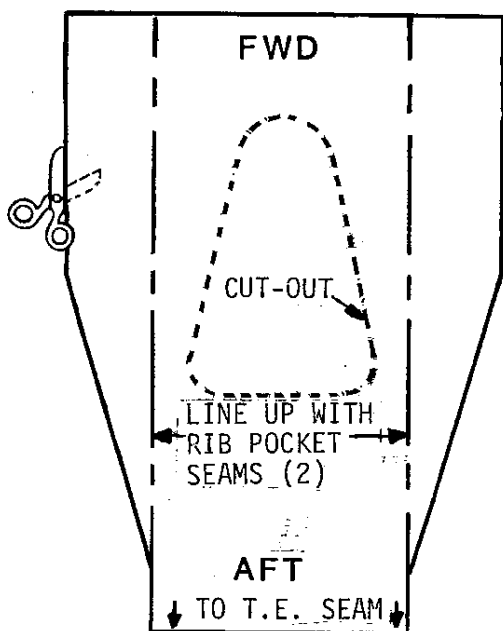
POSITION IN LINE WITH CENTERLINE OF ELEVATOR STRUT (BOTH SIDES).



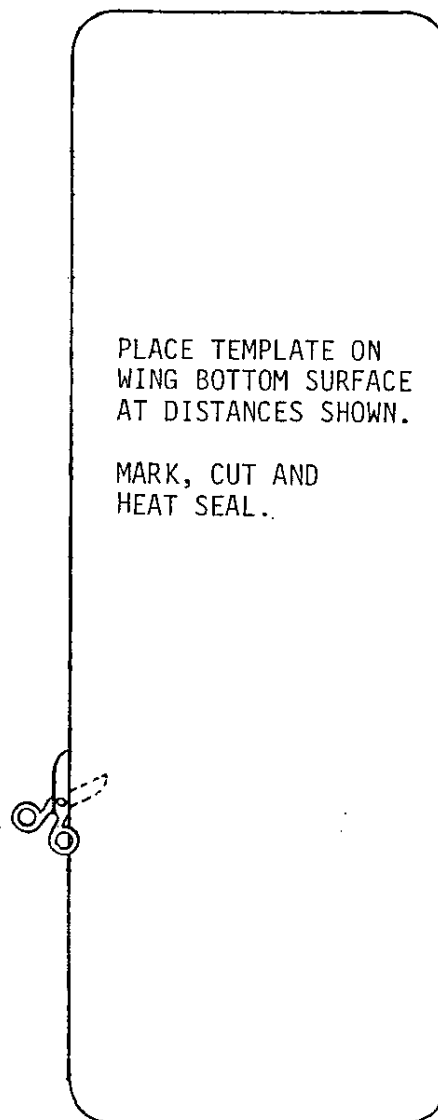
# **TEMPLATES FOR RIB INSERT SLOT AND TELEFLEX BRACKET & PUSH ROD ASSEMBLY**

CUT OUT TEMPLATES ALONG DASHED LINES AND USE AS GUIDES FOR HOLE PUNCHING AND FABRIC CUTTING PLACEMENT AS INDICATED.

**TEMPLATE "5"**  
RIB INSERTION SLOT



**TEMPLATE "6"**  
PUSH ROD ASSEMBLY  
INSERT SLOT



# INDEX

## A

Adjuster, Conduit Thread 53  
 Aileron Assembly 9-15  
 Aileron Attachment 61  
 Aileron Installation 59-64  
 Aileron System Check 70  
 AN Bolt Gauge I,V  
 Angle, Engine Mount 24,25  
 Arm, Elevator Control 4,57,65  
 Arm, Push/Pull 28  
 Axle, Main 17,51  
 Axle, Nose 17,18

