



GMC MOTORHOMES
INTERNATIONAL

IN-TANK FUEL PUMPS
EMERY STORA
September 30, 2010

A very big
Thank You
for

The Inventor,
Bill Bramlett

and also the assistance of
Bob Musgrove

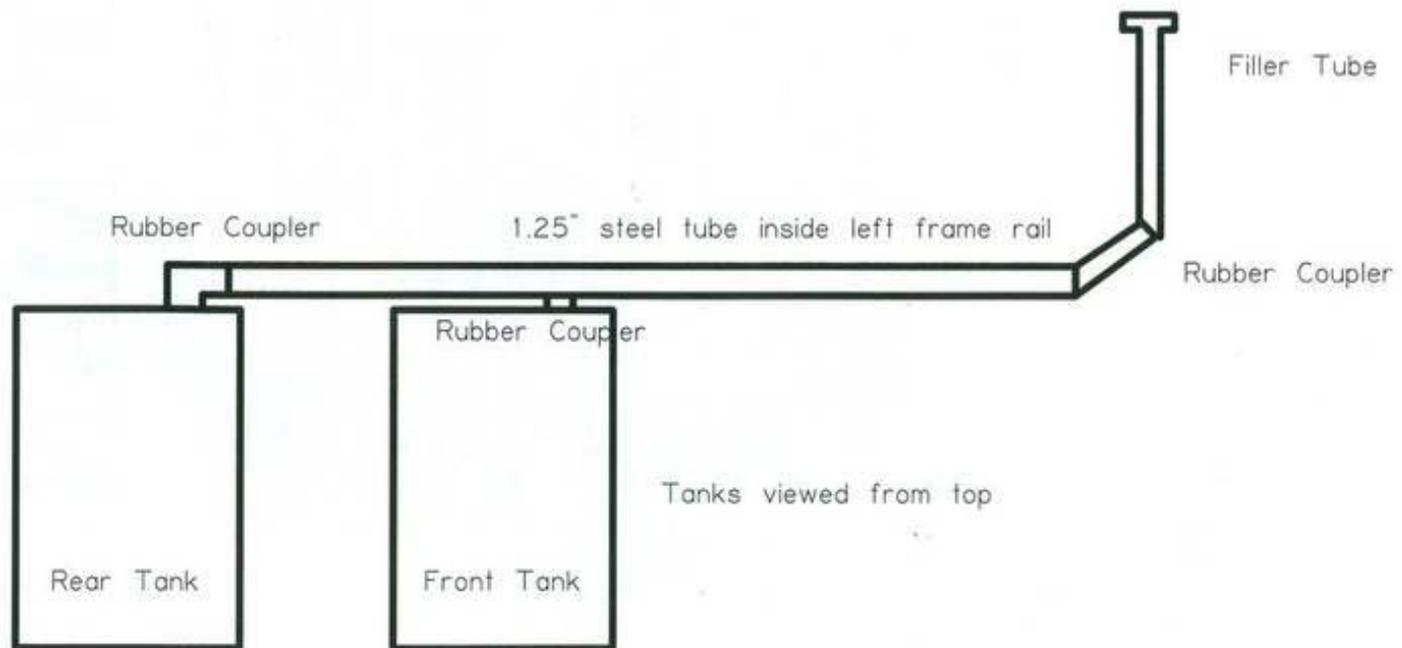
for their help with this project.

Premise: Fuel pumps are good for pumping but poor in sucking. Pressure ahead of a pump will hold down vapor lock. Suction behind a pump creates a low pressure area subject to vapor lock.

When an external pump sucks air it is sometimes difficult to get it primed from the other tank.

By putting pumps into the tanks you eliminate the lower pressure in the intake hose, eliminate the selector valve, cool the pumps, and have instant priming -- all of which helps eliminate vapor lock.

Fuel Fill

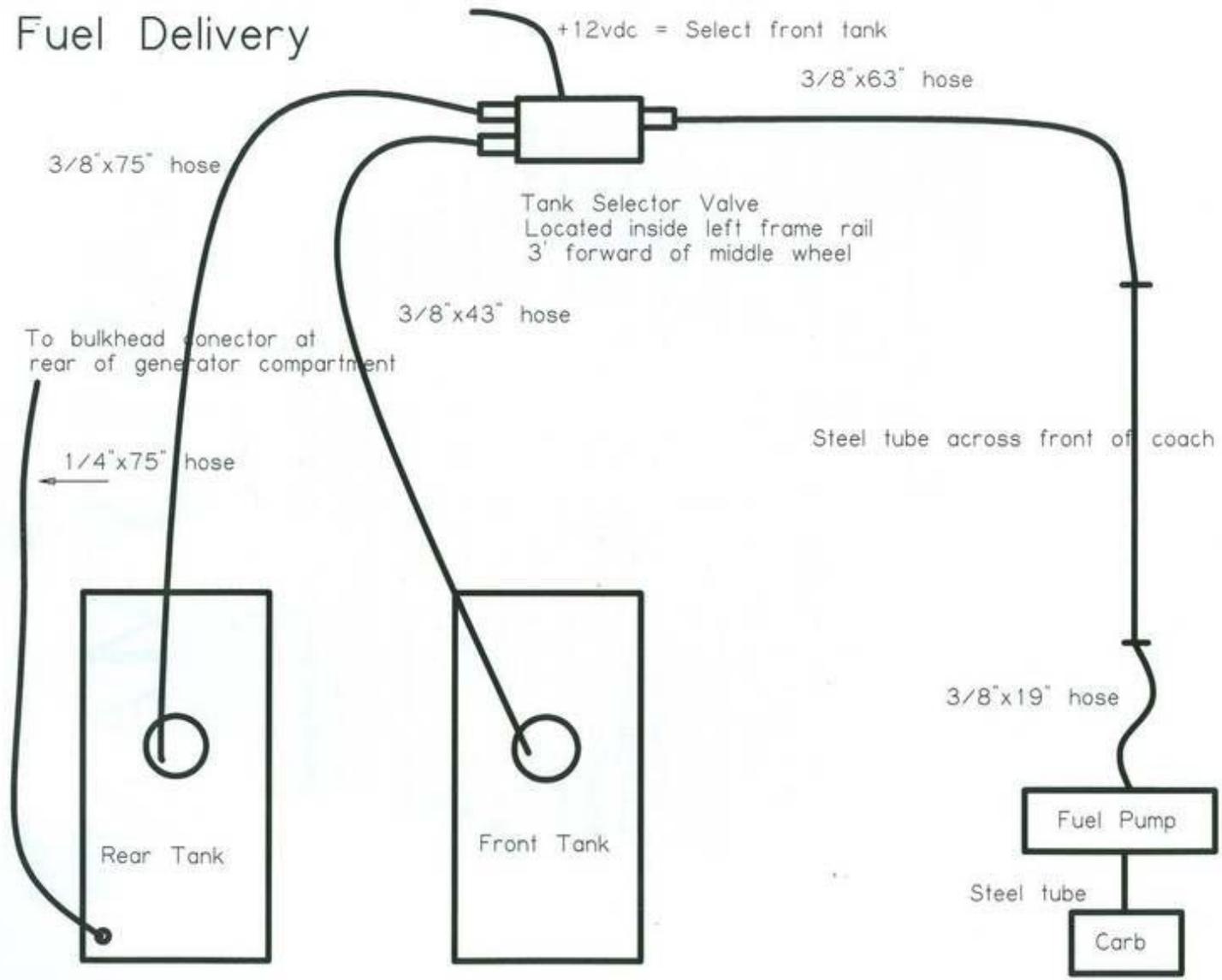


We will not change the fuel fill system.

However check the rubber connectors at the tank and replace them if necessary.

Available from Jim Kanomata and others.

Original Fuel Delivery



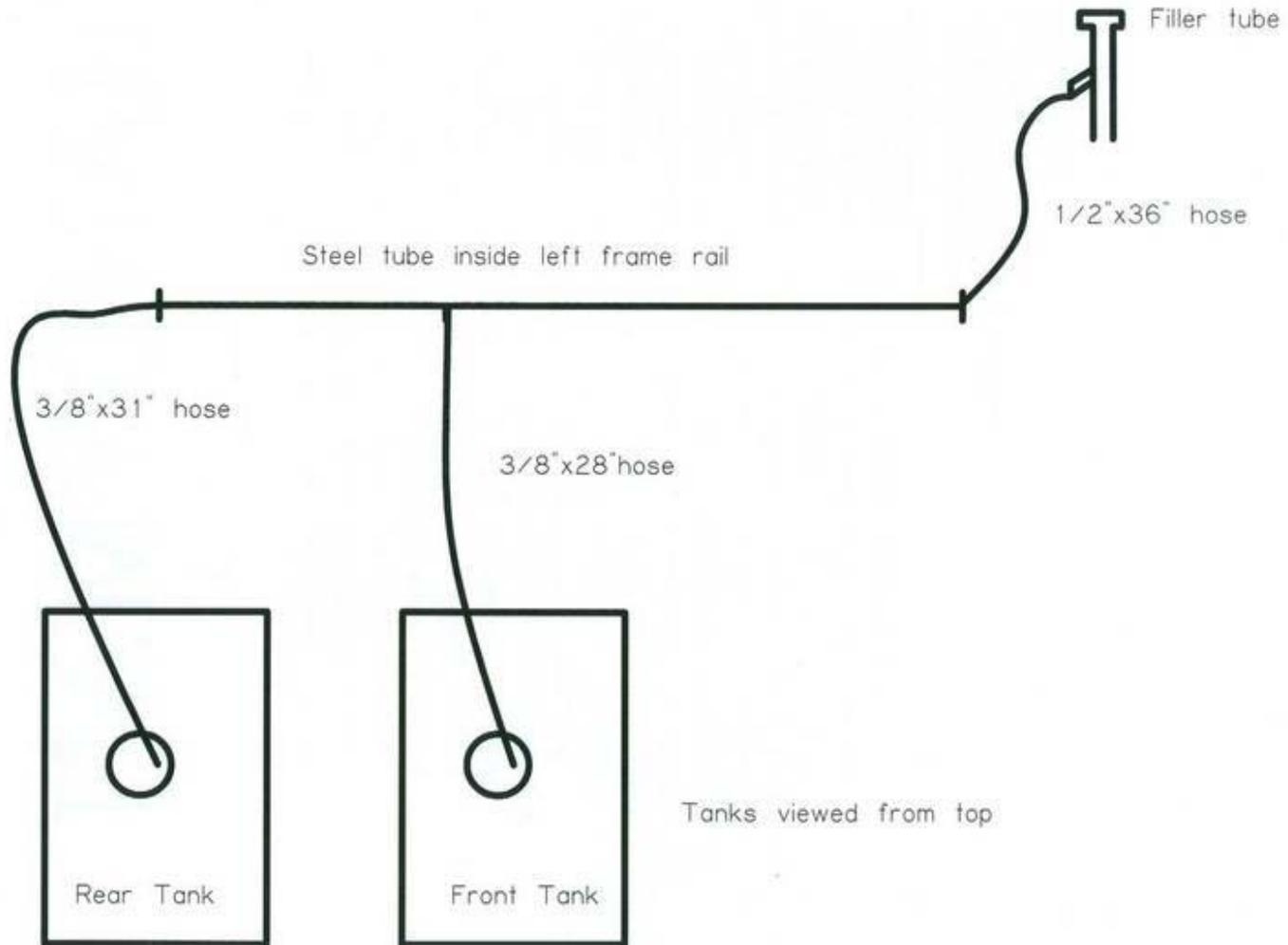
Picture by Rick Williams

We will replace the rubber lines with steel lines.

