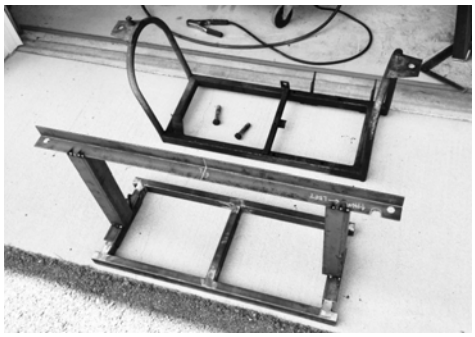
J-16 M3 Engine Cradle *By Bob Olbers*

WHEN I INSTALLED a Comet torque converter in my Model 3 several years ago, I decided to run the driven pulley "back-wards" to allow me to get the belt to align without having to move the engine or shorten the transmission. Although I drove the car extensively like this, it was a compromised setup that I eventually wanted to address. Last year I finally decided to turn the pulley around to the proper orientation. That resulted in a misalignment between the pulleys that required correction. I either needed to shorten the transmission housing or move the engine to the left about two inches.

From an engineering point of view, a shorter transmission has a couple of advantages. The engine weight on the right rear drive wheel is not changed, and the overall weight is reduced a bit. I have been very careful not to make any permanent modifications to my car (I had a machinist friend make a longer replacement transmission shaft for the Comet pulley and have the OEM engine and parts stored away) so I wasn't about to cut up the original housing. I thought a bit about buying a second transmission to shorten or even making a new one from scratch. I finally decided this was more work and expense than I was willing to take on.

If one is willing to make a few simple mods to the OEM engine cradle, moving the engine can be accomplished without too much effort. Note that my car has the later "hairpin" style cradle with bent round tubing joining the bottom to the frame-mounting tabs; some details may be different for the earlier "A-frame" type. The crossmember adjacent to the engine sits proud of the mounting surface and needs to be relocated down to allow the engine to slide sideways. The tensioning rod mount also interferes and similarly needs to be relocated a bit. Then it's basically a matter of drilling four new mounting holes and perhaps some exhaust modifications. One could also make some sort of adapter plate that mounts to the stock engine bolt holes and allows the engine to be offset as needed.

I didn't want to make even these limited changes to my original cradle. Instead, I made my own more-or-less-stock-appearing cradle while incorporating the necessary changes. (To tell the truth, I was also looking for an excuse to play with an oxyacetylene torch setup I had acquired as well…). This also allowed me to safely store the original engine and cradle together as one unit.

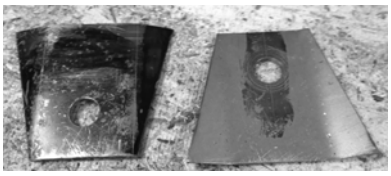


Some years ago, I picked up this advice from a Norm Abram woodworking book: "measure twice, cut once, but don't measure at all if you can avoid it." This means that it is often better to fit things to existing features without trying to make and transfer measurements, which can be a source of error. This is particularly relevant to the engine cradle, which despite its simple construction, has a number of hard-to-measure angles and offsets locating the various mounting points in three-dimensional space. I constructed a jig starting with a piece of angle iron bolted to the mounting tabs. Then I cut additional angle iron pieces to sit on the bottom frame rails and tacked them to the jig. Later, this jig held the pieces in the correct locations while I welded the new assembly together.

I tried to keep to the stock design and dimensions as much as possible. One change I did make was to make my new cradle symmetric (the original has a pronounced "kick-out" at the right-front corner to provide clearance for the starter-generator belt) to simplify the build and improve the aesthetics a bit.