## B

Bearing, Bellcrank 28,48  
 Bearing Lubrication 70  
 Bearing, Prop Shaft 66,67  
 Bearing, Rod End Female 59  
 Bearing, Rod End Male 62  
 Bellcrank, Aileron 28,29,56,60,62  
 Bellcrank, Root Tube 48,59,60,62  
 Belt, Seat 54  
 Belt Tensioning 68,69  
 Belt, "V" 68,69  
 Block, Pillow 66,67,69  
 Boom, Tail 7,50,72  
 Bolt Gauge I,V  
 Bolt, Grade 5 I,1-5,32,35,29,40,71  
 Bolt Note I,II  
 Bolt, Shoulder 53  
 Brace, Rudder 7,8,72  
 Brace, Tail 7  
 Bracket, Root Tube 66  
     Teleflex Attach 56  
     Tension Strut 18  
 Brake Assembly 19  
 Break-In, Engine 77  
 Buckle, Wing 34,42  
 Bushing, Nylon 19,55,56  
 Bushing, "T" 62

## C

Cable, Aileron 29,60  
 Cable, Anti-Drag (See Wire, Anti-Drag)

Cable, Push/Pull Safety 20,65  
     Rudder Left 2,19,43  
     Rudder Right 2,19,43  
     Teleflex 56,58,59,63  
     Throttle 21,53,73  
 Cable Guide Assembly 72  
 Cap, Fuel Filler 45-46  
 Cap, Tube III,2,8,15  
 Carburetor 22,53,73,76  
 Channel, Control Stick Assy 57  
     King Post 27,44  
     Landing Gear 20  
     Root Tube 26  
     Tail Skid 8  
     Tri-Bar 17,27,43  
 Clamp, Hose 21,22,45  
 Clamp, Teleflex 56,59,63  
 Collar, Bearing Lock 66,67  
 Collar, Eccentric Lock 66,67,69  
 Construction Notes I-II  
 Control Stick Assembly 56-57  
 Coupler, Engine 23,67,69  
 Cover, Aileron 13  
 Cover, Seat 54  
 Crosstube, Tri-Bar 17

## D

Door, Velcro 46  
 Deflection, Aileron 64  
 Diagonal Struts 38  
 Driveshaft/Bearing Assembly 67 & 69

## E

Elevator Assembly 4,79  
 Engine 21-25, 76,77  
 Engine Break-In Procedure 77  
 Engine Mount Assembly 25  
 Engine Mount Procedure 24  
 Engine Start-Up & Tuning 76  
 Exhaust Header Assembly 23,58  
 Eyebolt, Aileron 10,14,61  
     Elevator 4  
     Foot Pedal 19  
     King Post 44  
     Rudder Cable 3,19  
     Stabilizer 5

## INDEX (CONT'D.)

---

### F

Filter, Air 21,73  
 Filter, Fuel 22  
 Fitting, Nose Axle 18  
 Fitting, Pulse 21,22  
 Foot Pedals 19  
 Forkbolt, Foot Pedal 19  
     King Post 44,47  
     Root Tube 26  
     Rudder Hinge 8  
     Teleflex 56  
     Wing 61  
     Wing Wire 39,41  
 Fuel 77  
 Fuel Pump Mounting 21  
 Fuel System Assembly 21,22  
 Fuel Tank Assembly 45

### G

Gap Seal 13,36  
 Gasket, Exhaust 23  
 Glue III,15  
 Grip, Control Stick 56  
 Grommet, Rubber 25,58  
 Guard, Pulley 43  
 Guide, Cable 72

### H

Heat Cutting 1,3,4,14,15,36,38,  
     39,40,46,62  
 Horn, Aileron 14,15,62  
 Horn, Rudder Control 2  
 Housing, Teleflex Cable 56  
 Hub, Wheel 16

### I

Incidence, Wing/Stabilizer 75  
 Inserts, Wing Rib 31

### K

Kill Switch 71  
 King Post 43,44,78

### L

Landing Gear 17,20,49  
 Landing Gear/Axle Strut Attach 49  
 Lever, Throttle Assembly 53  
 Line, Fuel 22,45  
 Loctite II,67  
 Lubrication, Bearing 70  
 Lubrication, King Post 44

### M

Manifold 22  
 Mount, Aileron Bellcrank 48  
     Back Plate 53  
     Rudder Pulley 43  
     Tail 6,8  
 Muffler 58

### N

Nico Sleeve Gauge I,VI  
 Nose Brake 19  
 Nose Gear Attach 51  
 Nose Wheel Assembly 18  
 Nut, Castle III,33  
 Nut, Self-Locking IV  
 Nutplate 3,10,32