We eliminate the fuel selector valve. The fuel pumps have check valves so their outlets can be connected together and to the fuel line going to the engine. I tested them to 70 psi and they held fine.

A new steel line goes from the pump connector to a fuel filter and then to the engine.

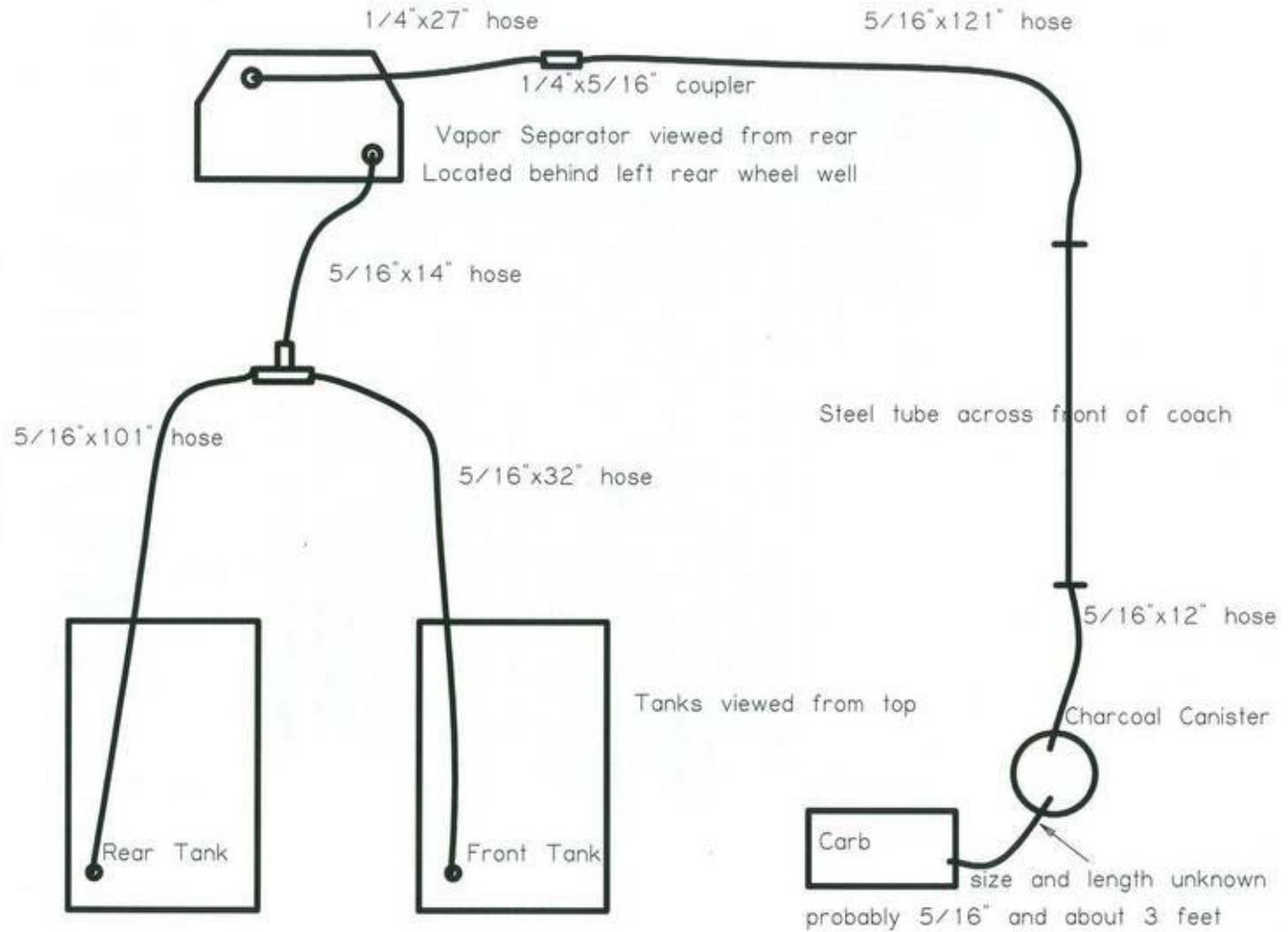
Original Tank Venting



We will replace the rubber hoses on the top of the tank with steel lines connected with short hoses to the steel tube at the frame rail.

The rubber stub hoses can easily be reached alongside the tanks to replace if ever necessary without dropping the tanks.

Original Tank Vapor Collection



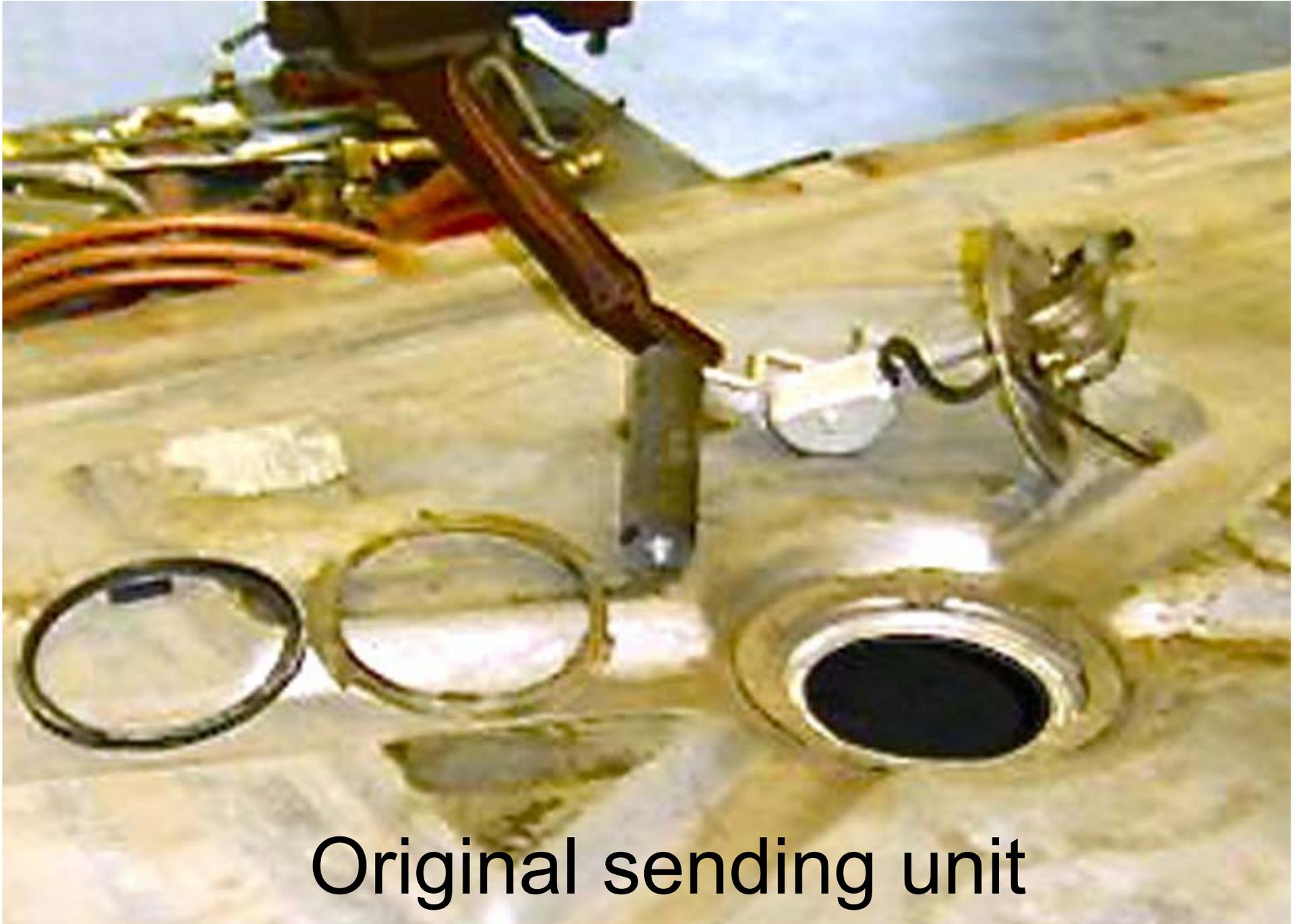
The only change made here is to replace the rubber hoses on the top of the tanks with steel lines which connect to the existing hoses which are shortened and now connect at the sides of the tanks.

Again making it easy to replace the hoses without dropping the tanks.

