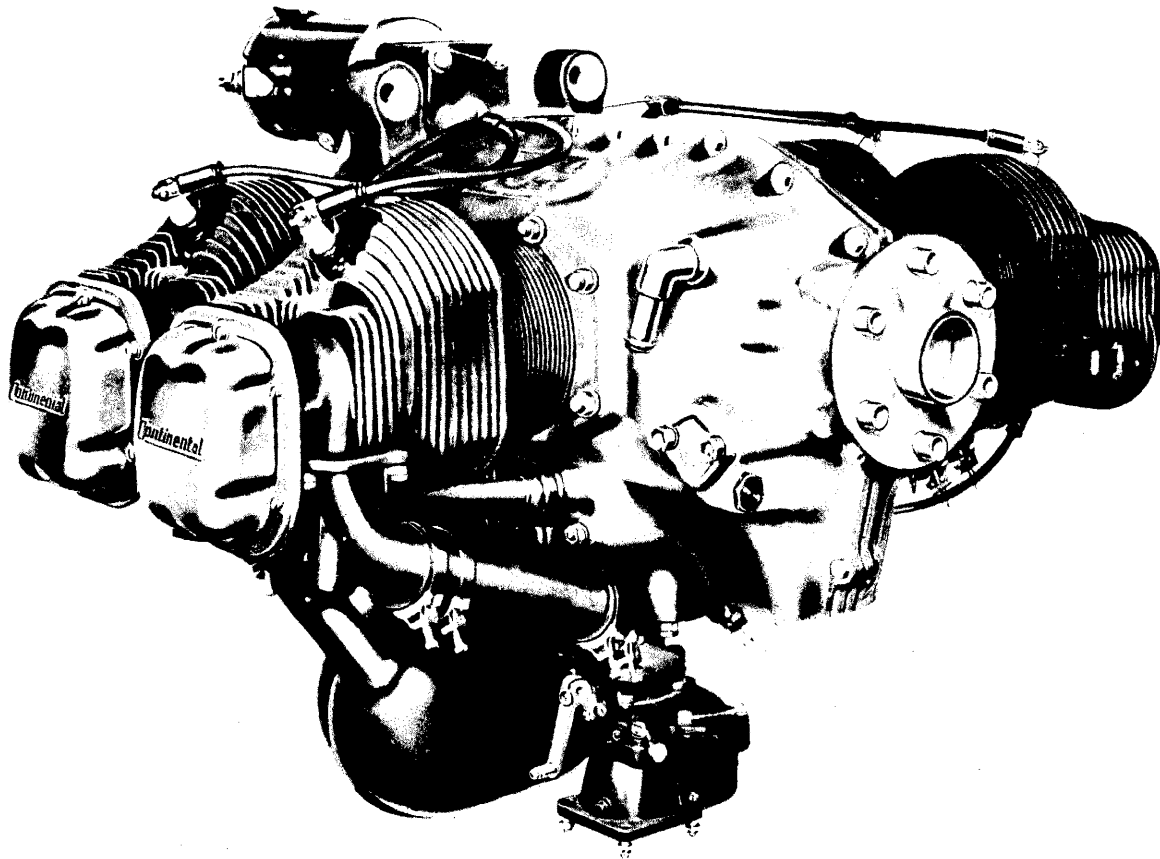
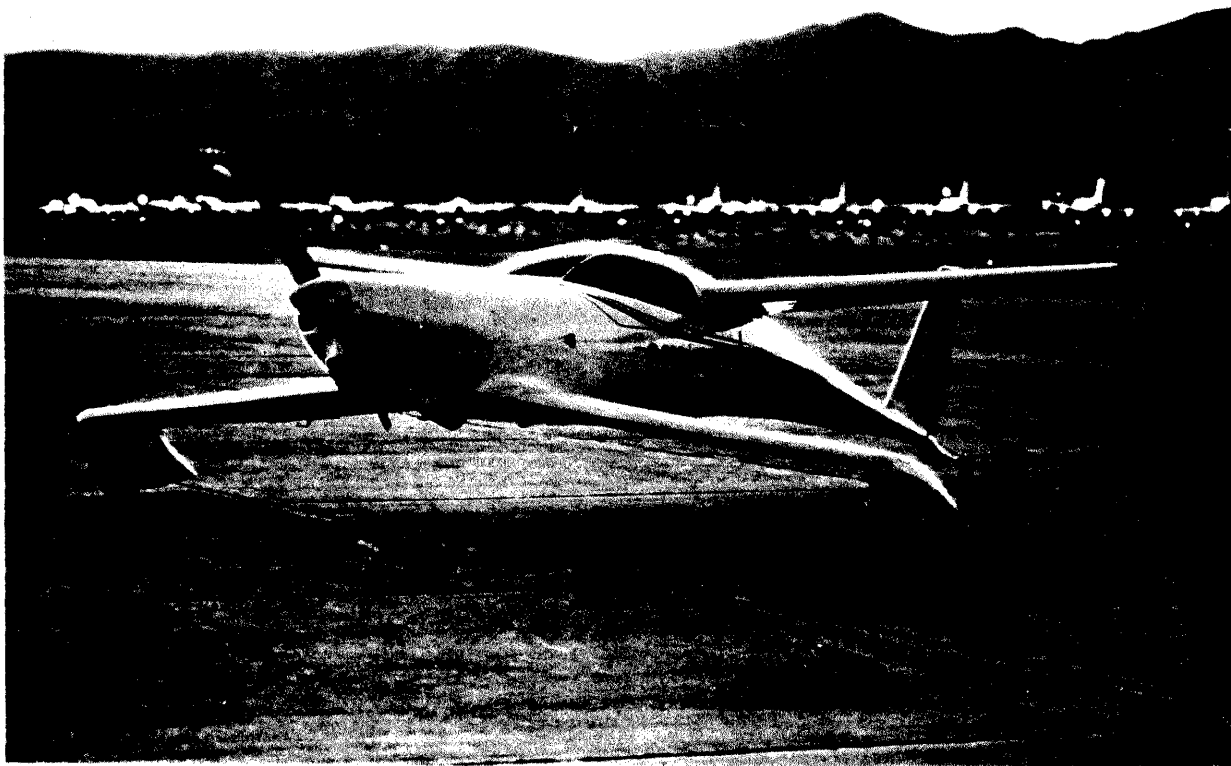


# **Q-200 CONSTRUCTION PLANS**

## **SECTION II**

*Addendum to Q2/Q-200 Construction Plans  
Continental O-200 Engine Installation*



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# STEP CHART

- Step I. Construct magneto box.
- A. Use Appendix Sheet #2 as an assembly guide.
  - B. Glue pieces together with 5 min.
  - C. Cover box inside and outside with 1 Bid.
- Step II. Build up the header tank and set aside to cure.
- Step III. Cut out hole in firewall.
- A. Use template in Appendix Sheet #3 to find position and shape of cut out.
  - B. Save template: You will use it to locate engine mounts locations.
- Step IV. Mount magneto box in firewall.
- A. Box should be taped in with 2 Bid tape and flox.
  - B. Install firewall stiffeners on inside of firewall with 2 Bid.
  - C. Lay-up a 4 Bid local lay-up over the 4 engine mount areas, both inside and outside of firewall.
  - D. You people who have changed your mind on engine types and have already installed a header tank have a big problem. You will find it very hard to install the magneto box and impossible to install the engine mount bolts with the bolt heads on the inside of the firewall. Since the header tank on the Q-200 is smaller anyway, we would suggest you remove the large header tank before you try to install the magneto box and engine mounts.
- Step V. Using firewall template, locate and drill 3/8" engine mount bolt holes and install Q2EM1-C stand-offs with AN3-10A bolts.
- Step VI. Install header tank.
- Step VII. Install prop extension on engine prop flange, use anti-seize around all lugs and bolt threads.
- Step VIII. Install engine on aircraft.
- A. Weight tail down and chock airframe.
  - B. Engine is to be off set slightly to the right to off set engine torque. Washers are supplied to be placed between the EM1-C and the Continental #530741 washer on the left engine mounts as needed (see plans for proper engine off set).
- Step IIIX. Install propeller spinner flange.
- Step IIX. Install cowl.
- A. Trim aft edge at firewall using spinner flange to locate forward end.
  - B. Space cowl .1 aft of the spinner flange.
  - C. Make cowl mounting flange (see Q-2 construction plans 16-3).
  - D. Rivet cowl flange to firewall.
  - E. Drill small positioning holes to hold cowl in place; celcos work well for this.
  - F. Install nutplates provided.
  - G. Remove cowl for Step IX.



## STEP CHART CONTINUED

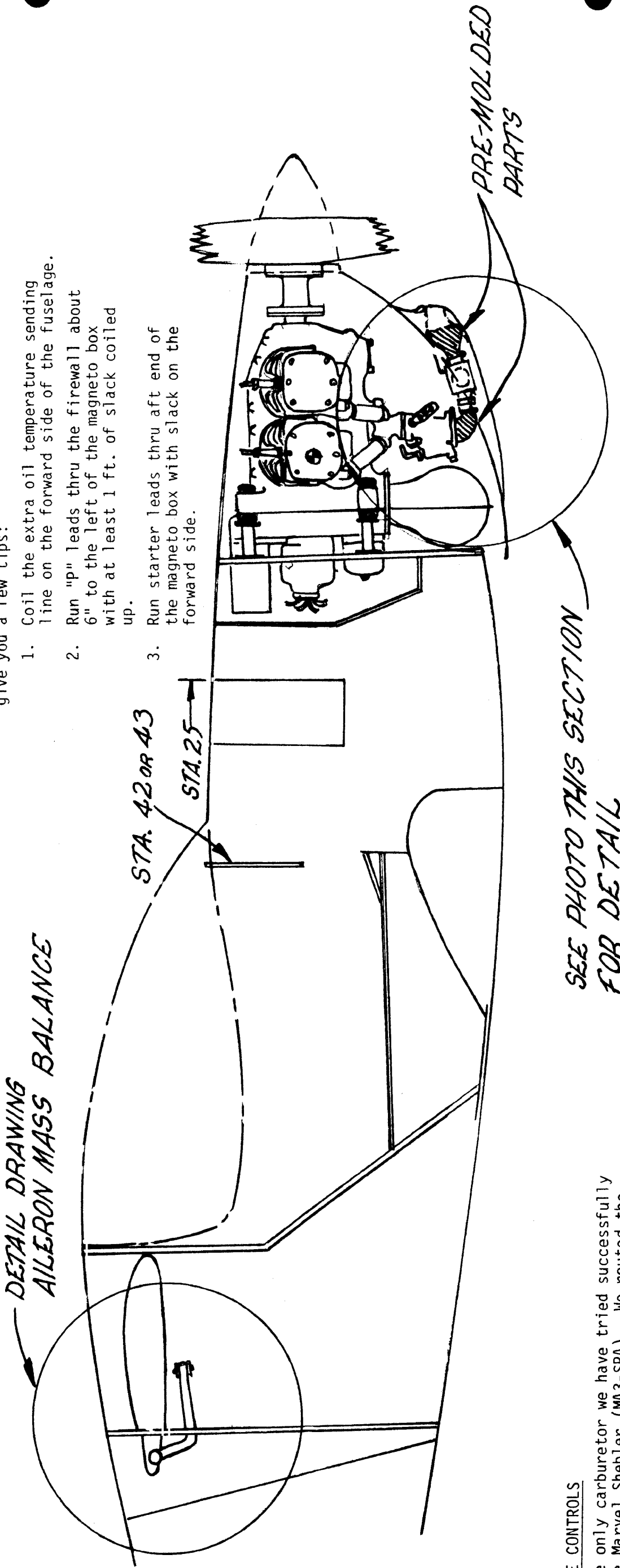
- Step IX.
- A. Position controls.
    - 1. Throttle.
    - 2. Mixture.
    - 3. Carb heat - Alt. air.
  - B. Install exhaust.
  - C. Install carb. heat/alt. air muffs.
  - D. Install prefab fiberglass air duct elbow to bottom of carb.
  - E. Install heat transfer valve.
  - F. Install short section of 2.5" scat hose to front of elbow & heat transfer valve.
  - G. Install short section of scat hose connecting front (cold side) of heat valve to prefab air inlet duct.
  - H. Wiring & instrumentations.
    - 1. Alternator leads.
    - 2. "P" leads.
    - 3. Starter cable & Solenoid.
    - 4. Engine ground
    - 5. Oil temperature line or wire.
    - 6. Oil pressure line or wire.
    - 7. EGT lead.
    - 8. CHT lead.
    - 9. Tach cable (if mechanical tach. is used).
    - 10. Manifold pressure line (if used).
  - I. Fuel.
    - 1. Mount gas-co-lator on forward side of the firewall.
    - 2. Run gas line to gas-co-lator.
    - 3. Run primer lines if carburetor doesn't have primer circuit.
- Step X. Remove engine.
- A. Seal firewall openings around wire and control holes.
  - B. Fire proof firewall.
  - C. Bolt voltage regulator to the firewall.
- Step XI. Install aileron balance assembly.
- Step XII. Bolt engine to airframe for final installation.
- A. Shim for engine torque, 1° right and 1° down.
  - B. Tighten engine mount bolts to 180 to 190 in. lbs.
  - C. Install cotter pins.
  - D. Install all engine controls and hook-ups.
  - E. Check for proper rigging and make sure there is no interference.
- Step XIII. Install cooling and induction system.
- A. Cut cooling inlet in lower cowl.
  - B. Install cooling ramp and radius inlet.
  - C. Cut induction air inlet using prefab scoop as a guide.
  - D. When position is correct, perform final trim, floc, and cleco in place. After cure, fair edges and tape 1 ply Bid. in & out allowing 1 in. overlap,
  - E. Install exhaust system.
- Step XIIIIV. Engine run.
- A. Install prop, check for track.
  - B. Check for oil leaks.
  - C. Use Continental guide for break-in run.



