How to put the S10 transmission in a 4 cylinder car.

From Pat McGowen as told to Dave Penniman

Note to reader: Pat McGowen can be reached by phone at 909-629-2459 (answering machine, but he will pick up if there) or mail at 1595 Prospect Drive, Pomona, CA 91766 (sorry, no email).

Here is what Pat says about accomplishing this feat –

Your first steps will be to modify the bellhousing and crossmember (see Note 1). The trans must be modified in the front, so the input shaft retainer will not interfere with the modern (bought from VCCA member Verlyn Husman through The Filling Station) throwout bearing and original clutch fork. You will have to check to see how well they miss things when you test fit these parts. When you bore the bellhousing and crossmember, the crossmember top flange must be modified to miss the trans top edges. Bend, cut and weld a new flange as low as possible so no floor board issues show up, do this after you bore the 4-inch trans hole to 4.687 inches by bolting the two together (see Note 1). Then modify the crossmember and weld the bellhousing to the crossmember. Put the trans in place and figure out where good spots for the 4 bolts are. Remember your design should let you pull the trans without pulling the bellhousing off the engine.

You will need to make a new input shaft bearing for the end of the crank. Most of the input shafts have been the correct length so not to bottom out in the crank. You will need to check by carefully measuring the length. Make the bushing longer to give the shaft more support.

Modify the stock clutch disc with a new S10 hub riveted in and have it relined.

The shifter tower should be modified to shorten the throw, so you do not punch the dashboard. Take the shaft out, weld it to your old shifter shaft, then put it back in and re-clamp the retainer without melting the plastic bushing.

The trunnion adapter (Part 5 as shown in Photos 4 & 5 and Drawing 1) slips over the filed to fit trans tail shaft end. Position the 4 bolts properly, 2 upand 2 down, because the bottom 2 bolt to the crossmember plate (Part 6 in Drawing 1). You could put in some sealer to keep dust out, during final assembly.

Take a look at the Drawing 1, there is a yoke spacer (aluminum tube) that goes into the front yoke to keep it from going to far into the trans. It is important to keep the universal joint centered. There is a spring for the rear yoke (see Note 2), to push on the drive shaft and yoke to keep the universal joint located toward the trans. The assembled yokes go on to the trans, then the trunnion ball and its retainer are held on by the 4, 1/4"X20 bolts. Remember the bottom 2 bolts hold the plate that will be part of the new crossmember you will make (Part 1 as shown in Photo 4).

Remember this crossmember now takes the load from the rear-end and must be very strong. I use a 1-1/2" square tube around .100" thick and some 1/4" plate to bolt this to the frame. The plate goes on the front of the trunnion adapter so ball and retainer can easily be removed without removing the crossmember.

The next stuff is when careful work must be done. The driveshaft is cut, re-splined and machined for a new bushing to center it inside the cut and welded torque tube. The bushing will need to be greased so a fitting must be put into the torque tube in the correct place to lube the bushing yet miss the trunnion ball housing end.

To get the driveline lengths, first assemble the new trans and all it's parts into the car. The new crossmember, trans and trunnion adapter, everything has to be in place to measure. Remove the torque tube, driveshaft out of the rear-end, but leave the rear-end in place. Remove the driveshaft and pinion from the torque tube, cut the torque tube about 3inches in front of the iron casting (easy to weld). Bolt the torque tube back on the rear-end and rotate it to line up with the trunnion ball and universal joint parts. Now measure how much to cut off the back of the front half of the torque tube. **Do not weld yet.**

Put the driveshaft back into the torque tube and with the trunnion ball out of the way, put the universal joints in place and centered, now measure for the length of the driveshaft. Remember to leave room for the rear-end in and out travel and the spring in the back yoke.

While the driveshaft is out being re-splined, you could tack weld and fit the torque tube and if it fits, weld it. When the driveshaft is machined round and re-splined, it is OK if it's outside diameter is not 100% of the S10 spline diameter. This diameter must fit the new bushing you make for the torque tube to support the driveshaft, I make the bushing out of bronze. Don't make the machine length too short, give the bushing and spline a lot of room, but the bushing cannot run on the spline.

Remember that this bushing will also need to be greased, so it needs a hole to line up with your new fitting when it's pressed into the torque tube.

To assemble the whole thing when ready, you will have to back the rear-end up, unbolting the U-bolts, brake rods and sliding it back. This is a pain, but how it has to work.