Original sending unit



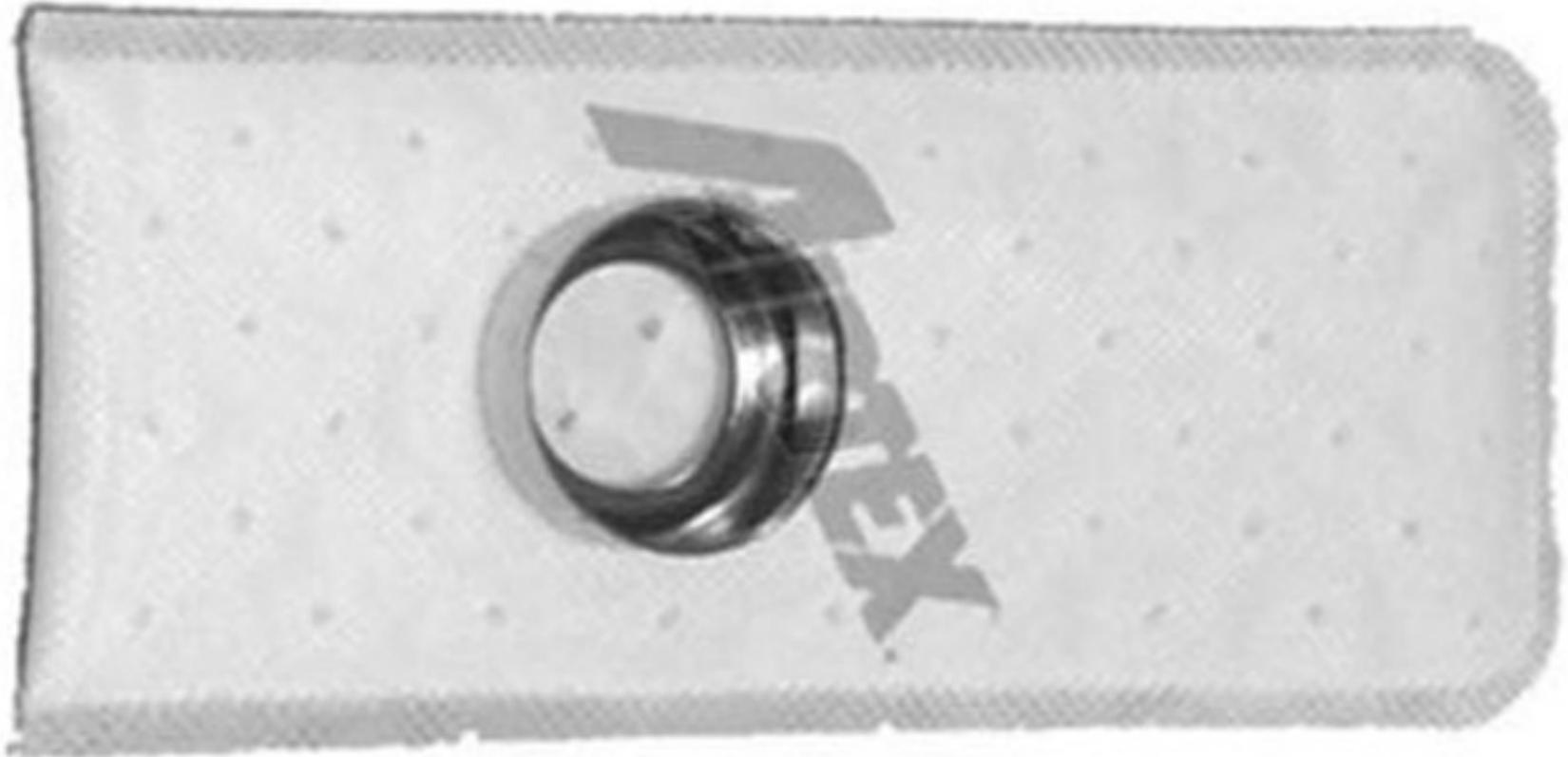
Longer tube is vent.



Original sending unit

PARTS

Airtex FS1 Fuel Strainer



This has a plastic “cage” in the bottom to prevent the bottom from collapsing against the bottom of the tank.

O'Reilly Auto Parts \$10.99 each plus tax
Amazon.com \$7.02 each delivered

Alternate Carter Parts

The Carter equivalent to the Airtex pump E3902 is P74037.

The Carter equivalent to the Airtex SR1 filter is STS-2.

Bracket for Bottom of Pump

You will need a bracket for the bottom of the pump. You can easily make your own or find one at a junkyard from a GM pickup truck but you would have to pull the fuel tank.

Use 1/16" thick steel plate.



BIG WHEEL
we're big on people

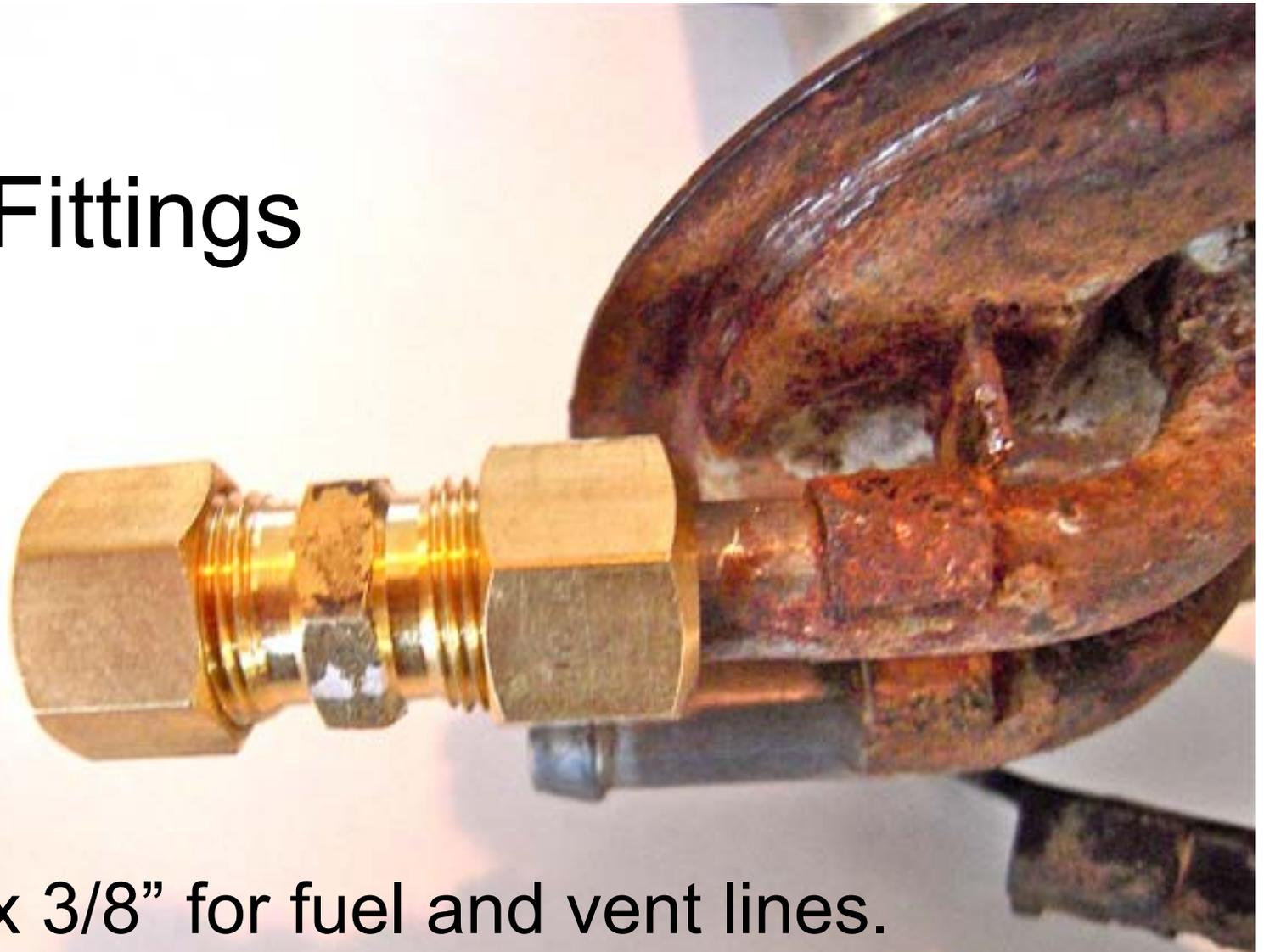
BIG
we're

Different pumps have different size bottoms.
Know what you have before you make it.
Circle inside tabs is sized by diameter of rubber.



Tabs are just bent up to hold pump. Large tab is bent up and bolted to new vent pipe to hold bottom of pump.

Brass Fittings



Use six 3/8" for fuel and vent lines.

Use two 5/16" for vapor lines.

Use one 1/4" right angle inverted flare to pipe thread fitting for Onan fuel pickup.



You will cut large rubber connector (comes with pump) and use a 3/4" piece. The insulators are 1/4"+ OD nylon "flange bushings" and smaller ID nylon washers from Ace Hardware. Drill "F" hole (.257") in washer for press fit.

Misc. Bolts, Nuts, Washers to fit.

Hose clamps to fit pump hose and fuel/vent hoses.

3/8" inverted flare coupler for fuel line.

Wire terminals to fit over bolt and larger ones to fit over flange bushing.

Hoses for tanks and lines if needed.

IMPORTANT!

BE SURE to test your fuel sender before using the sending unit to accommodate your new pump.

It should read approx. 90 ohms at full and 0 ohms at empty.