The exact rigging & adjustment is covered later on. At this time select firewall locations for running starter leads and wires, oil temp line, oil pressure line, EGT & CHT leads, carburetor alternate air cable, "p" leads to the magnetos. Engine grounds are located on studs on bottom engine mount bosses. Either left or right ground stud can be used. I did not give exact locations for wire and cable routing, because each of you will undoubtedly arrange your panel to suit your own needs and likes, but I will give you a few tips:

1. Coil the extra oil temperature sending line on the forward side of the fuselage.
2. Run "p" leads thru the firewall about 6" to the left of the magneto box with at least 1 ft. of slack coiled up.
3. Run starter leads thru aft end of the magneto box with slack on the forward side.

DETAIL DRAWING  
AILERON MASS BALANCE



#### ENGINE CONTROLS

The only carburetor we have tried successfully is the Marvel Shebler (MA3-SPA). We routed the throttle cable behind and around the top of the oil tank, securing the cable to a plate affixed to 2 bolts on the oil tank and a stud at the lower engine mount also used to dampen the oil filler neck from vibration. The mixture cable routes in front of the tanks.

All this is to allow you to pull engine forward far enough to disconnect the hard to reach areas, such as mag.wires, etc.





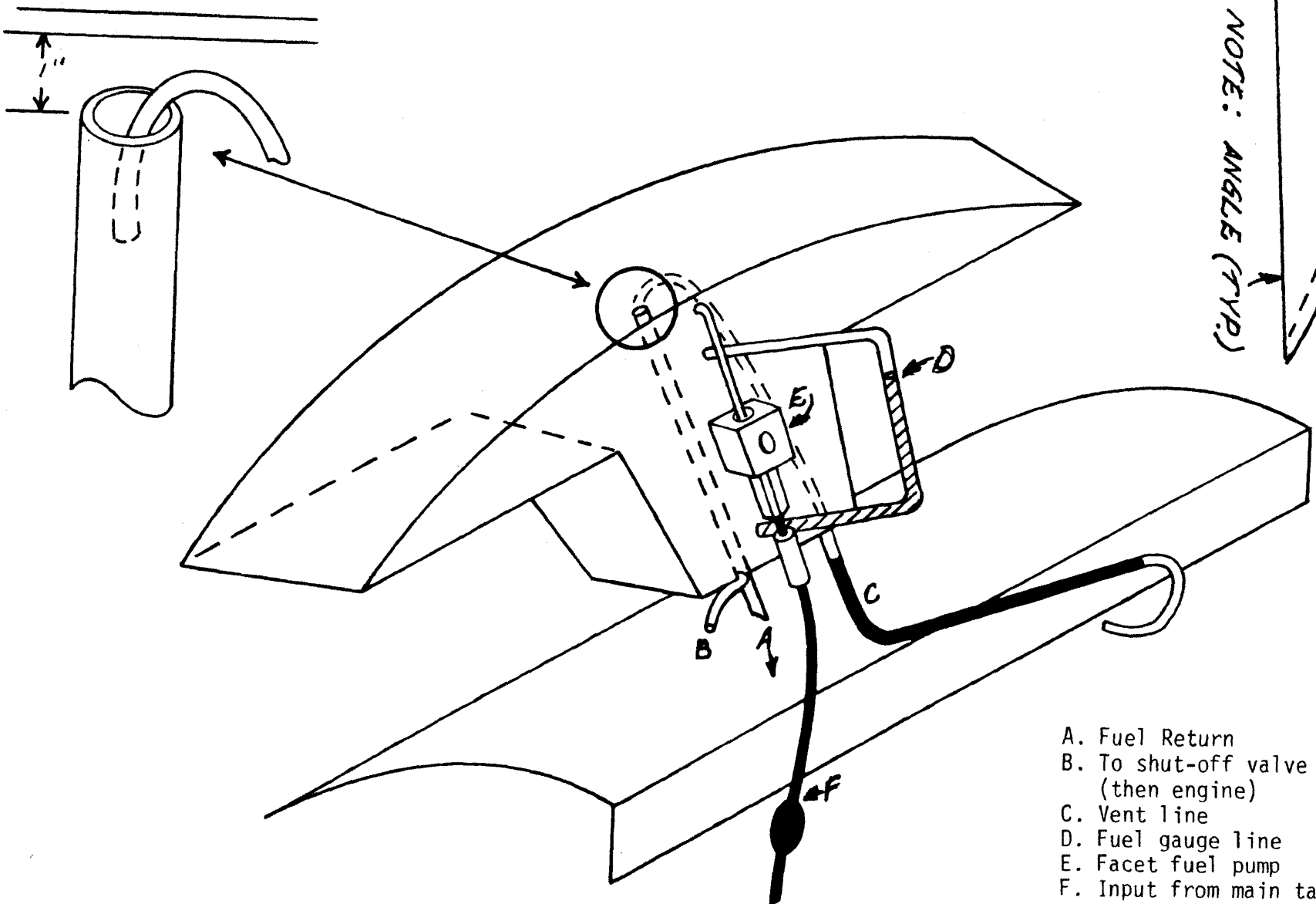
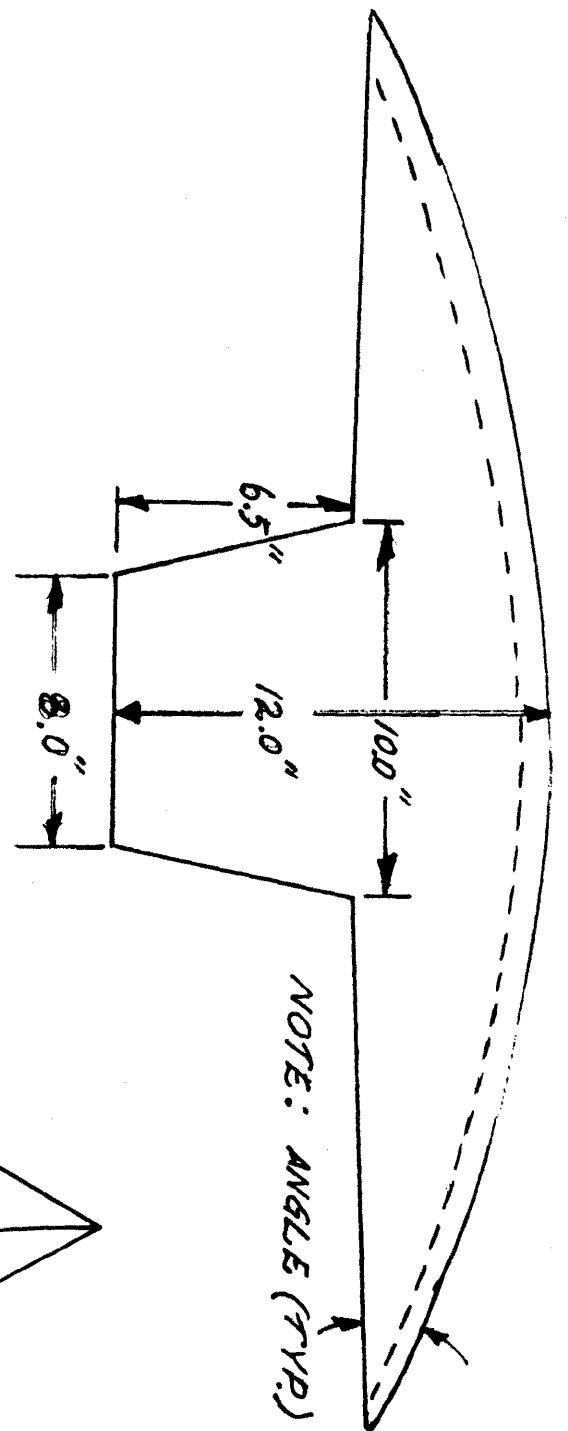
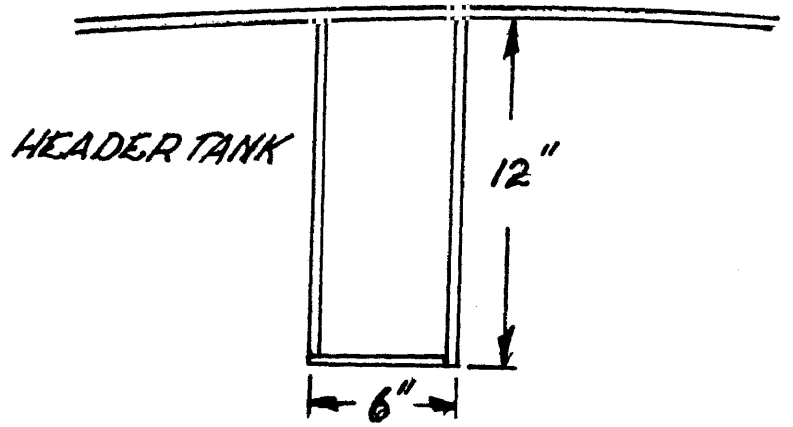
## HEADER TANK CONSTRUCTION

The header tank used in this conversion is smaller than the tank used for the standard Revmaster engine. The main size difference allows more room from the forward face of the tank to the firewall. The construction and mounting is basically the same as the larger tank, page 17-2, Q-2 Plans. Use the perspective drawing to help guide you with the plumbing.

Note the Following:

1. The fuel pump mounted on the aft tank face.
2. The fuel return tube stops 1" below the top of the tank.
3. A fuel vent line is stuck into the center of the return tube about a half an inch and exits thru the bottom of the tank, where it is connected to a hose which runs to a tube on the aft of the canard shear web, bent forward into the airstream.
4. The fuel that exits the fuel pump from the main tank enters the header tank 1" from the top, so fuel will not back drain thru the pump when it is off.
5. You can make a fuel indicator by using some white foam and sanding it into a small ball. Paint it red and dip it into epoxy and allow to cure. Place it in the fuel level tube making sure it is small enough not to get stuck.

The installation of the header tank will require you to crawl into your aircraft and lay on your back to do the attaching. You will have lots of space to work and laminate. Those of you who still wish to install the larger tank will not have it as easy.



- A. Fuel Return
- B. To shut-off valve (then engine)
- C. Vent line
- D. Fuel gauge line
- E. Facet fuel pump
- F. Input from main tank



## MAGNETO BOX ASSEMBLY & ENGINE MOUNTING

The magneto box assembly serves three functions:

1. Isolate and protect the aft accessory case.
2. To extend the firewall around the aft of the engine for fire, fume and noise protection.
3. To add additional strength to the firewall.

The box itself is made of 1/8" aircraft plywood, glued together with floc and resin and covered with 1 BID cloth on each side. In addition to the box itself, two vertical stiffeners run across the inside face of the firewall. Full size templates for all pieces are given in the appendixes. The pieces are to be cut out and assembled on the firewall template. Five minute epoxy mixed with a little micro can be dabbed on the pieces in small areas to help hold the pieces in place while the floc cures. By covering the template with waxed paper you can avoid soiling the template. In aircraft where the instrument panel and, or header tank have already been installed, you will have to install the vertical stiffeners after the box is in place on the firewall. Sand a radius on the outside corners of the plywood. Cover inside and outside with 1 BID. The vertical stiffeners Q2-MB 8, 9, 10, & 11, are to be laminated with 2 BID to the firewall on each side later on.

The next step is to cut-out the hole in the firewall using the full size template.

This can be done at the time the firewall is cut-out before it is installed in the airframe or after it has been attached to the airframe. Again, try to save the template, for you can use it to locate engine mounting holes after magneto box is installed and the 4 BID local beef-up is cured. If you have already installed a header tank for the Revmaster and now wish to install the Continental, I have some bad news. We recommend you remove the tank from the airframe for the following reasons.

1. Removing the header tank makes the installation the header tank a heck of a lot easier.
2. The recommended header tank size is reduced to allow for more room behind the firewall, move it's cg aft and reduce cg shift as fuel is consumed.