### O

Oil 77  
 O'Ring 68

### P

Pedal, Foot 19  
 Pedal Mount Tube 17,19  
 Pin, "T" Handle 7,44,49-52  
 Plate, Lower Bearing 66  
 Propeller 68  
 Rulley Mount, Rudder 43  
 Pulley, "V" 66,69  
 Pump, Fuel 22  
 Push/Pull Adjust Tube Prep 55

## INDEX (CONT'D.)

Push/Pull Tube Assembly 65  
Push Rod Assembly 2,64,80

### R

Reduction Assembly 66  
Retainer, E-Clip 53  
Rib, Wing 34,36,37  
Rib, Wing Tip Re-Arch 42  
Rib Insertion 36,80  
Ring, Safety II,III  
Root Tube 17,24,33,48,49,52,58,66  
Root Tube Assembly 26-27  
Root Tube Bellcrank Assy 48  
Rudder 1-3,8,78,79

### S

Sail, Main Wing 30  
Safety Ring I,II  
Seat, Rubber Fuel Tank 45  
Seat 53  
Seat Mount Assembly 52,54  
Seat Support Tube 52  
Shaft, Axle 17,20,49  
Shaft, Engine Drive 23,24,66,67  
Shaft, Prop 26,66  
Shim, Engine 24  
Shim, Stabilizer 75  
Skid, Tail 7,8  
Skid, Tail Assy 8  
Sleeve, Aileron 12  
Sleeve, Wing 31  
Spacer, Nose Axle 18  
Spacer, Stick Attach Tube 56  
Spar, Aileron 9-12  
Spar, Wing 30-33,74  
Spring, Muffler 58  
Spring, Rudder Pedal 18  
Stabilizer Assembly 5  
Stabilizer/Wing Incidence 75  
Starter 21  
Start-Up, Engine 76  
Stick, Control 56,57  
Stop, Aileron/Elevator 15  
Strap, Muffler Attach 58  
Strut, Aileron Bellcrank 28,29,35  
Aileron Comp. 10-12,28  
Axle 17,20

Strut, Diagonal Wing 31,38,39  
Nose 17,18,51  
Rudder Compression 1  
Rudder Balance 3  
Switch, Kill 71  
Swivel, Cable 53

### T

Tab, Trim 78  
Tail Skid Assembly 8  
Tail To Plane Attach. 50  
Tail Tube Assy 7  
Tape, Duct 8,54  
Teleflex Cable Housing 56  
Template, Aileron Install. #6 62,80  
Elevator Assy #3 & #4 4,79  
Rib Insert #5 36,80  
Rudder Assy #1 & #2 1,79  
Tensioning, "V" Belt 68,69  
Tester, Tension 68  
Throttle Assembly 53  
Throttle Cable Assembly 73  
Throttle Mount Assembly 53  
Tip, Aileron Comp. Strut 10,12  
Tip, Wing Rib 37  
Tipping, Wing 42  
Tools Needed for Assembly III  
Torque Values IV  
Tri-Bar Assembly 43,51,52  
Trim Tab 78  
Tube, Elevator Adjust 55,57  
Landing Gear Down 17,20,49,59  
Pedal Mount 17,19  
Push/Pull 55,57,67  
Seat Support 52  
Stick Attach 56  
Tri-Bar Cross 17,43,39  
Tri-Bar Down 17,43  
Wing Tip 32  
Tuning, Engine 79

### V

Valve, Fuel 45  
Velcro Door 46  
"V" Belt Tensioning 68-69

## INDEX (CONT'D.)

---

### W

Washer, Star Lock 25  
Washout, Wing 74  
Weight Adjustments 52,65  
Wheel, Nose 18  
Wheel/Tire Assembly 16  
Wing Assembly 30-34  
Wing Re-Arching Tip Ribs 42  
Wing/Stabilizer Incidence 75  
Wings to Nose Tipping 42  
Wing Washout 74  
Wire, Anti-Drag 29,39-41,60  
    King Post Nose 26,44,47  
    Landing Gear Side 17,39  
    Rib & Strut Assembly 34  
    Safety 58  
    Tail Lower 6,72  
    Tail Upper 3,6  
    Tri-Bar Nose 43  
    Twisted I  
    Wing 39-41,43,44