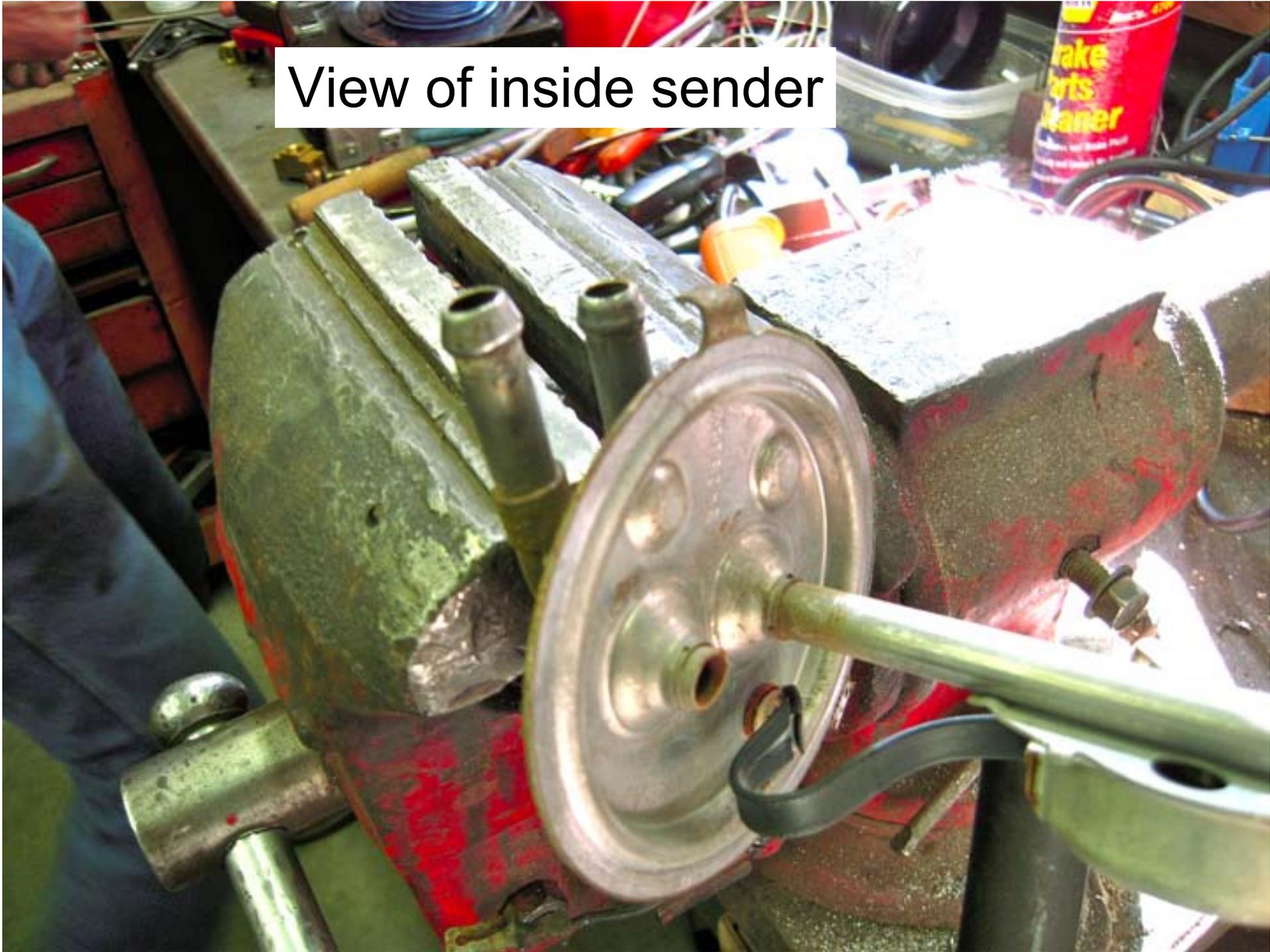
Mine were both 110 ohms and 10 ohms.

Cutting lines on
original fuel
pickup.

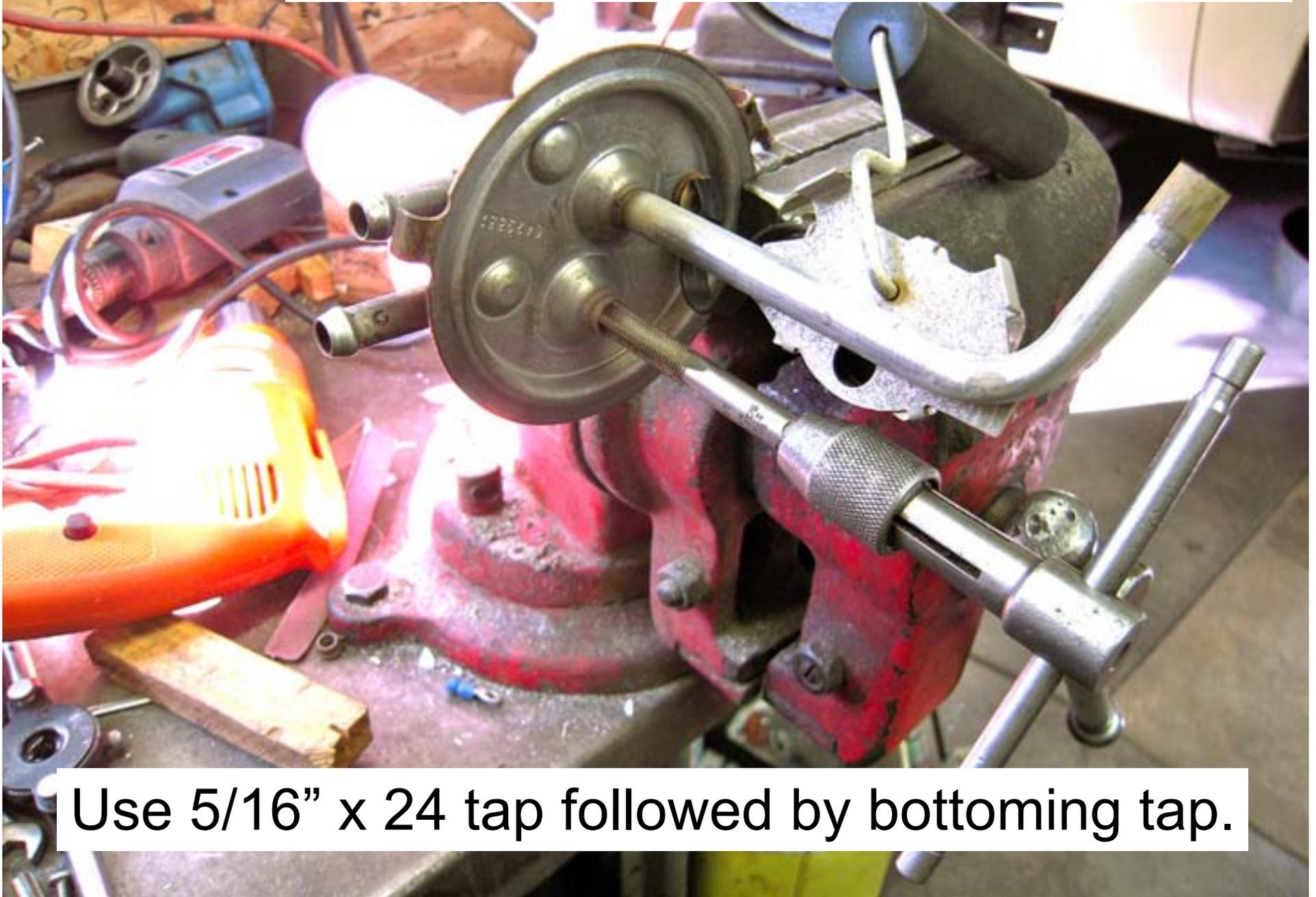
Cutting swedged ends from top of sender.