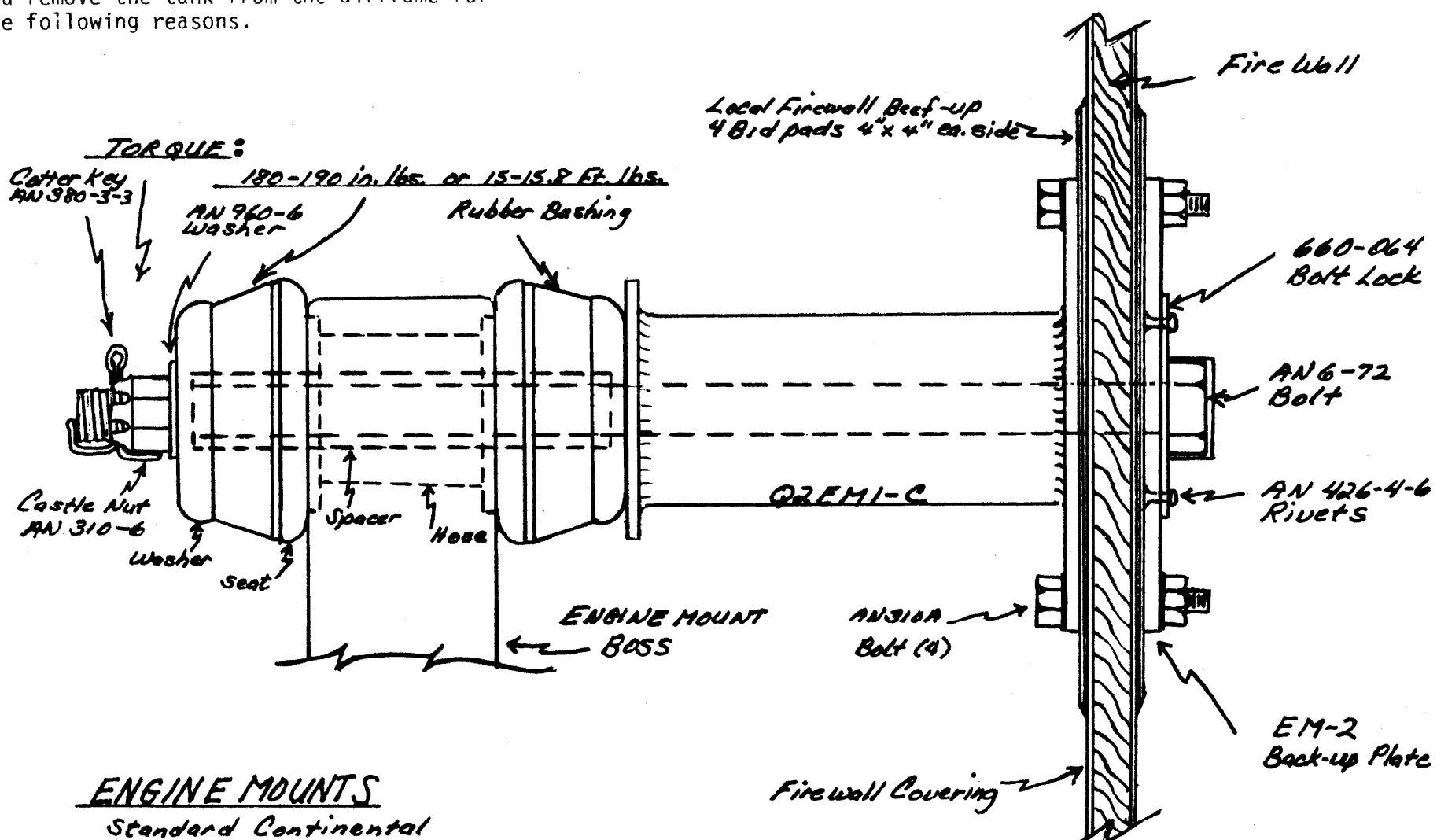
The loss of fuel capacity is to be made-up in a slight increase in main tank size and, or an aft auxillary tank in the baggage compartment area. The smaller header tank is recommended but you may wish to re-install the larger header tank after the magneto box and engine mounts are installed; the choice is yours.

Mount the magneto box in the firewall with floc and a 2 BID. Put 2" tape on each side. Also, lay-up the 4 BID pads inside and outside of the firewall in the engine mount areas. Next install the stiffeners Q2-BM 8, 9, 10, & 11 on the inside of the firewall. You will have to trim the outboard ends of the stiffeners to fit the contour of the inside of the fuselage.

After all this is cured, drill the 3/8" holes in firewall for the mount bolts, make the EM-2 spacers and install the Q2 EM1-C mount standoffs. We have found that installing the 3/8" mount bolts with the bolt heads facing aft will allow for easy engine installation and removal. With the bolt head locked down one man can un wrench the engine, although two are needed to lift it on and off.

Now it is time to trail fit the engine to the airframe. Chalk the tires to secure the aircraft. Lay-out a butt line extending forward 3' past the firewall. When you install the inner engine mount rubbers, install a thick washer (Q2-EM4) on each of the left mount stand-offs as a starting place.

Now install engine and remaining mount systems and tighten to 180-190 in-lbs. Install propeller extension, using anti seize on prop flange and bolts. Torque to 200-220 in-lbs. and safety wire bolts one to one.

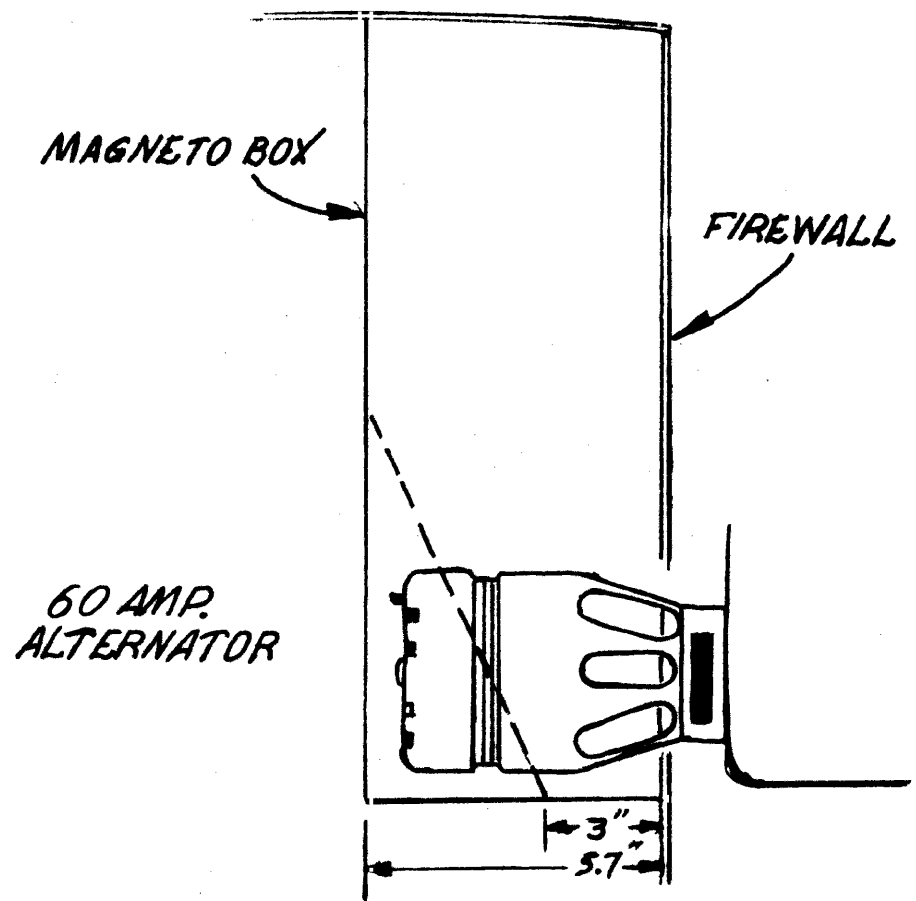
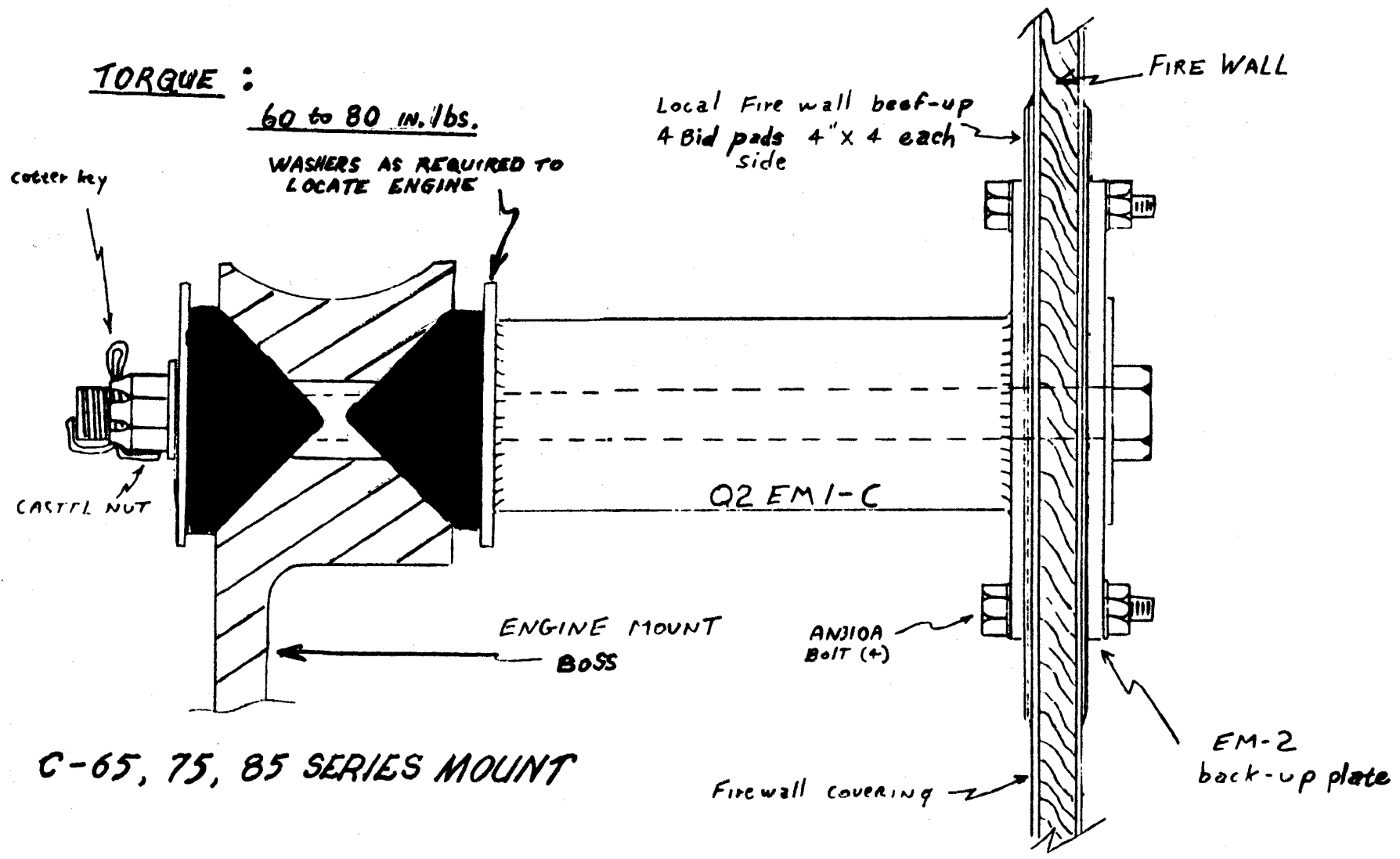


### ENGINE MOUNTS

Standard Continental Part	P.N.
Hose	62855-16
Spacer	530627
Seat	530626
Bushing	530740
Washer	530741



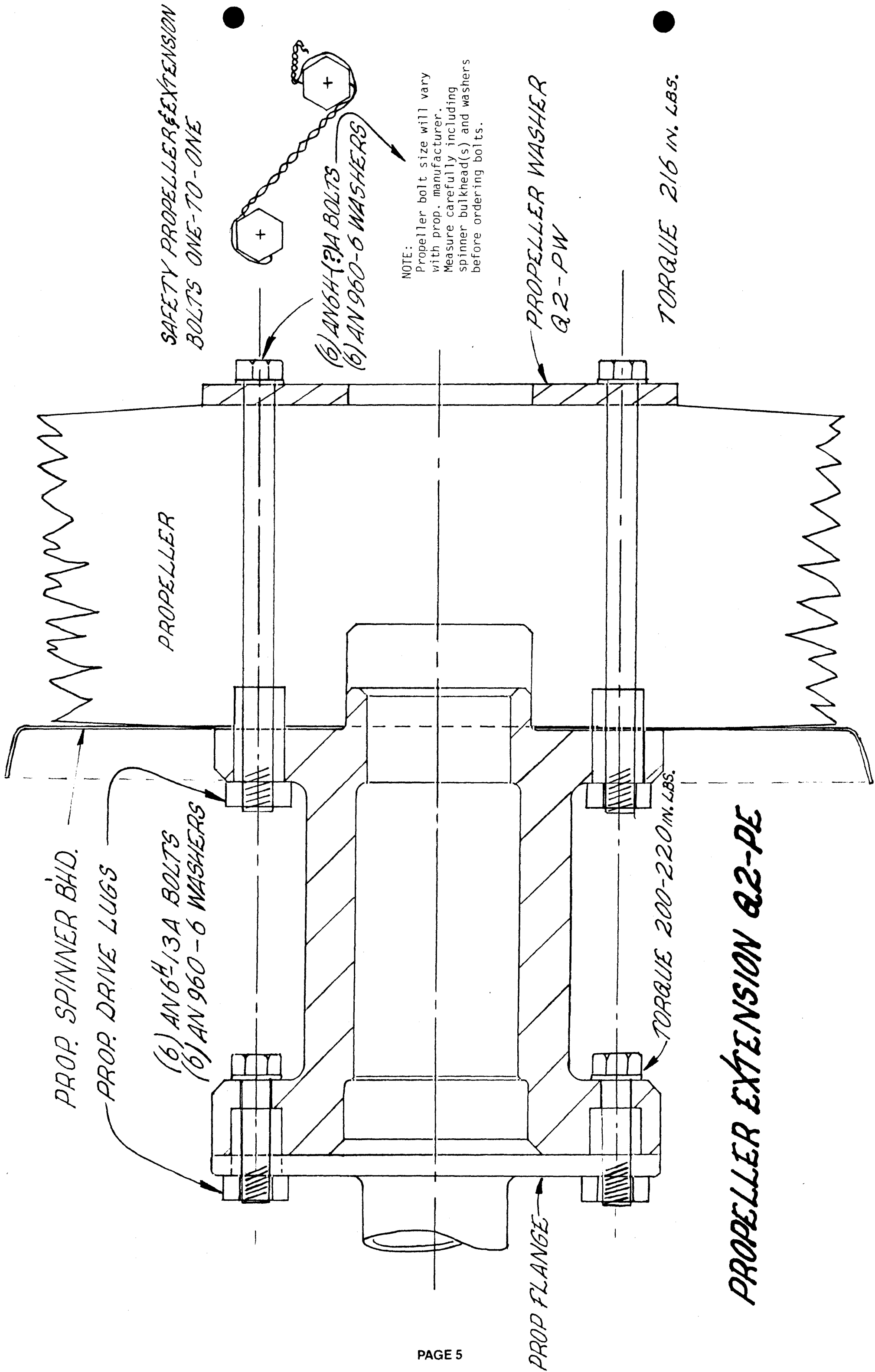
Level aircraft to w1 15 and drop a plumb bob from the center of the end of the prop extension to the butt line on the ground. The bob should end up .2 to .3" to the right of the butt line. Now place a level on top of the engine case to make sure it is level. Engine position can be controlled by different thickness washers between engine mounts and standoffs. The engine off-set is to allow for engine torque, and you can correct for a slightly warped firewall by using washers to obtain correct left-right and horizontal engine alignment. Check clearances between magneto box and starter, magnetos, alternator, etc. You should try to maintain at least .2" at the closest points. Remember, the engine will rock slightly at idle.