To duplicate the "hairpins" on each end of the cradle, I used 4-ft. sections of mild steel ¾" OD x 1/8"- wall round tubing. I found that a pair of discarded rear brake drums from my Mustang closely matched the required diameter for the bends (never throw anything away!). I bolted the drums side-by-side to a simple angle-iron frame to make a bending jig (using a pair of drums helps to keep everything in one plane as the bend is formed). Working a few inches at a time, I heated the tube with an oxy-acetylene rosebud torch and hand-bent it to

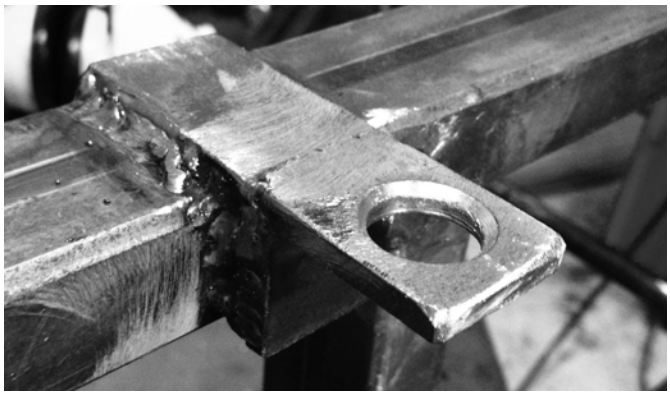
conform to the drum. I clamped the bend to the drum with a collection of Vise-Grips as I went. Once the bends were formed, I trimmed the legs to the proper length with a cutoff wheel. Finally I corrected any slight misalignment between the legs by slipping a long steel pipe over one leg, clamping the other to my work table, and gently bending as necessary.

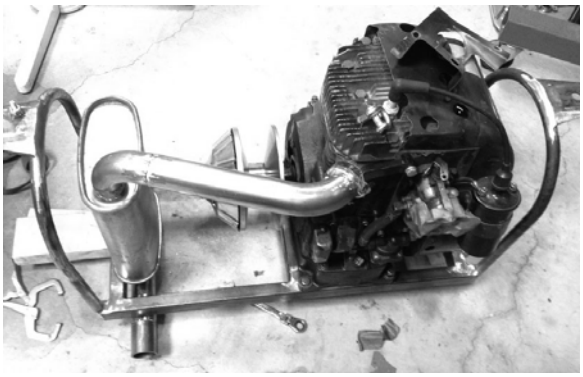


To make the tabs at the top of the hairpins, I cut and bent some 1/8" steel sheet using the "sledgehammer-and-vise" method to match the originals.

I built the bottom frame from 1" x ¾" x 1/8" wall rectangular tubing. Because the tensioning rod interfered with the revised engine location, I relocated its bracket to the bottom side.

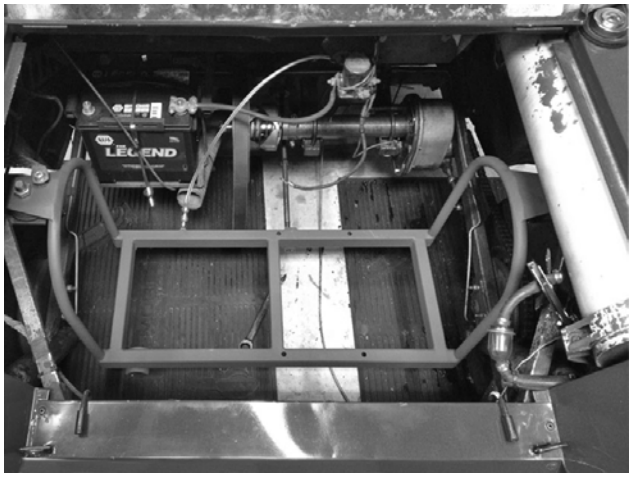
I made the bracket from two pieces of angle iron that wrap around the frame rail to add strength.





I also made a custom exhaust, using a vertically-oriented oval muffler and routing the outlet off the left side. This provides better separation between the fuel tank, intake system and carburetor, and hot exhaust gases.

I ground the welds smooth and applied a few coats of red oxide primer to match the original finish. I was pleased with the result. It allowed me to make a few improvements without cutting up any genuine parts, and it looks like it came with the car. □



M. Modifications