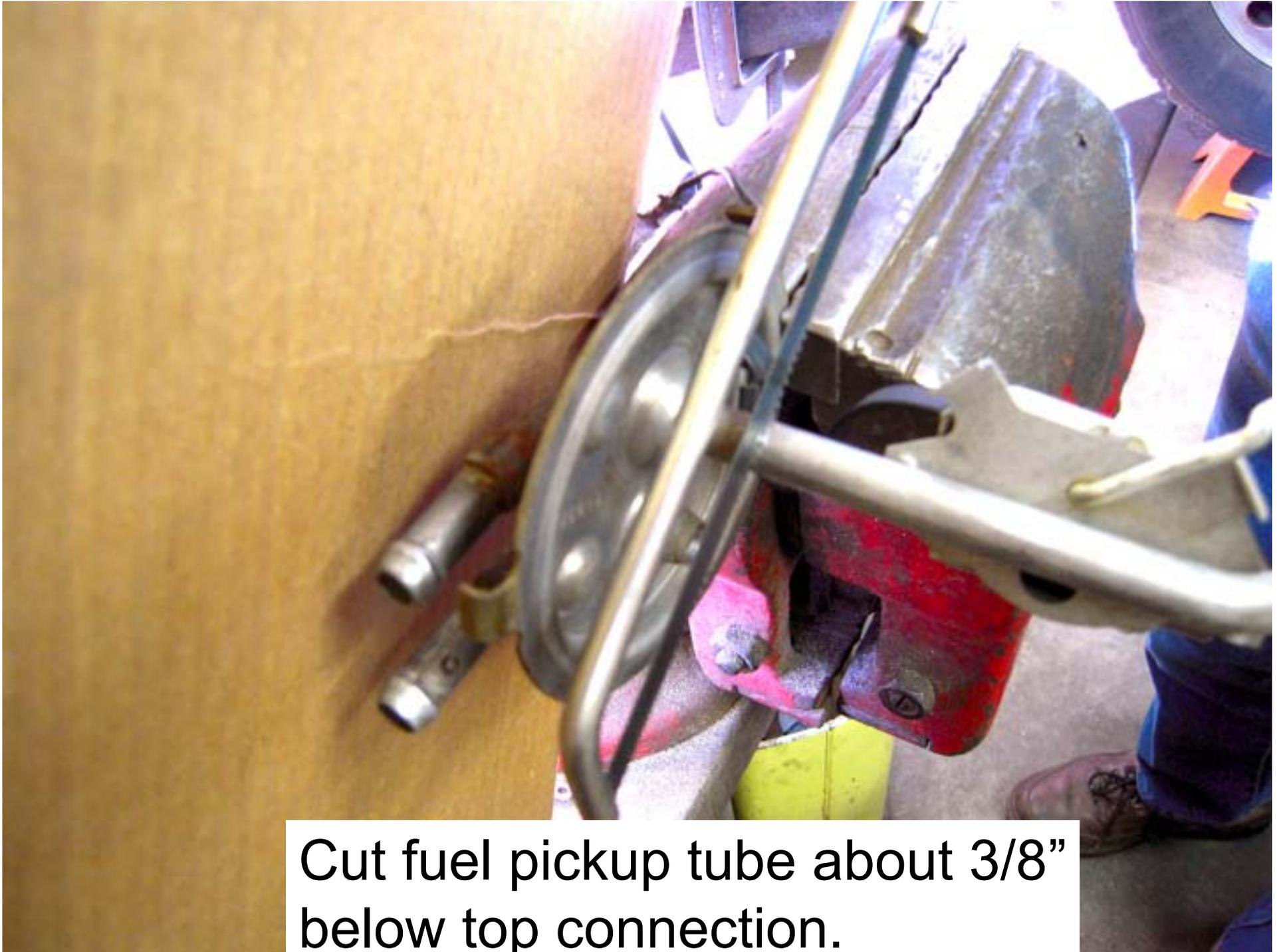
View of inside sender



Thread Vent Opening for 3/8 steel line



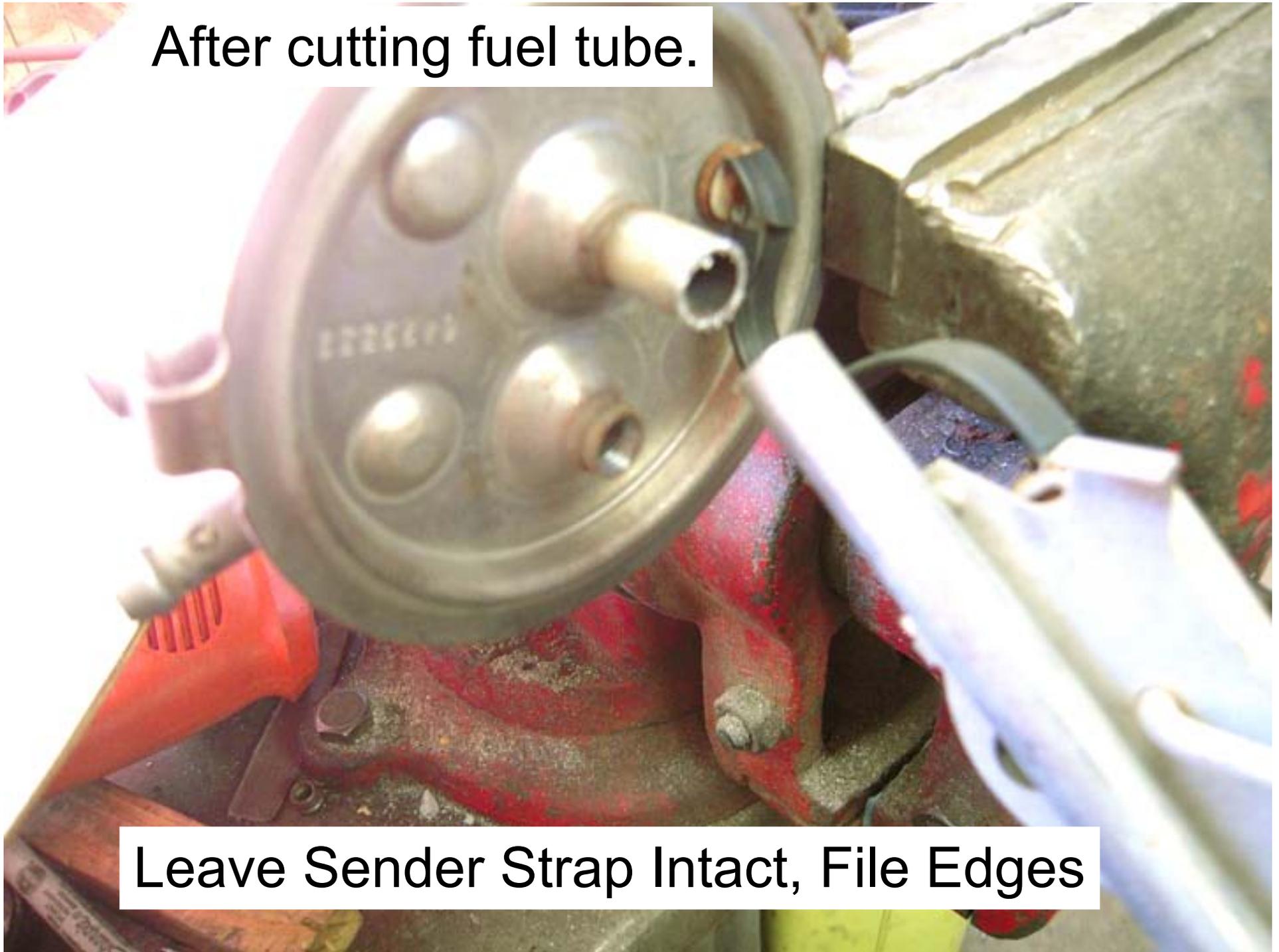
Use 5/16" x 24 tap followed by bottoming tap.



Cut fuel pickup tube about 3/8" below top connection.

After cutting fuel tube.

Leave Sender Strap Intact, File Edges



A piece of steel 5/16" line will be cut and threaded on one end to screw into threads tapped into vent opening.

This will support the fuel sending unit and the bottom of the fuel pump.

Cut it just long enough to reach the tab on the pump bottom bracket that you will bolt to it. 5" plus threads will do.

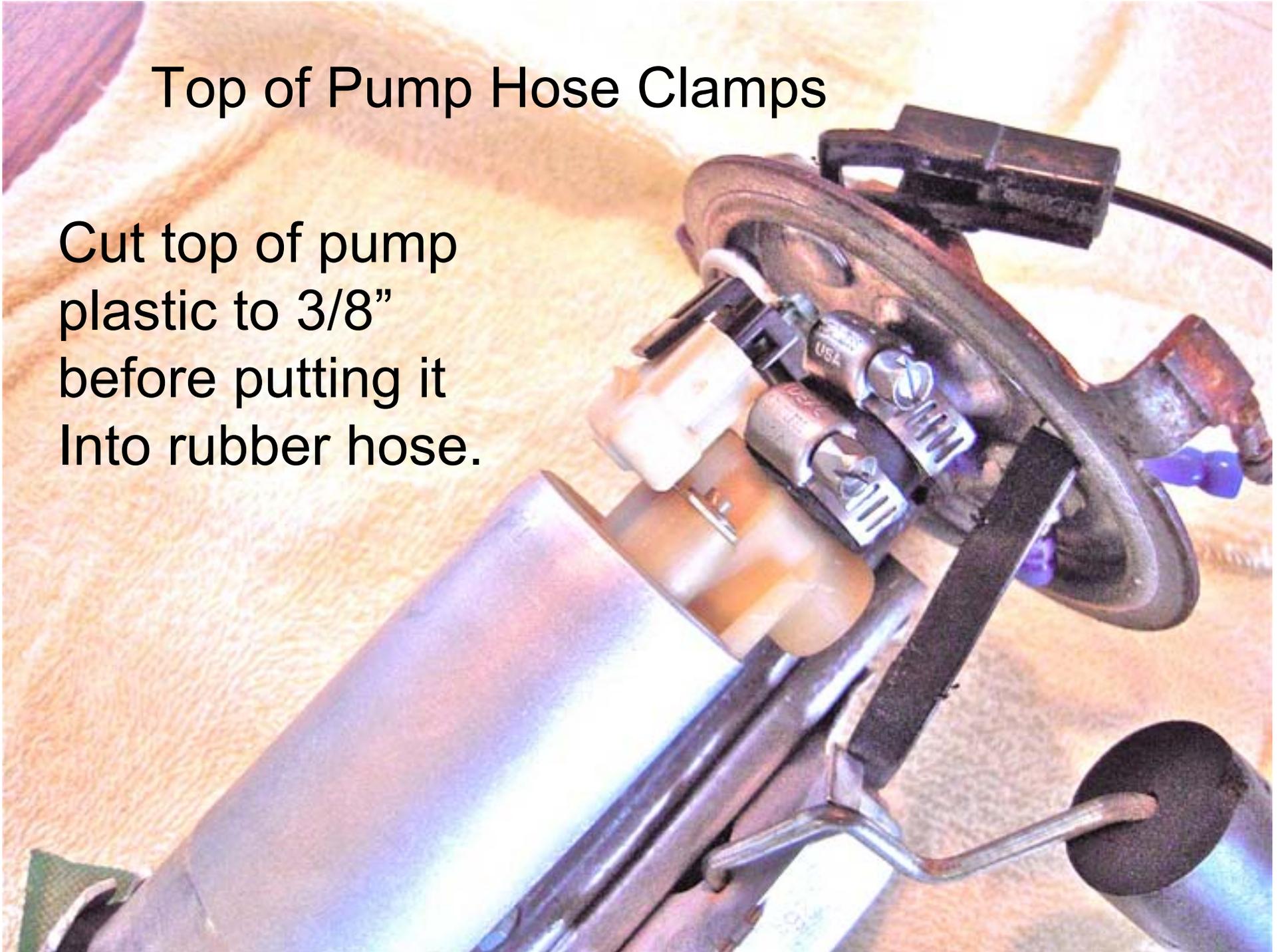
Important: drill 1/8" hole all the way through the tube just under the threads at top to vent fuel tank.

Showing vent tube before bolting sender to it. Position sender at the approximate height it originally was in tank.