The alternator used with this installation is the B & C specialty 12 amp alternator. Available from:  
 Bill Bainbridge  
 518 Sunnyside Court  
 Newton, Kansas 67114  
 316-283-8662

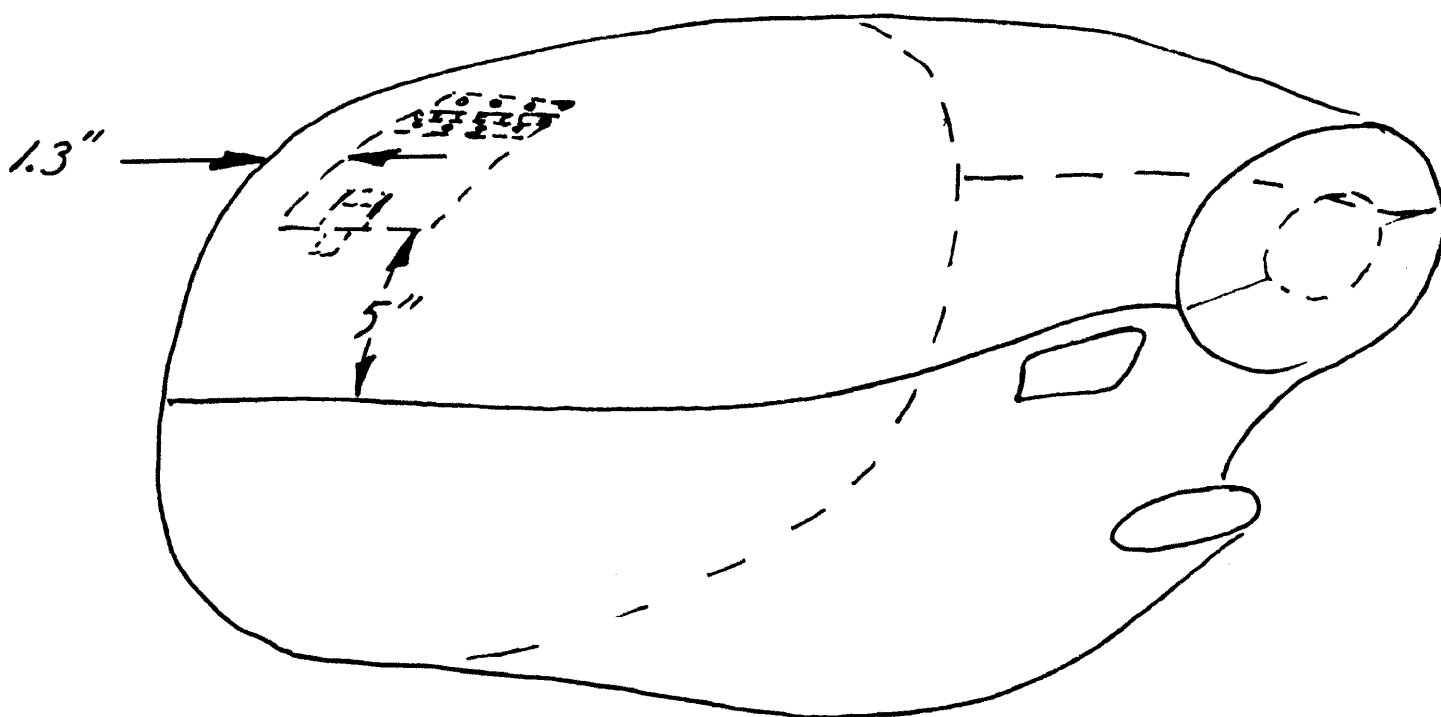
It is a well proven, light and compact unit and will put out enough power for instruments, radios etc. We are working on a light weight, small alternator conversion of 35 amps, which will supply enough power for most all accessories, color radar, 3 axis auto pilot, color TV and wet bar etc. Although it is not recommended, larger alternators can be used by modifying the size and shape of the magneto box to suit. The penalty will be a reduction in foot room.



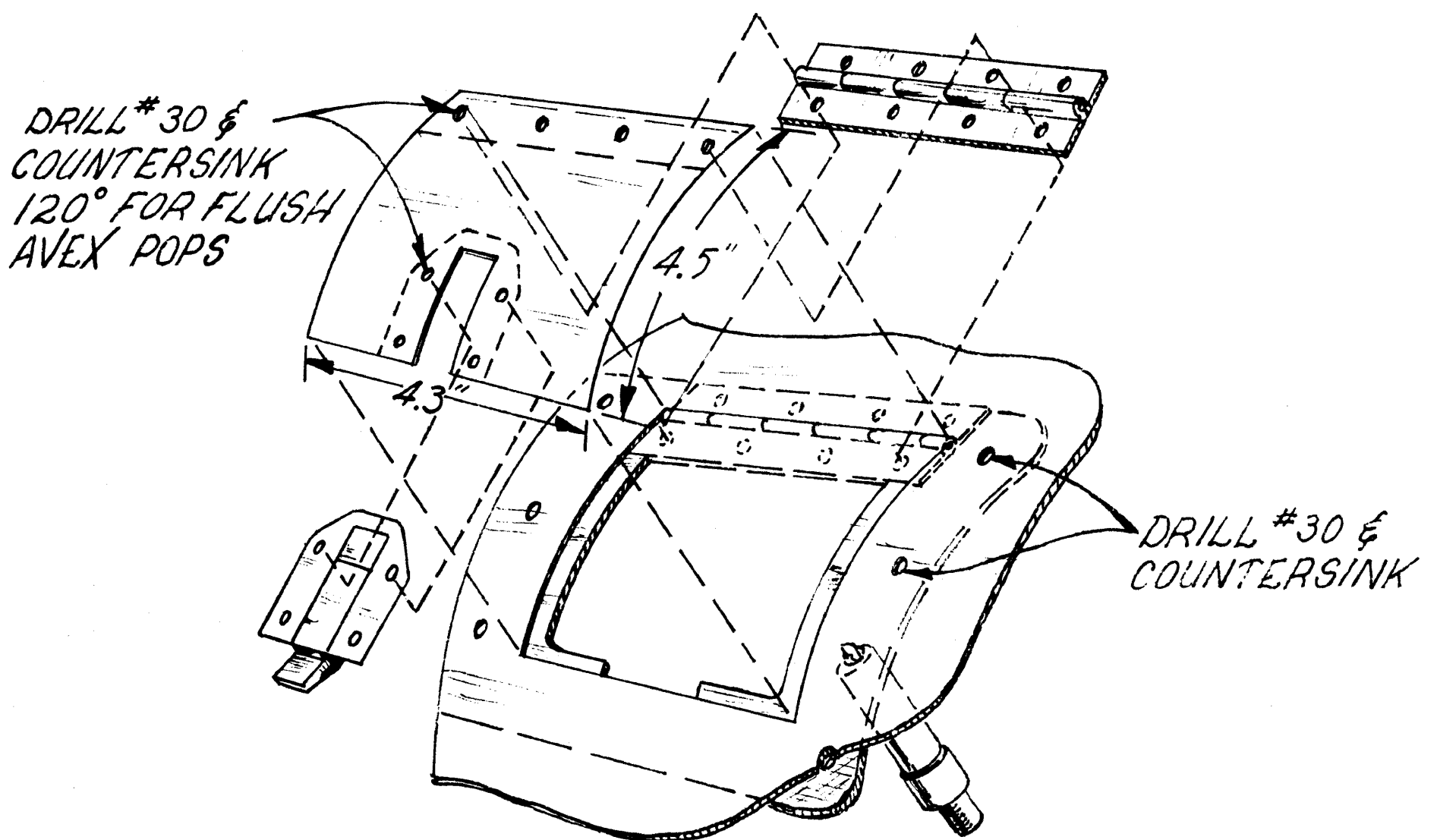








## OIL CHECK DOOR



### OIL CHECK DOOR LOCATION:

Ours is about 5" up from top half split line and 1.3" from AFT edge and measures 4.3" wide x 4.5". You can configure yours however you like.

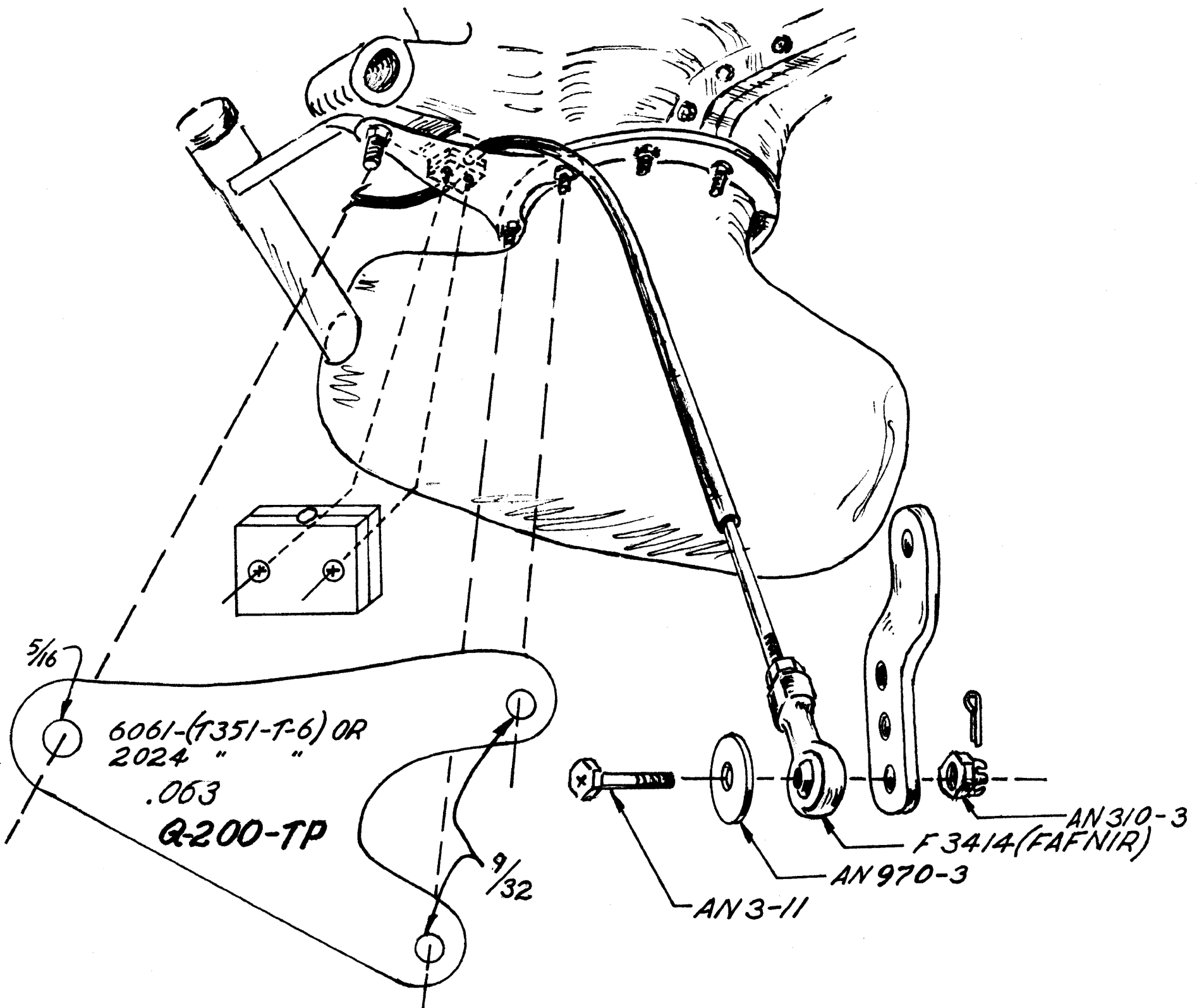
### Construction Steps:

1. Make a full size cardboard pattern of the oil-check door, placing it on the outside of the top cowling. Draw a fine line around the pattern.
2. Grey tape the inside for a release, then lay-up 4 or 5 ply Bid allowing at least 1" to the perimeter dimension and let cure.
3. Remove inside lip lay-up, grey tape, and dremel saw the fine line you established in step 1.
4. Trim door top so formed aluminum hinge can be flushed in place, floxed (being careful not to get epoxy/flox in hinge area) and flush riveted in place using Avex (1604-0412) pop rivets. Of course you roughed the hinge and attach area for a good bond.
5. Trim inside cured lip allowing .2 inside stop and .5 to .75 outside trim for flox bond.
6. Sand both inside surfaces, flox and celco in place. Wipe off excess, Squeeze out, and install Hartwell flush latch with #1604-0412 Avex rivets.
7. Fill recesses with micro in finish mode.

**NOTE:**  
**DRAWING NOT TO  
SCALE**



# THROTTLE LINKAGE DETAIL

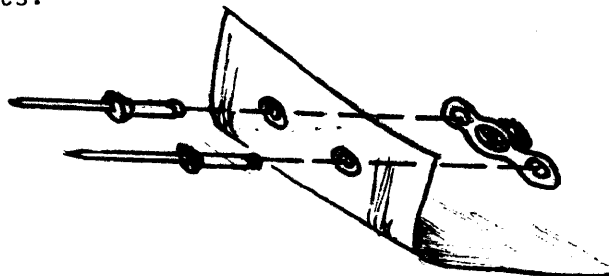
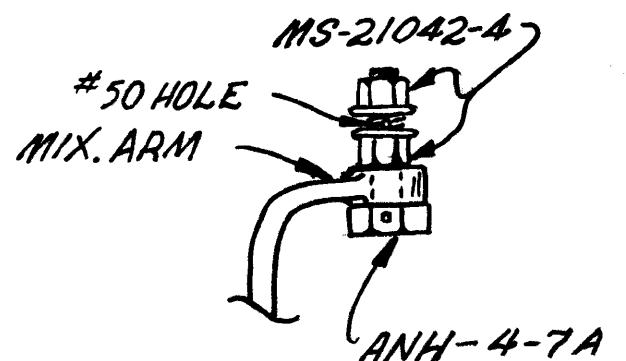


## MIXTURE:

Be sure your MA3 carburetor has a 155 #409 mixture arm. We installed a greased  $\frac{1}{4}$ " bolt, screwed a MS-21042-4 nut on upside down, drilled next to the lower nut with a #50 drill, then tightened another MS nut to the mixture wire. A loop of .040 safety wire thru the AN4 bolt head is the attach point for a light spring to return mixture rich in case of cable failure. Secure mixture cable outer housing to Q-200 TP plate (above) or attach bolt.

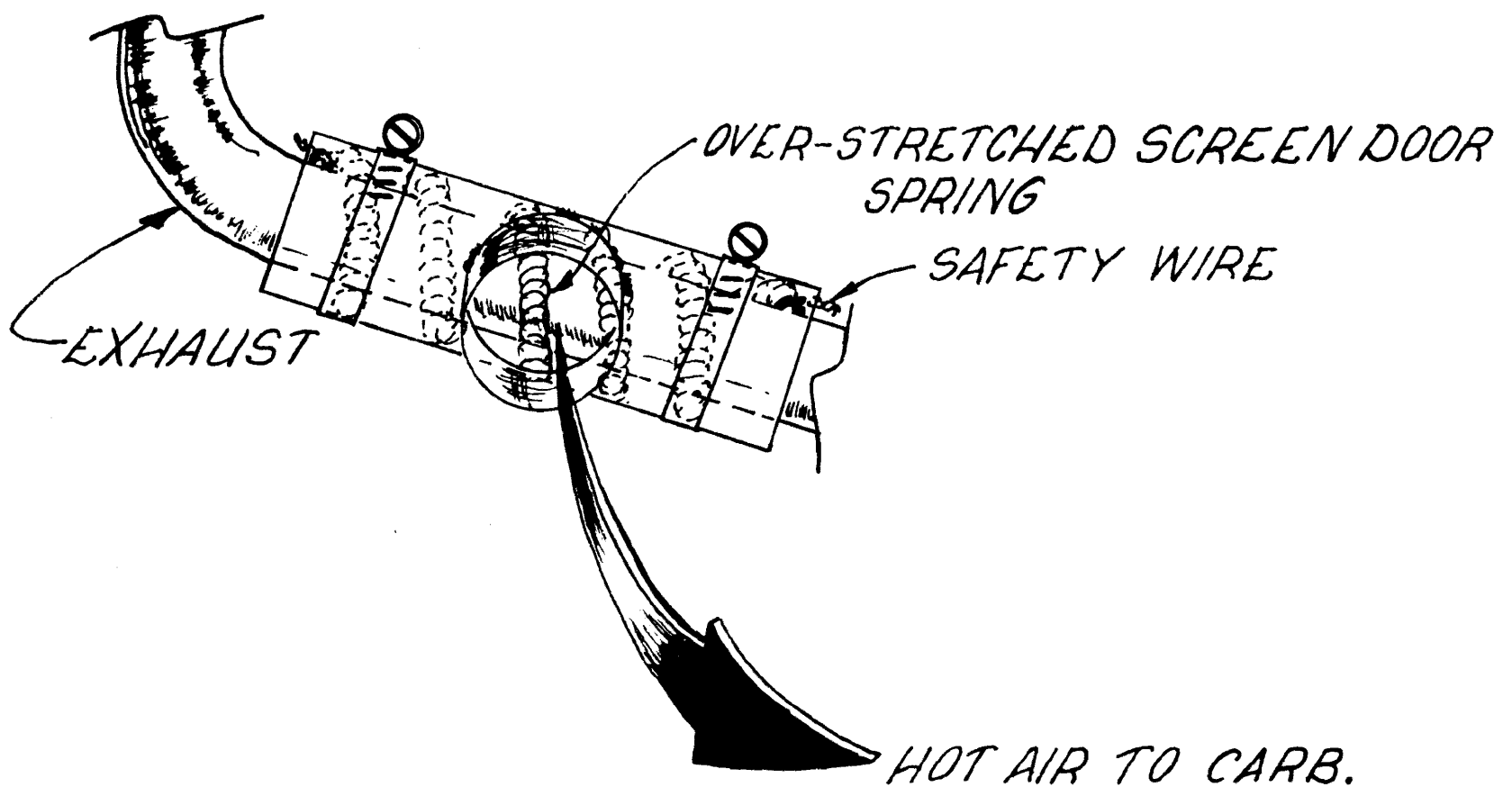
## FINAL ENGINE INSTALLATION:

Engine can be installed after firewall work is completed. Make sure spacers (stack of washers) have not changed or cowling will not align with spinner. Re-torque engine mount bolts to 180-190 in. lbs. and safety with cotter keys. Check that all engine controls are hooked up. Especially magneto ground leads. Install propeller using prop washer; torque bolts 216 in. lbs. and secure with .040 safety wire. Prop bolts should be re-torqued after 3 hrs. engine time, then 10, and again at 25 hrs. and no more than 50 hrs. interval there-after. Trim spinner to fit around propeller, drill & cleco attach holes thru bulkheads and install 8 K1000-3 (10/32") anchor nuts with 3/32 s.o. flush rivets or 3/32 flush pop rivets.



For new or re-manufactured engines, check the Continental Service Guide for run-in. Check for fuel & oil leaks. Monitor oil and engine temperature and limit static run-ups.



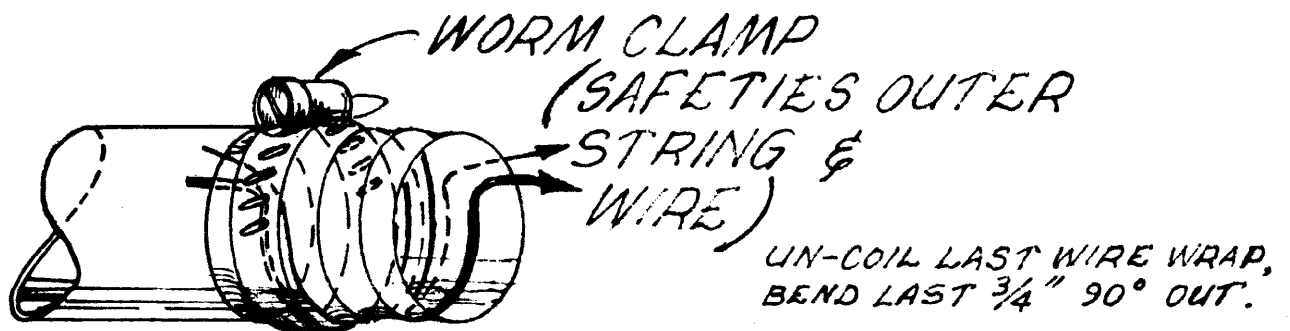
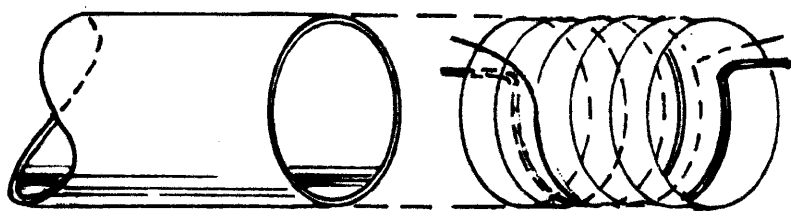


**Exhaust and Muff Installation:**

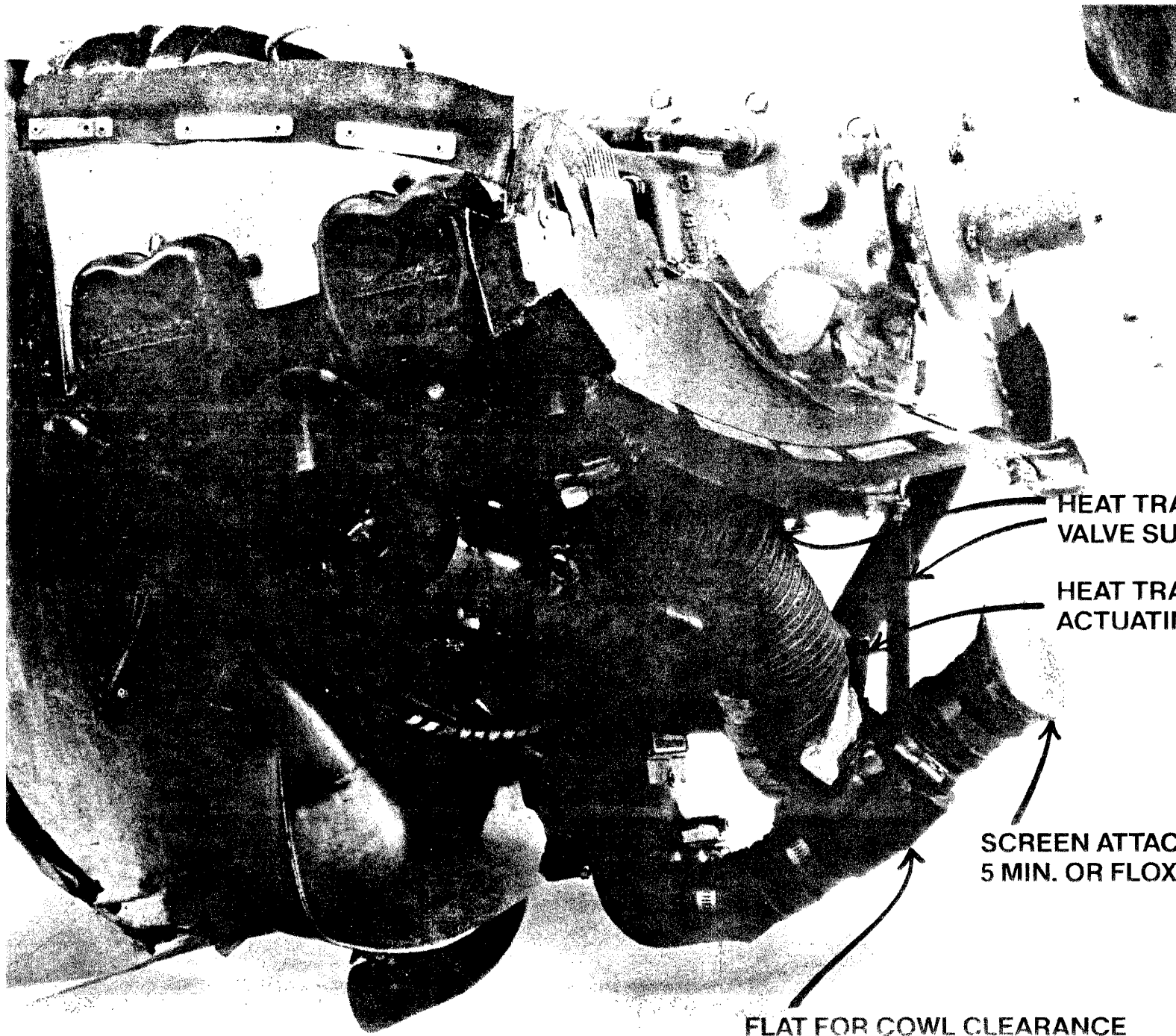
Examining your exhaust, you'll notice tangs on the forward right side. These are attach points for your hardware store variety, over-stretched 3/8" diameter screen door spring. We stuck a screwdriver through the wire loop at each end, clamped one screwdriver in the vise and pulled the other, overstretching the spring to at least a 4 ft. length. Then, safetying one end with .040 safety wire, each wrap is snugged uniformly and end secured at the second attach point. Check heat muff (Q-200 HM) for length and trim if necessary. Spread slightly at the split to install, being careful not to over-spread at the welds and align for SCAT hose connection to side position of heat transfer box. Install a stainless worm clamp securely about one inch inboard from each end.

Bolt exhaust in place using 5/16 x 24 #22022 brass nuts and star lock, #MS35333 washers, torque 180 to 220 in. lbs.