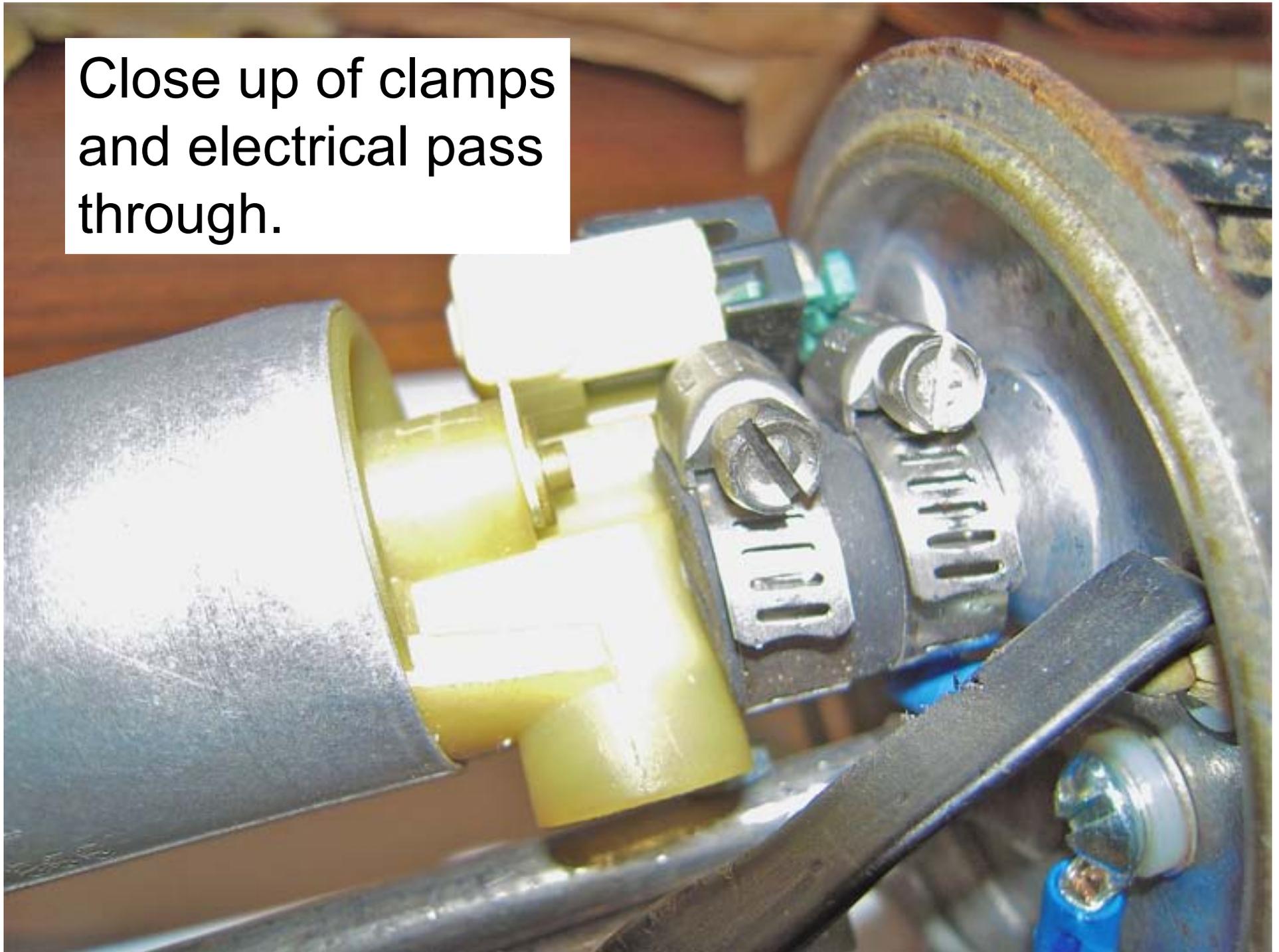


Top of Pump Hose Clamps

Cut top of pump plastic to 3/8" before putting it into rubber hose.



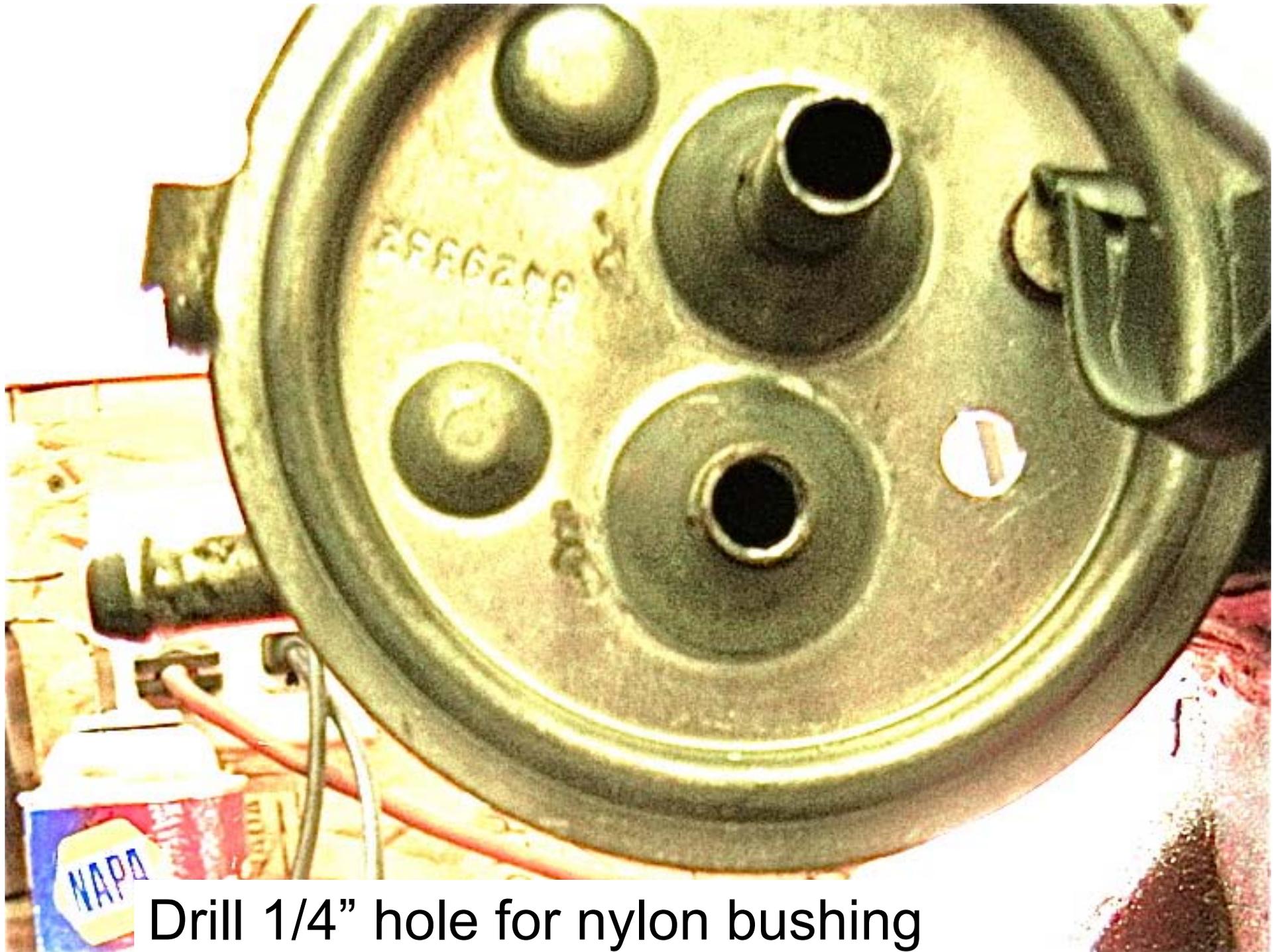
Close up of clamps and electrical pass through.





Bolt sending unit to side of vent tube.
Bolt pump bracket to bottom of tube.





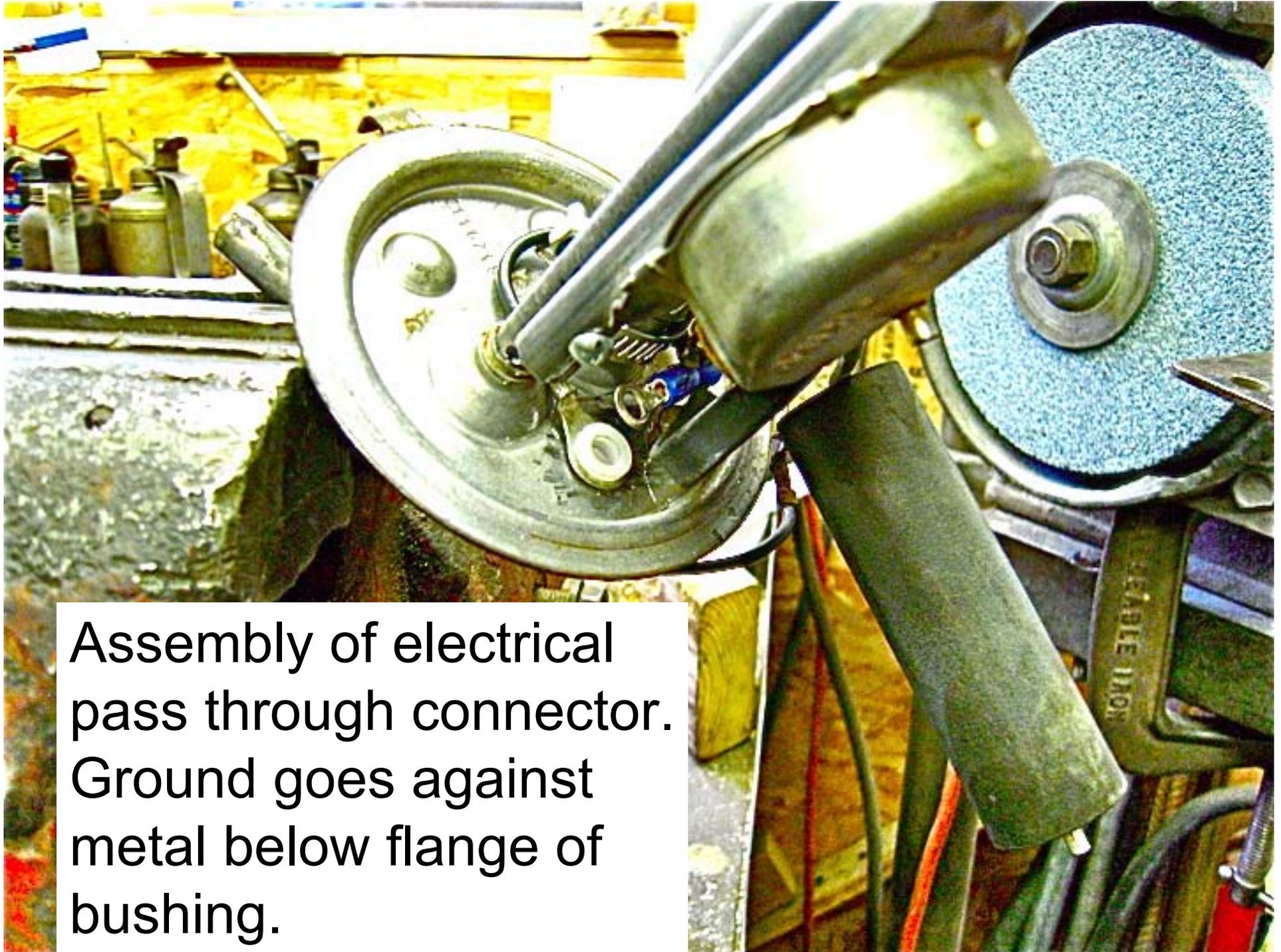
Drill 1/4" hole for nylon bushing

Press washer over bushing. It helps to use a short piece of tubing over the bushing and pull it together with a washer and nut. Cut the bushing flush with the top of washer. Don't forget to put ground lug for pump under the inside of the bushing before pressing.