## 'SCAT,' 'CAT' HOSE INSTALLATION





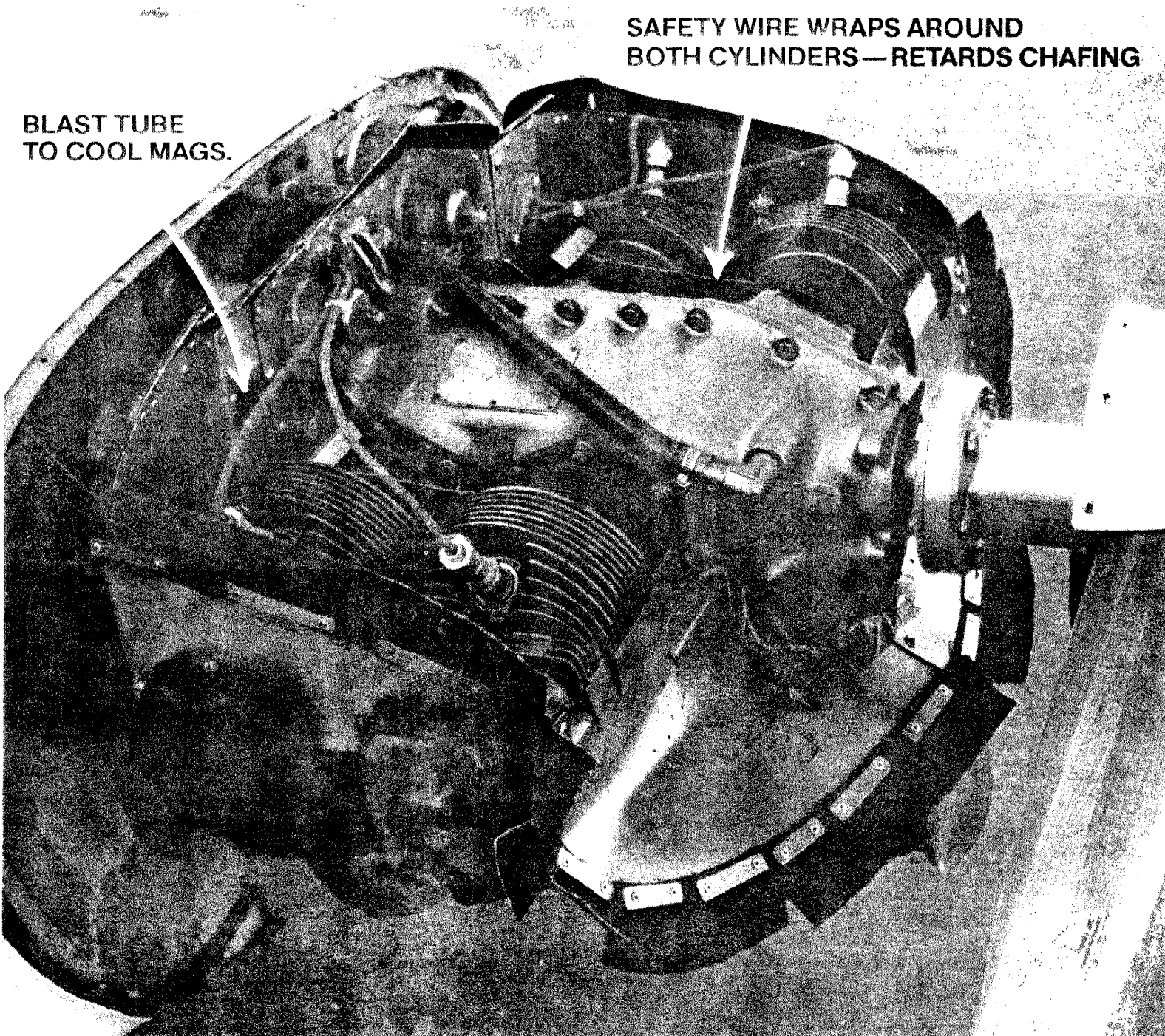


HEAT TRANSFER  
VALVE SUPPORTS

HEAT TRANS. VALVE  
ACTUATING ARM

SCREEN ATTACHED WITH  
5 MIN. OR FLOX

FLAT FOR COWL CLEARANCE



BLAST TUBE  
TO COOL MAGS.

SAFETY WIRE WRAPS AROUND  
BOTH CYLINDERS—RETARDS CHAFING



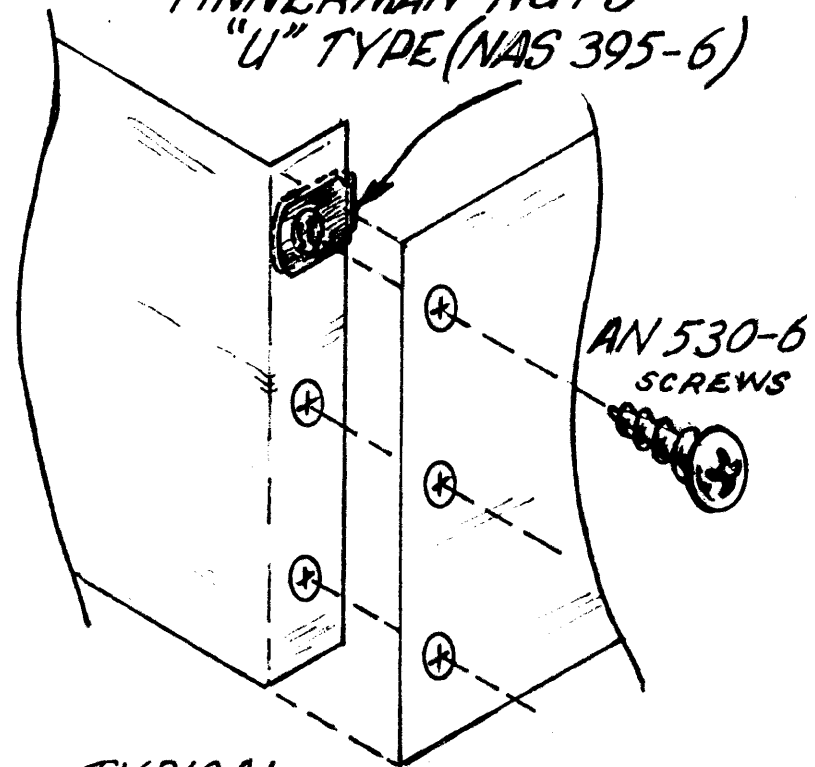


ENGINE BAFFLING

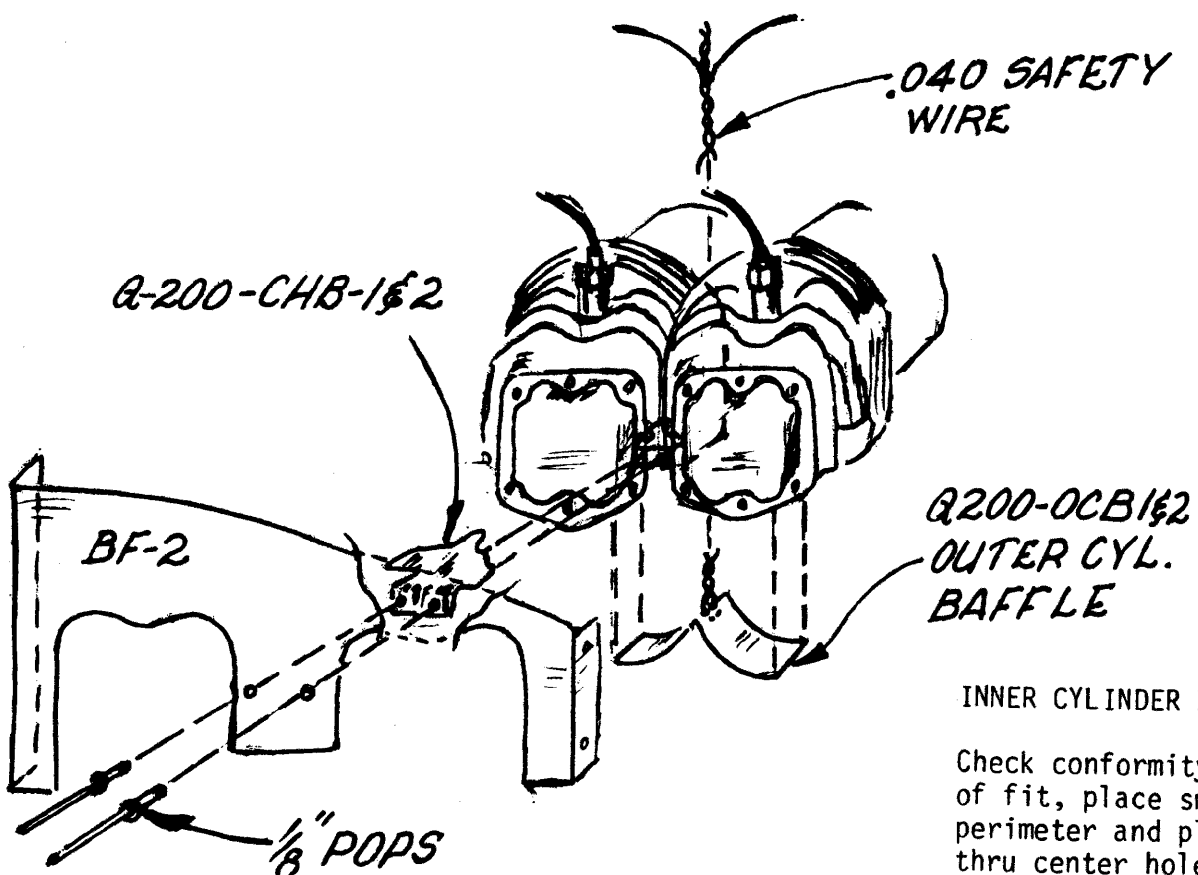
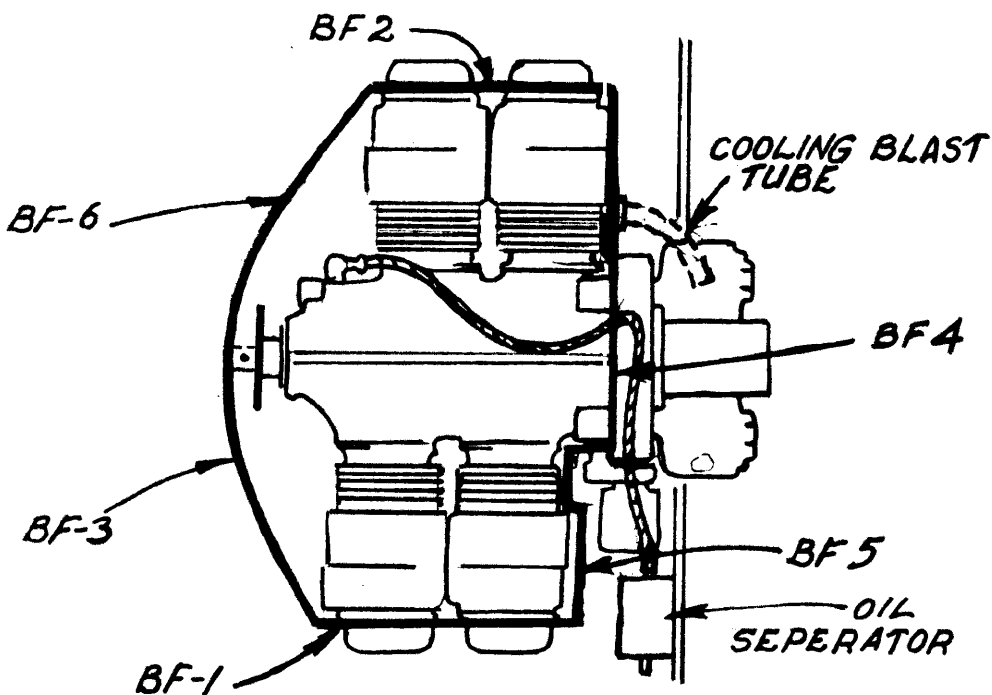
The engine baffling comes pre-cut to size and pre-bent to shape. The rubber treated asbestos material is cut and riveted by the builder to seal areas around engine baffling and cowling. Supplement this area with information on page 16-6 of the Q-2 Construction Plans. A blast tube is installed to cool magnetos and alternator.

As outlined in the Q-2 Plans, use silicone to seal small holes and gaps in the baffling. As of this time we have not found a need for an oil cooler, it would be a simple modification to add one. The location would be the back face of the left baffling for a remote cooler, or the installation of the standard Continental oil cooler assy PN#8526104.

TINNERMAN NUTS  
"U" TYPE (NAS 395-6)



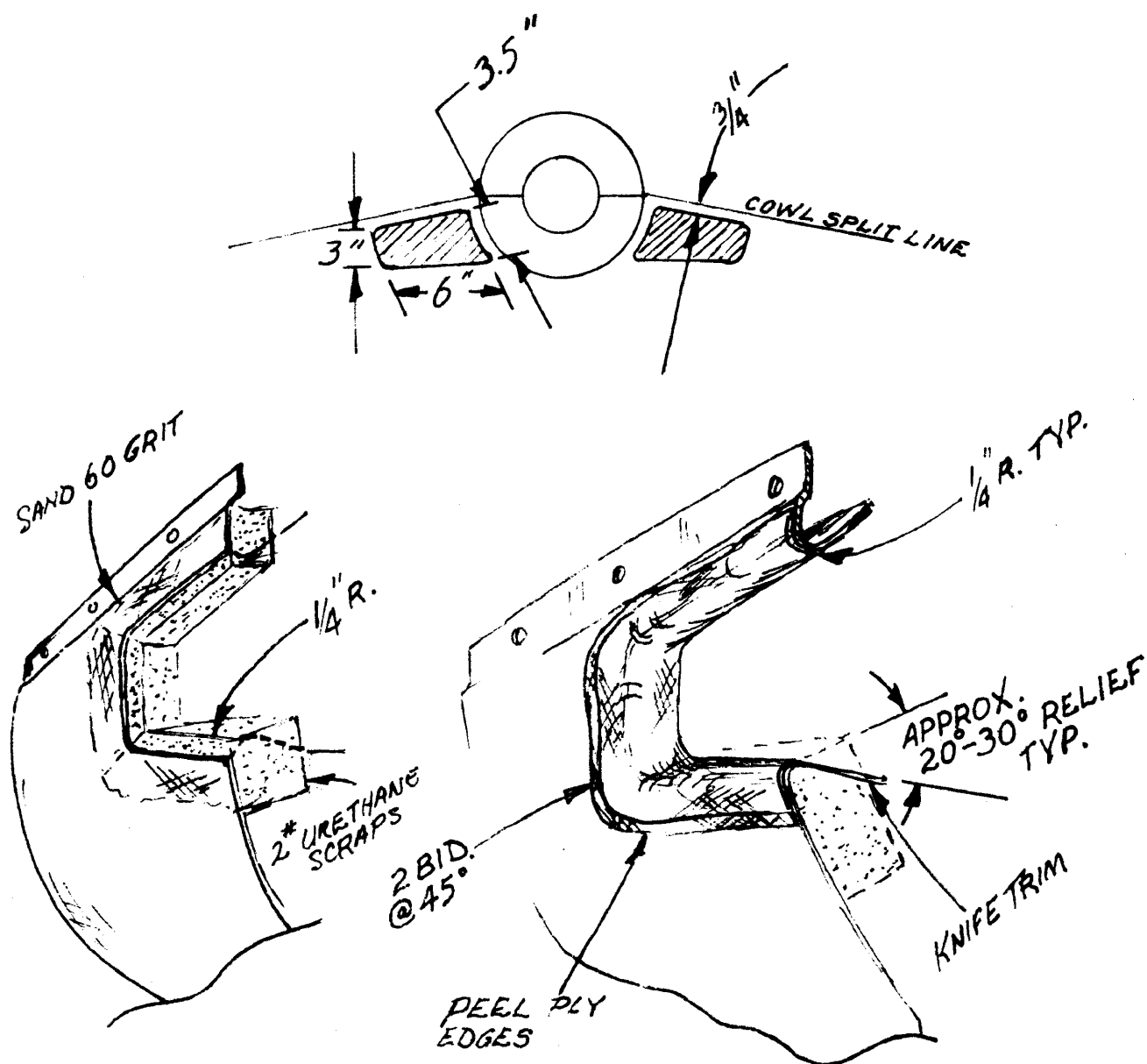
TYPICAL  
BAFFLE INSTALLATION  
A SMALL R.T.V. SILICONE WIPER BEFORE  
FINAL ASSEMBLY WILL REDUCE WEAR



INNER CYLINDER BAFFLES

Check conformity of bent tabs to cylinders. When satisfied of fit, place small dabs of high temp. silicone on inside perimeter and place. Thread a long loop of .040 safety wire thru center holes. Place upper large diameter piano wire center of cylinders. Twist with wire twisters 'til taugt.





#### COOLING AIR INLET:

Layout trim lines for sketch & cut-out. Sand 60 grit 3/4" around cut-out in preparation for 2 ply bid. 45° Lay-up front side. Install 1" styro. or urethane foam to form inside lip with small dabs of 5 min. epoxy allowing 1/4" foam to protrude inside trim line. Radius foam 1/4" & away from opening about 20° or 30°. Glass 2 or 3 ply bid, let cure, knife trim, and finally, remove foam form.

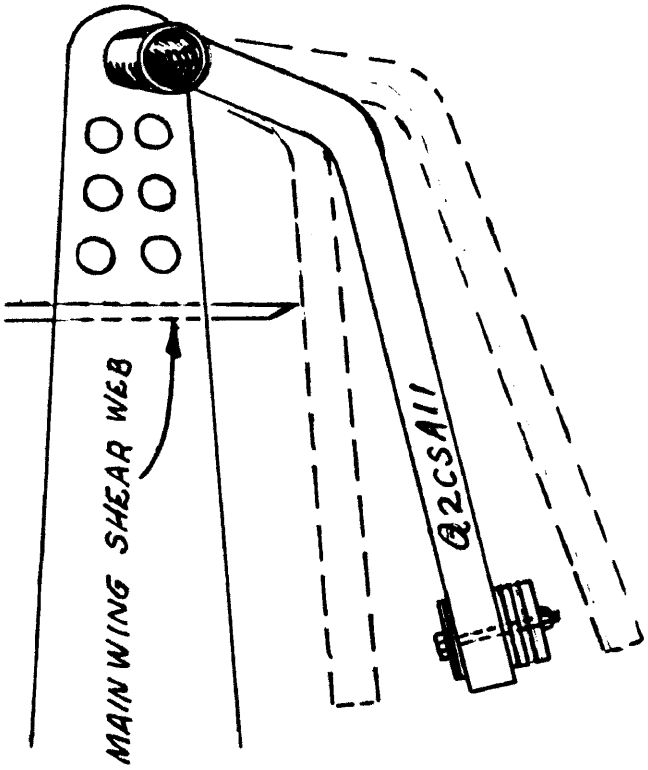
#### COWLING INSTALLATION

The cowling is a little long, to allow for individual building differences. Temporarily fasten spinner bulkhead to the end of the propellor extension. By attaching little spacers to the aft edge of the spinner bulkhead (about .10") you can trim the cowling to the fuselage and maintain a .10" gap between the spinner and the cowling. The details for the cowling installation are found in Q-2 Plans, page 16-3. The location and shape of the air inlets are different for the O-200 and are given in these plans. Also, the cowl flap has been eliminated. After the cowling has been cut to size and the cowling flanges have been attached to the firewall and the attach holes have been drilled between the upper and lower cowling halves. Remove cowling to install all nut plates, install air inlet radius and air inlet for the carburetor, cut oil door etc. If you have celcos (temporary sheet metal fastners), they make positioning the cowling easier during fitting and trimming. Also, duct tape will help hold cowling in place during fitting. At this point, remove engine (do not lose track of mount spacers) and install firewall and seal all firewall openings around wires and cowling. You may bolt the voltage regulator and gascolator on the firewall at this time. Run primer lines from gascolator to primer, and primer to intake spider and fuel line from shut-off valve to gascolator to carburetor.



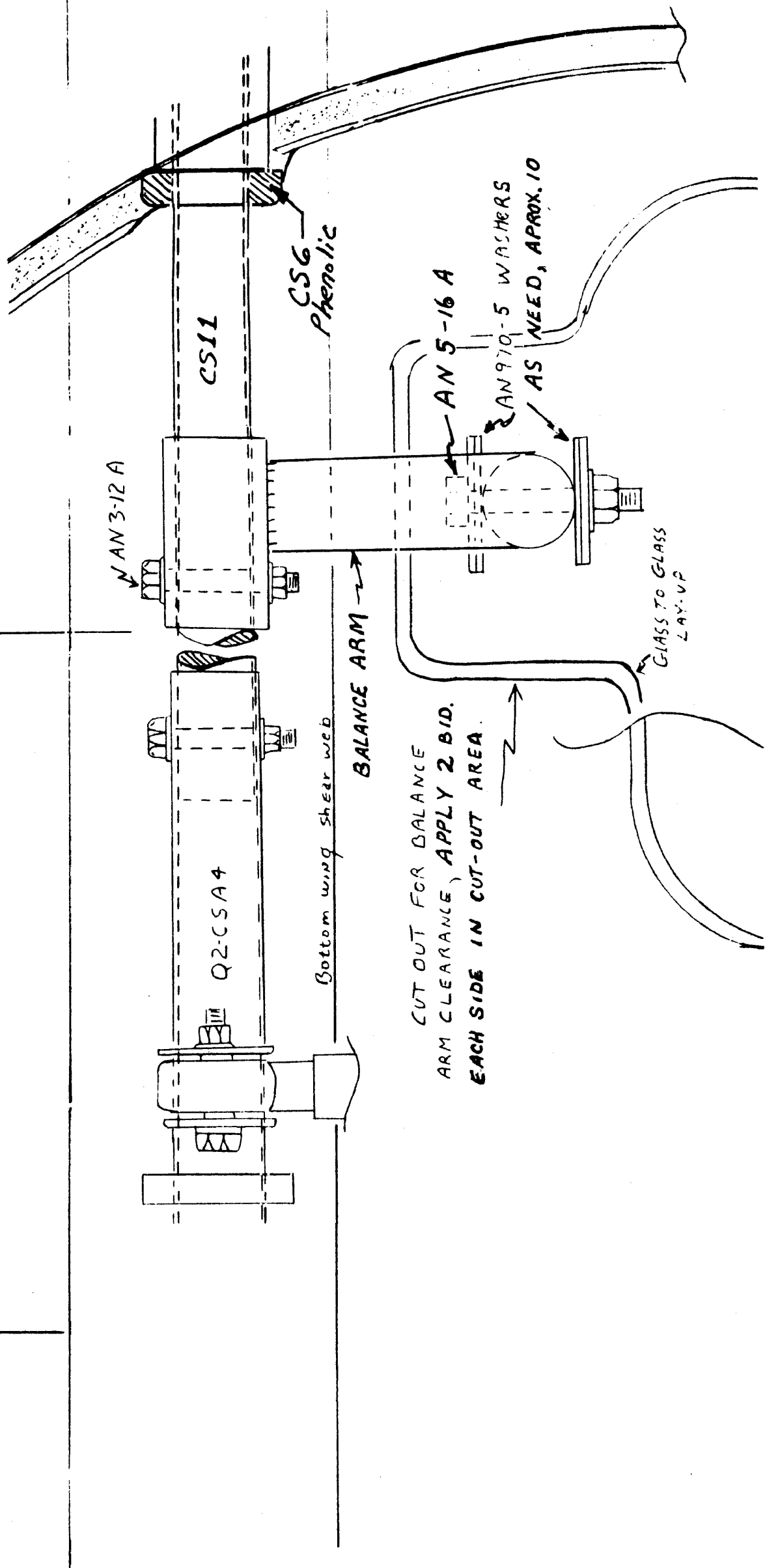
AILERON MASS BALANCING

The ailerons are balanced for obvious reasons of higher speed, and can be accomplished fairly fast. Assuming, of course, your aircraft can be disassembled behind the rear wing. As with the elevators, the ailerons should be as friction free as possible. The washers are bolted on the end of the internal balance arm to bring each aileron to full or slightly leading edge heavy balance. Make sure there is no interference with the arm for full aileron travel. Remember to disconnect ailerons from each other when balancing.



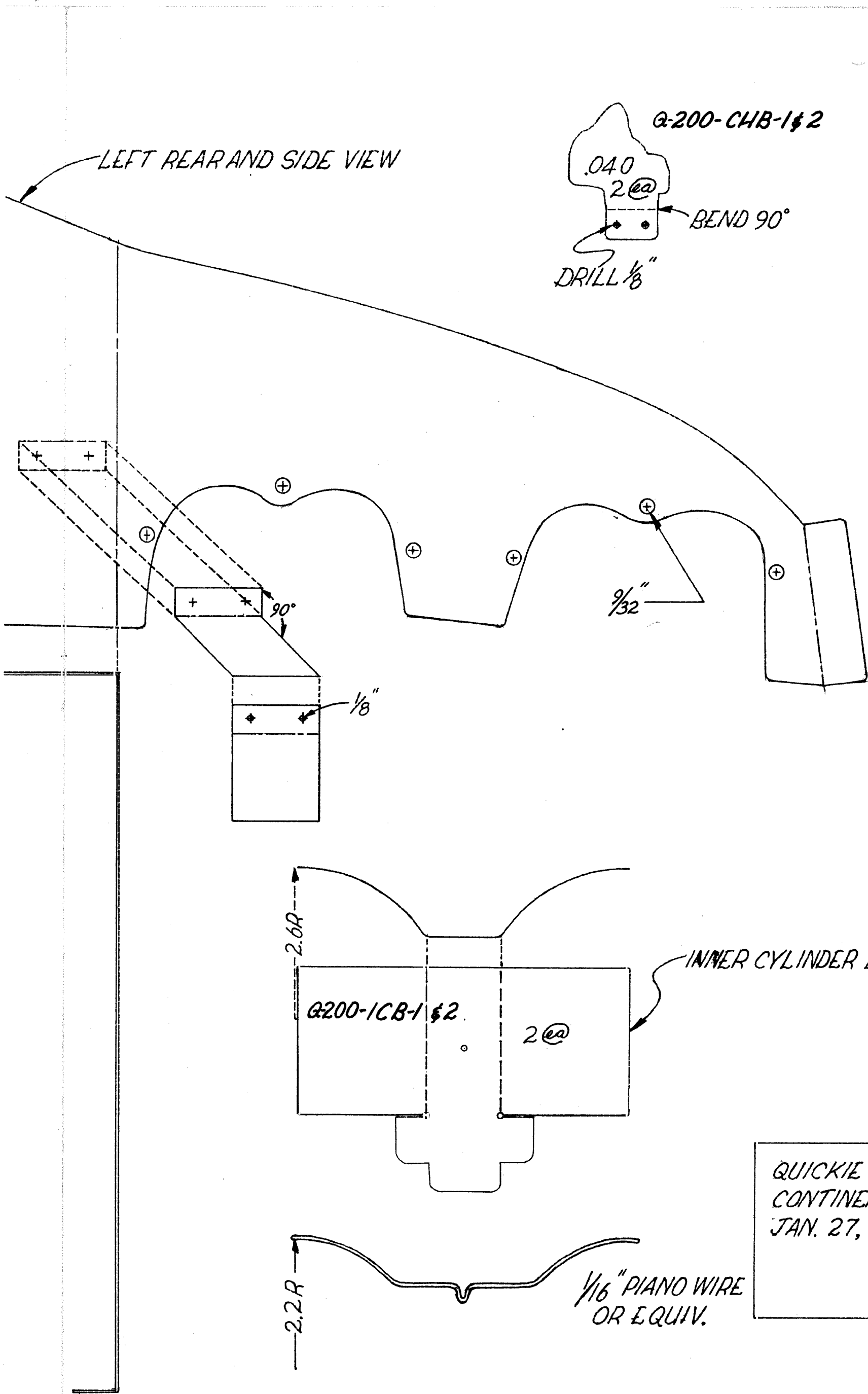
BL-0

11.0"



CUT OUT FOR BALANCE ARM CLEARANCE, APPLY 2 BID. EACH SIDE IN CUT-OUT AREA.