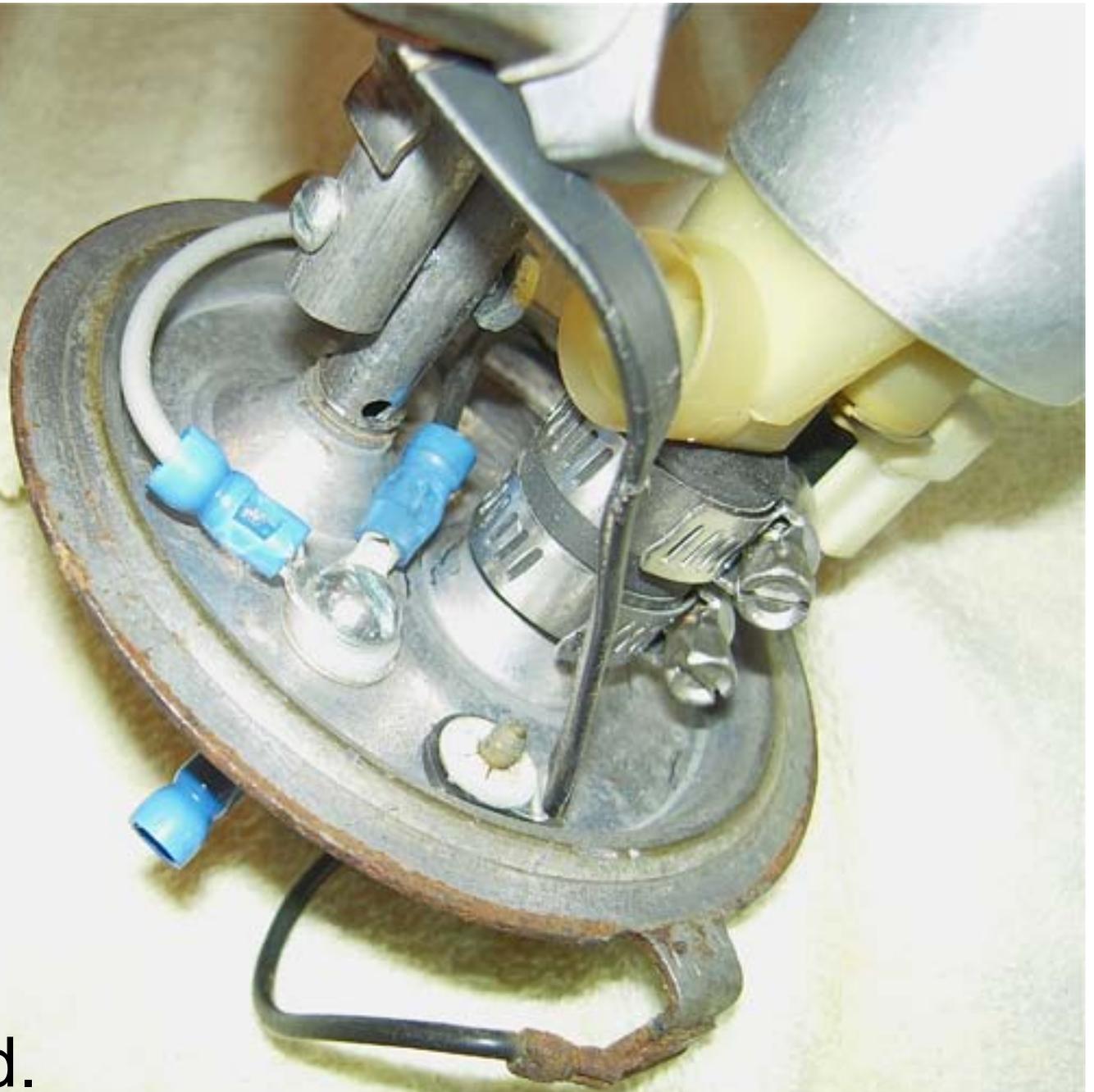


Use a metal washer over Nylon washer and a lock washer over the connector.



Assembly of electrical pass through connector. Ground goes against metal below flange of bushing.

Put ground wire 1/4" terminal under flange of bushing. Put hot wire under bolt head.





Finished Assembly

Insert pumps into tank
and connect steel lines.

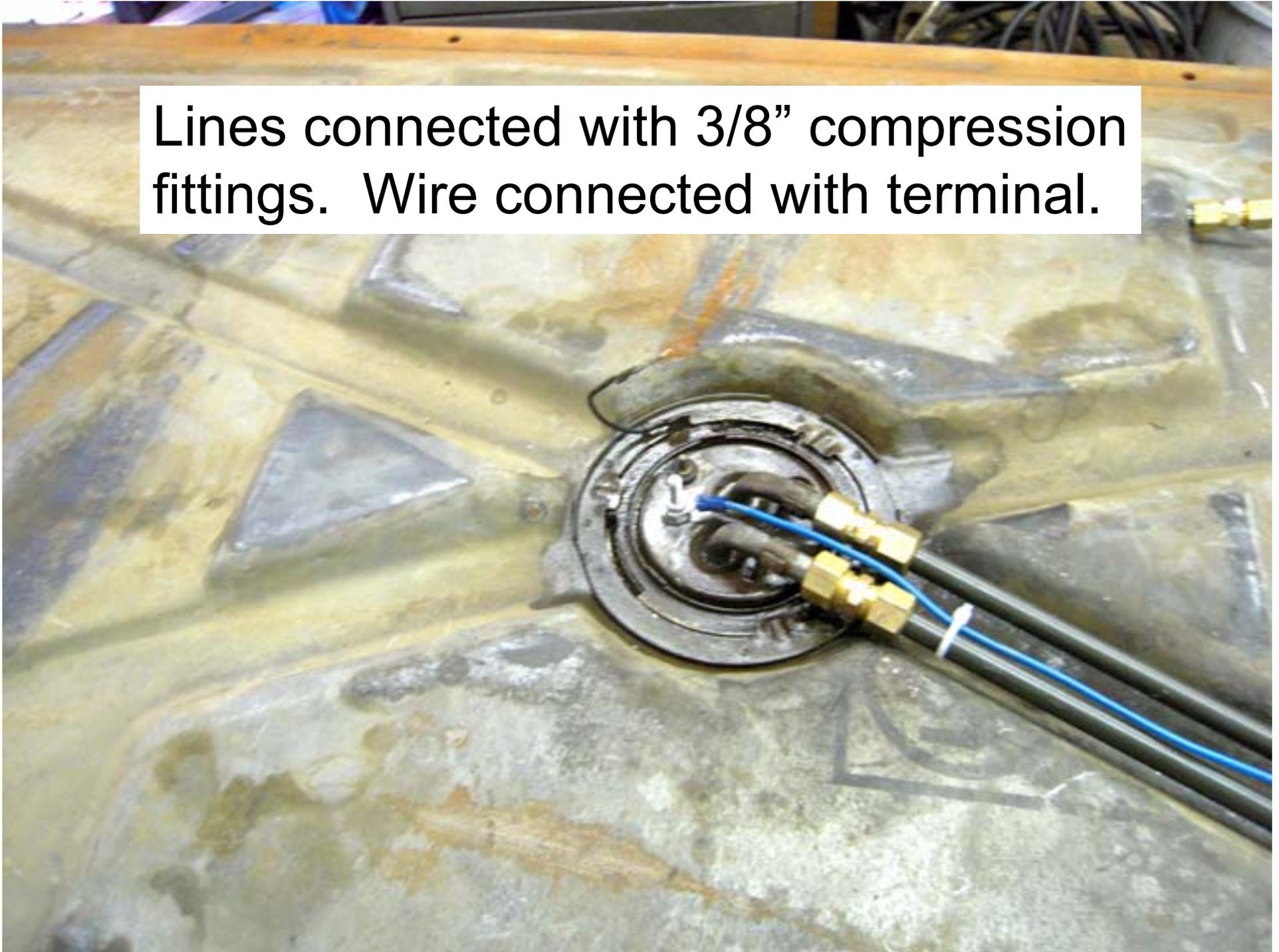
Don't forget to install
filter socks onto pumps.

Rear Tank First

After installing test at low pressure with a soap solution.



Lines connected with 3/8" compression fittings. Wire connected with terminal.



Rear Tank
fuel pickup



Rear tank vapor line hookup
5/16" compression fitting.



Rear tank Onan fuel pickup.
Use 1/4" inverted flare to
pipe thread right angle adapter.