Q-200-CHB-1 & 2

LEFT REAR AND SIDE VIEW

.040  
2 @  
BEND 90°  
DRILL 1/8"

9/32"

1/8"

2.6R

INNER CYLINDER BAFFLES

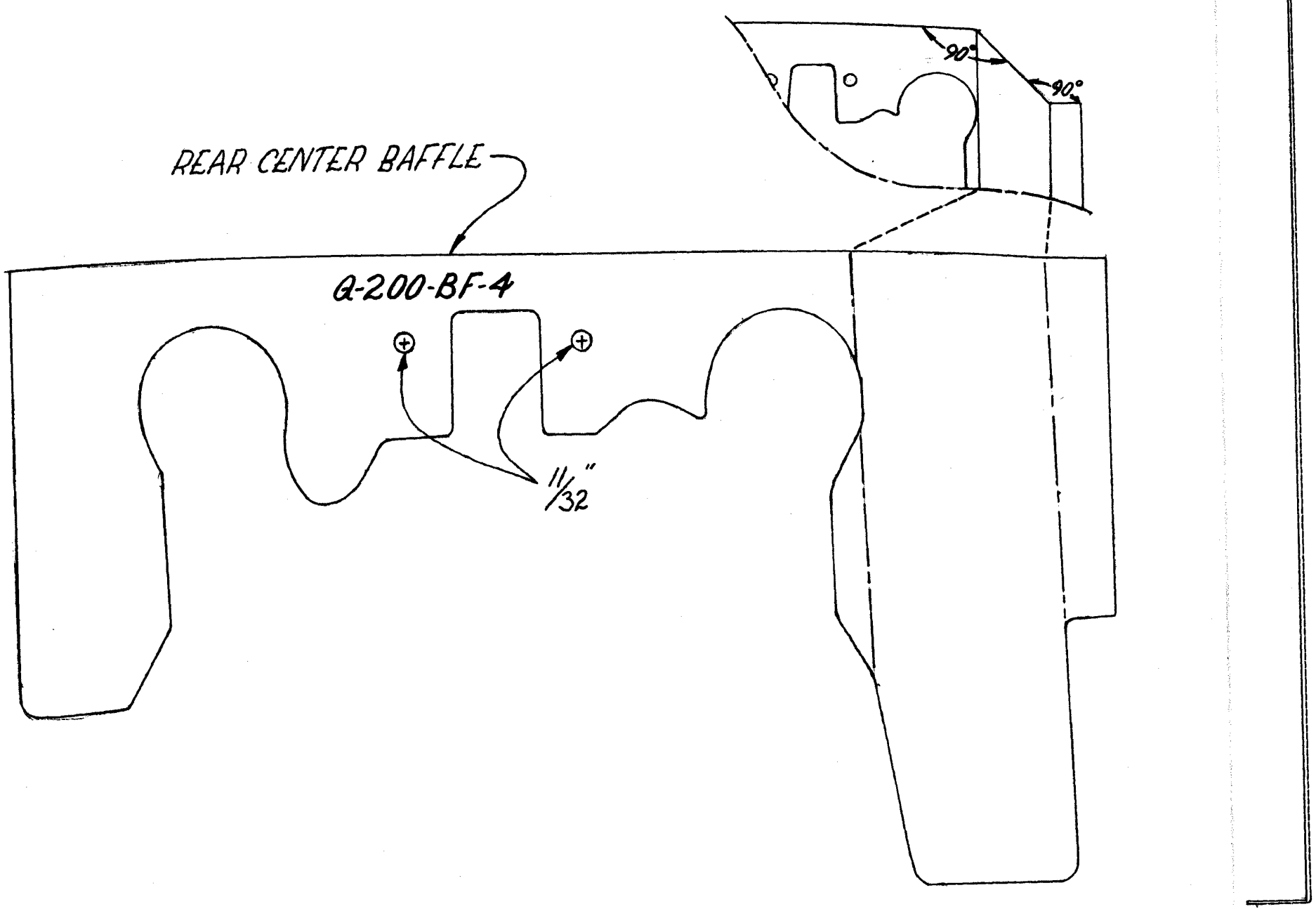
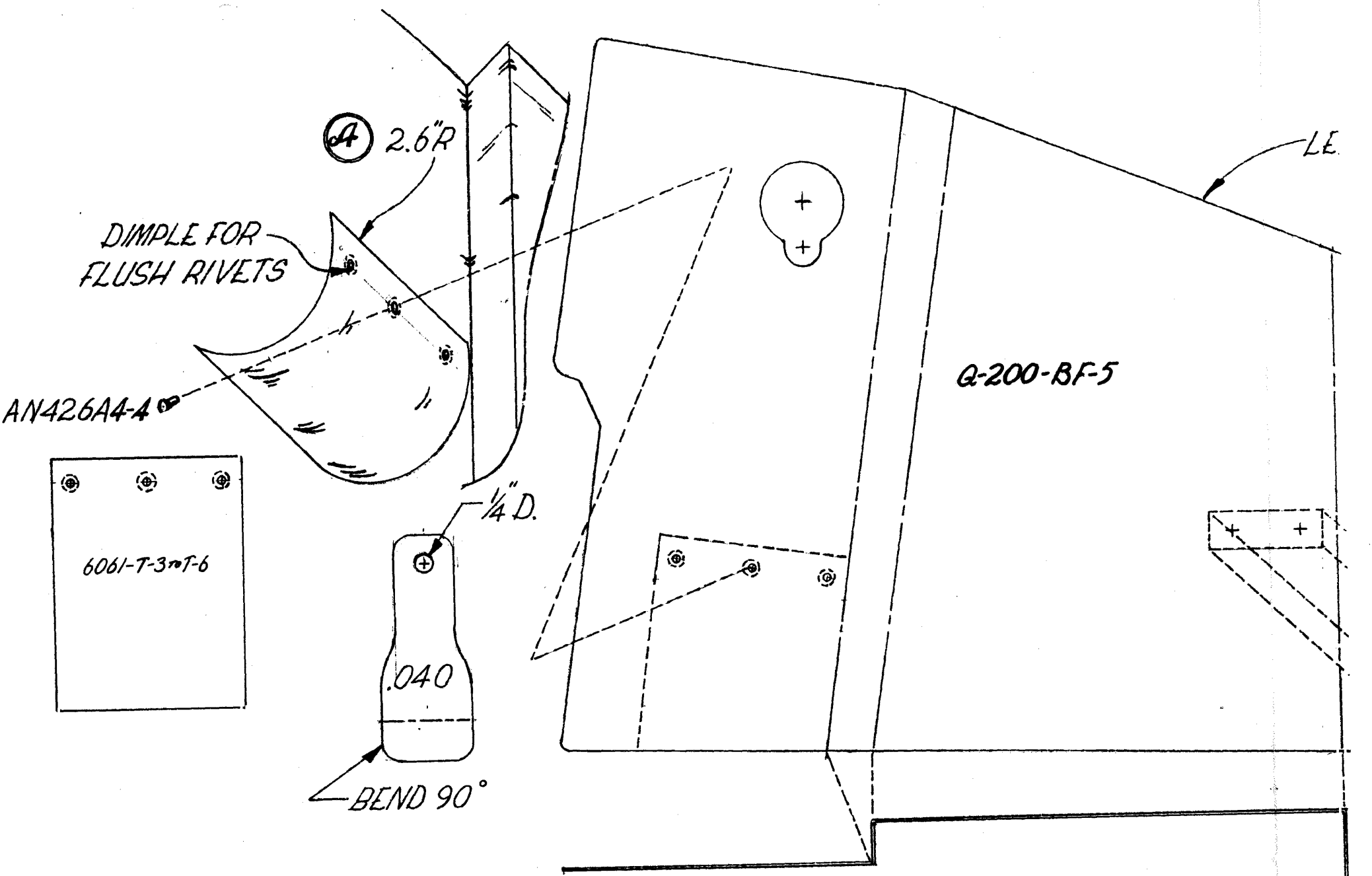
Q200-ICB-1 & 2

2 @

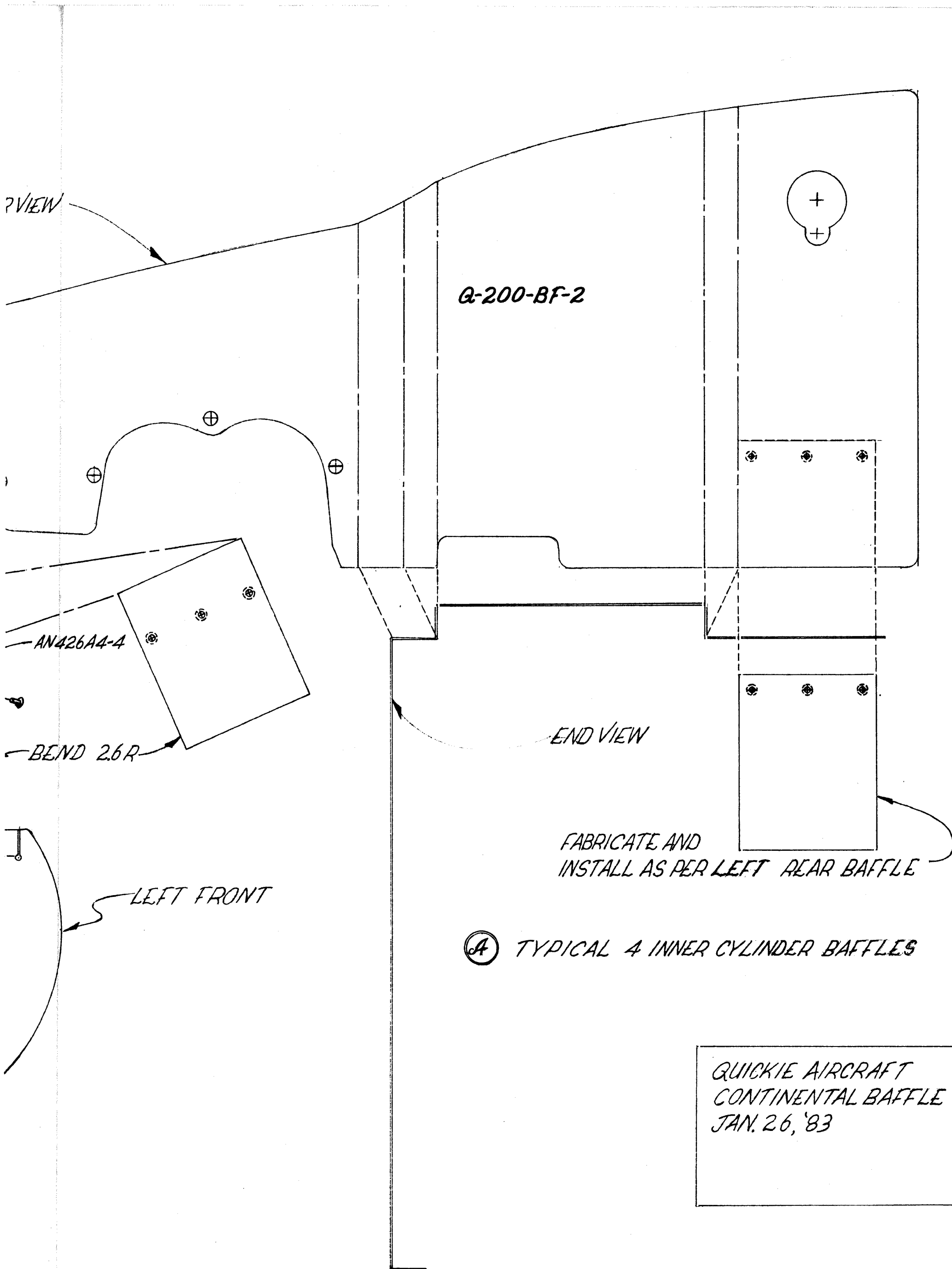
QUICKIE AIRCRAFT  
CONTINENTAL BAFFLE  
JAN. 27, '83

2.2R

1/16" PIANO WIRE  
OR EQUIV.







R VIEW

Q-200-BF-2

AN426A4-4

BEND 2.6R

LEFT FRONT

END VIEW

FABRICATE AND  
INSTALL AS PER LEFT REAR BAFFLE

(A) TYPICAL 4 INNER CYLINDER BAFFLES

QUICKIE AIRCRAFT  
CONTINENTAL BAFFLE  
JAN. 26, '83

RT. SIDE AND REAR VIEW

RT. FRONT

Q-200-BF-6

DIMPLE FOR  
FLUSH  
RIVETS

AN426A4-

BEND 2.

Q-200-BF-3