Rear Tank
Finished View 1

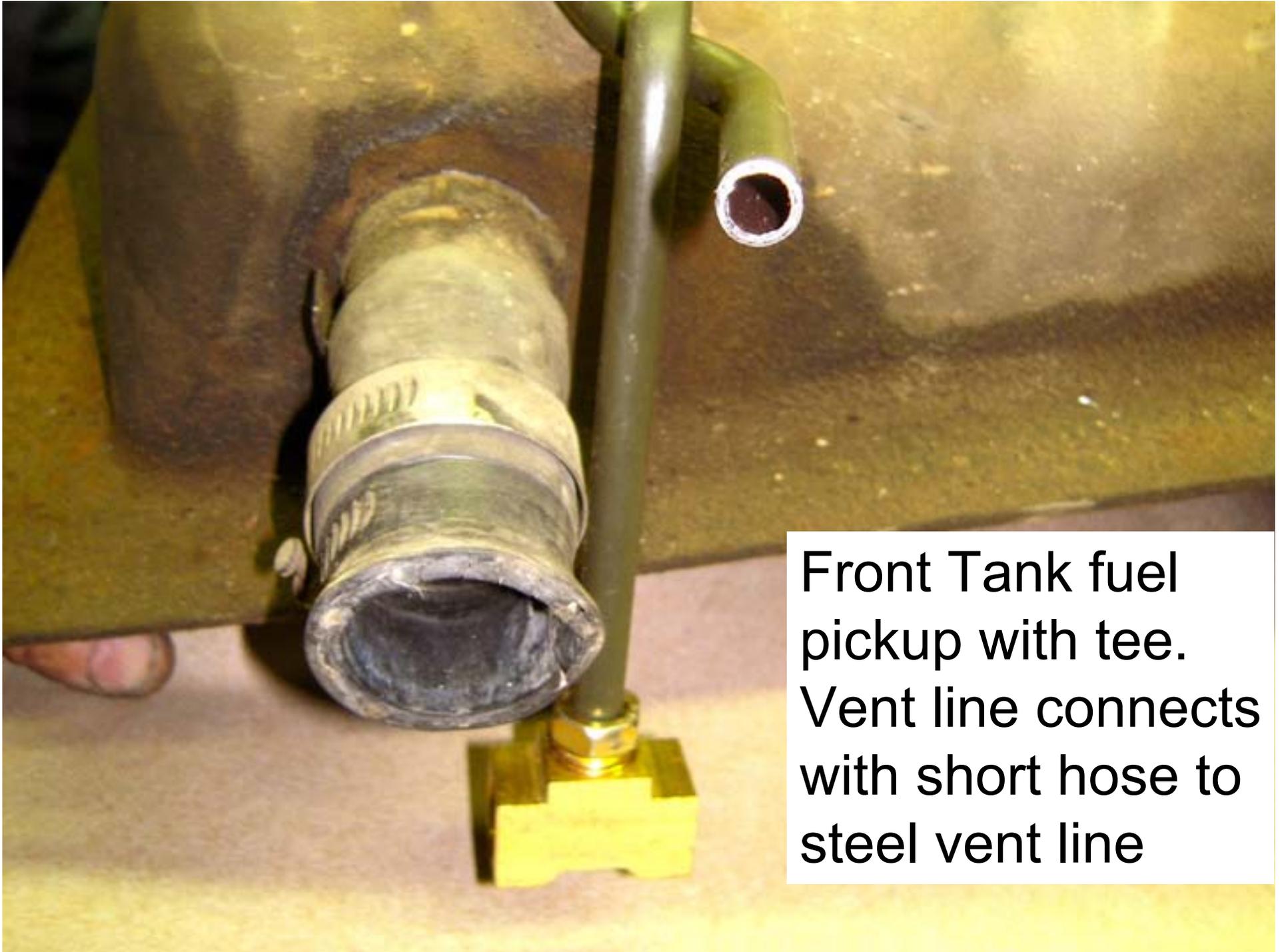


Rear Tank
Finished View 2

Front Tank Next



Front Tank fuel pickup line



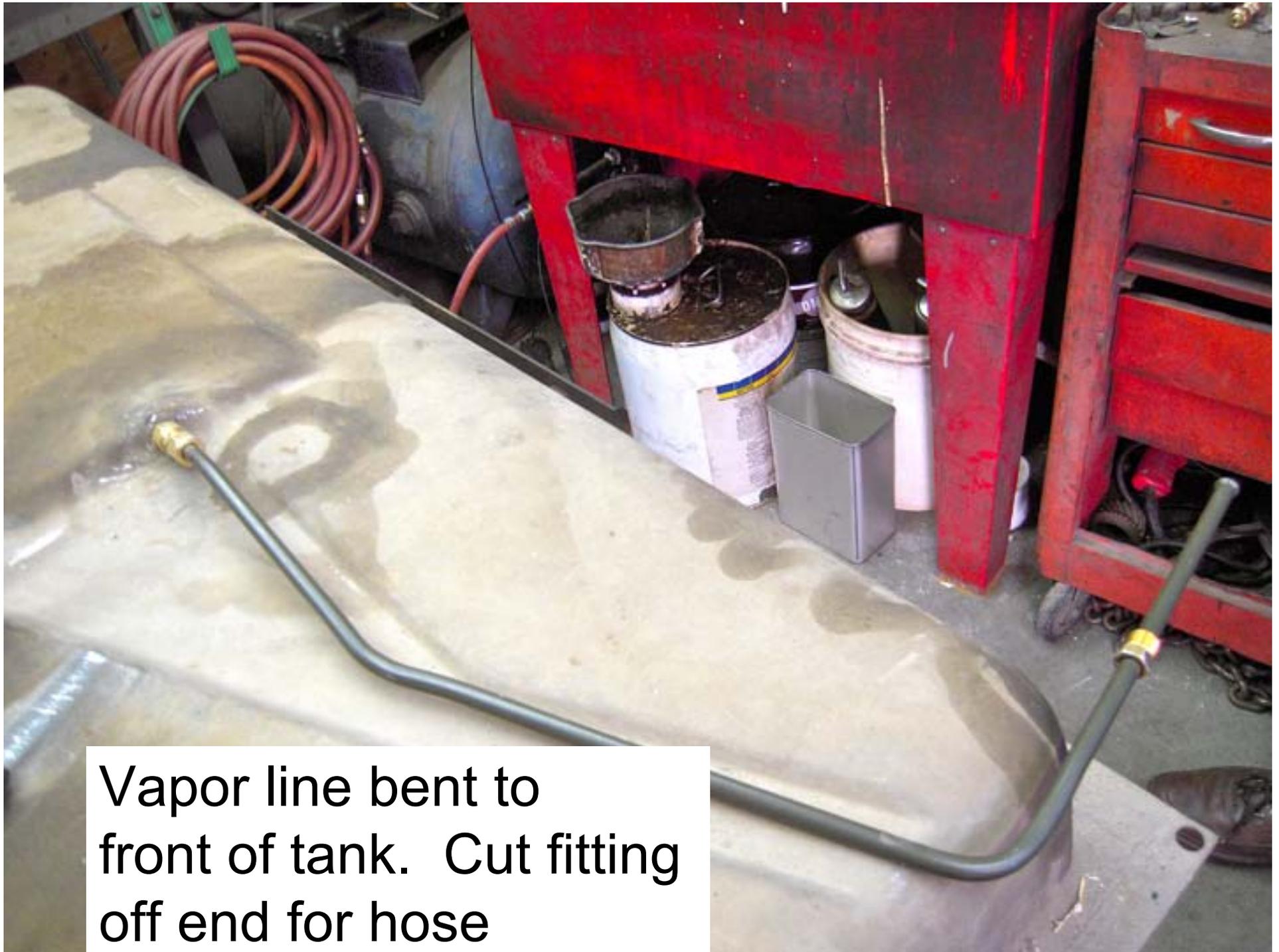
Front Tank fuel pickup with tee. Vent line connects with short hose to steel vent line



Cutting vapor line



Vapor line ready for fitting.



Vapor line bent to front of tank. Cut fitting off end for hose

Remount tanks into GMC.

Hook up vapor lines to hoses going to vapor/fuel separator.

Connect fuel lines from rear tank with an extension to tee.

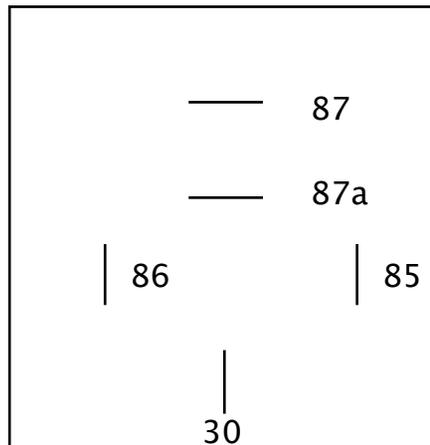
Come out of front of tee with a fuel line to filter and to engine.

Connect vent lines to stub hoses to steel vent line inside frame.

Fuel Pump Control Relay



RELAY WIRING



87 normally open, on when switch is closed
goes to AUX tank pump (front tank)

87a normally closed, on when switch is off
goes to MAIN tank pump (rear tank)

86 wire from fuel selector switch on dash
used to go to fuel selector valve

85 goes to ground

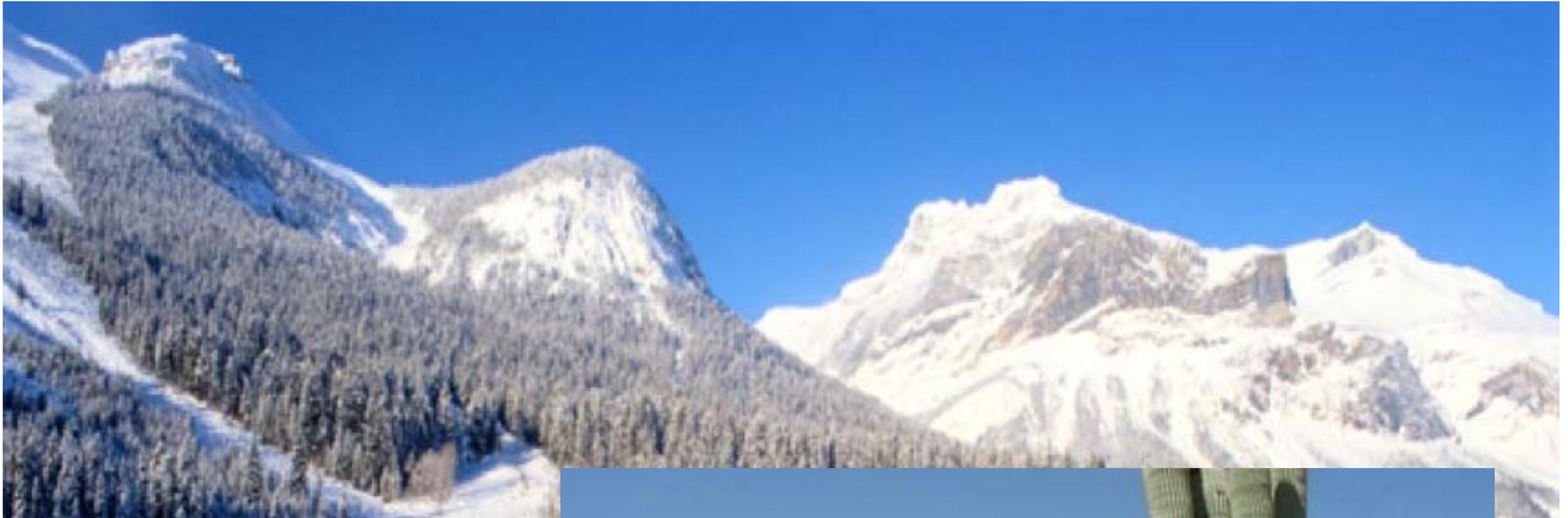
30 hot wire from TBI system to fuel pump











High
mountains
or hot
desert, NO
vapor
lock here!



That's
all,
folks!