I modified the brake rod stuff (Part 3 in Photo 4), but each car is different, so you are on your own!

You could modify the speedometer cable by using modem junkyard parts, combining it with the original fitting that connects to the speedometer. It works, but not very accurate.

Below are Notes 1 and 2, also attached are 2 sheets of drawings.

Note 1: I bolt and weld the bellhousing and crossmember together and bore them. The hole must be centered and just big enough to fit the outside diameter of the input shaft bearing retainer (Photo 2).

The clutch fork pivot inside the bellhousing will be machined a little when you bore the 4.687-inch hole. It should be welded on the sides so it can't rotate around the rivet. Don't machine it to far, just enough to miss the thickness of the retainer flange.

Note 2: Two yokes for the universal:
Yoke 1 is unmodified and is the front yoke. Use Spicer Number 2-3-6081X for this yoke.
Yoke 2 is modified and is the rear yoke. There are two possible yokes you can use. It depends on the diameter of the drive shaft. For smaller shafts (closer to 1" OD) use Spicer Yoke Number 2-3-13461X (turn drive shaft to .995). For the larger shaft (1.175" OD) use the standard Spicer Yoke Number 2-3-6081X mentioned above. The outside diameter has been turned smaller to clear the inside diameter of the torque tube. You will need to check to make sure that there is enough clearance for your torque tube, they should NOT rub. The U-joint itself is a Spicer Number 5-1310X

Photo 1: Early Bell housing and X-member (top) and later (28)

Photo 2: Boring out the X-member

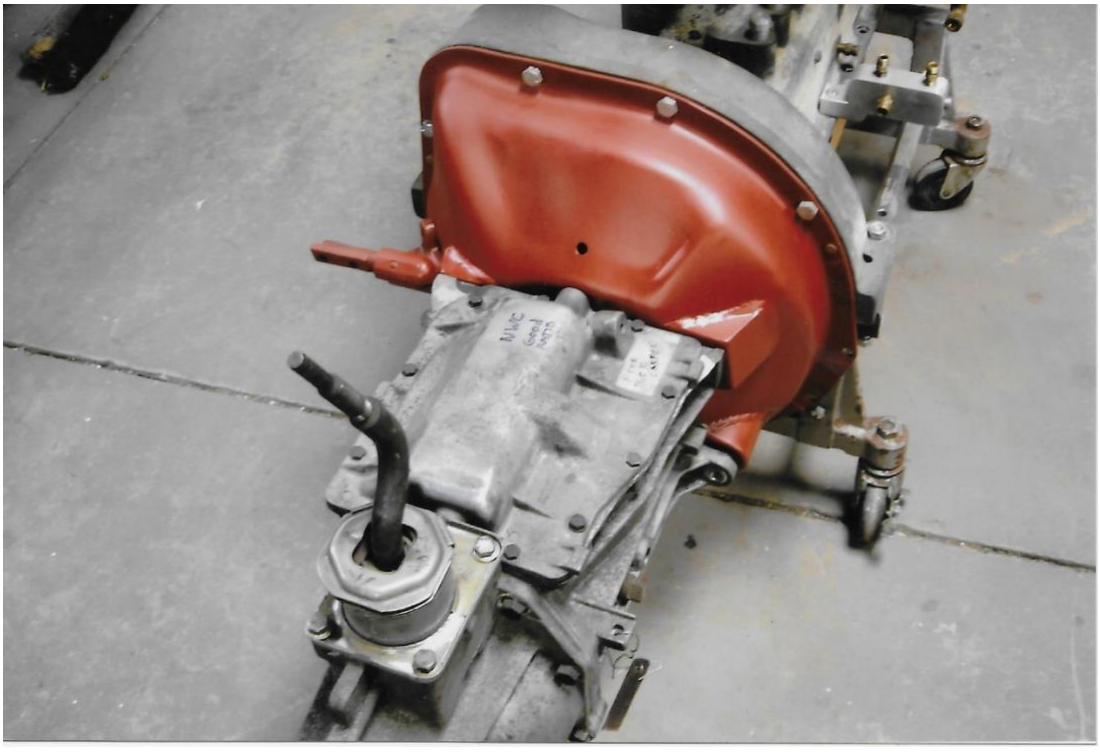


Photo 3: Bell housing with bolt flanges added

Photo 4: Modified parts including X-member, parking brake mount, cross bar brace, U-joint with S-10 yokes and trunnion ball adapter

Photo 5: Trunion ball adapter close up

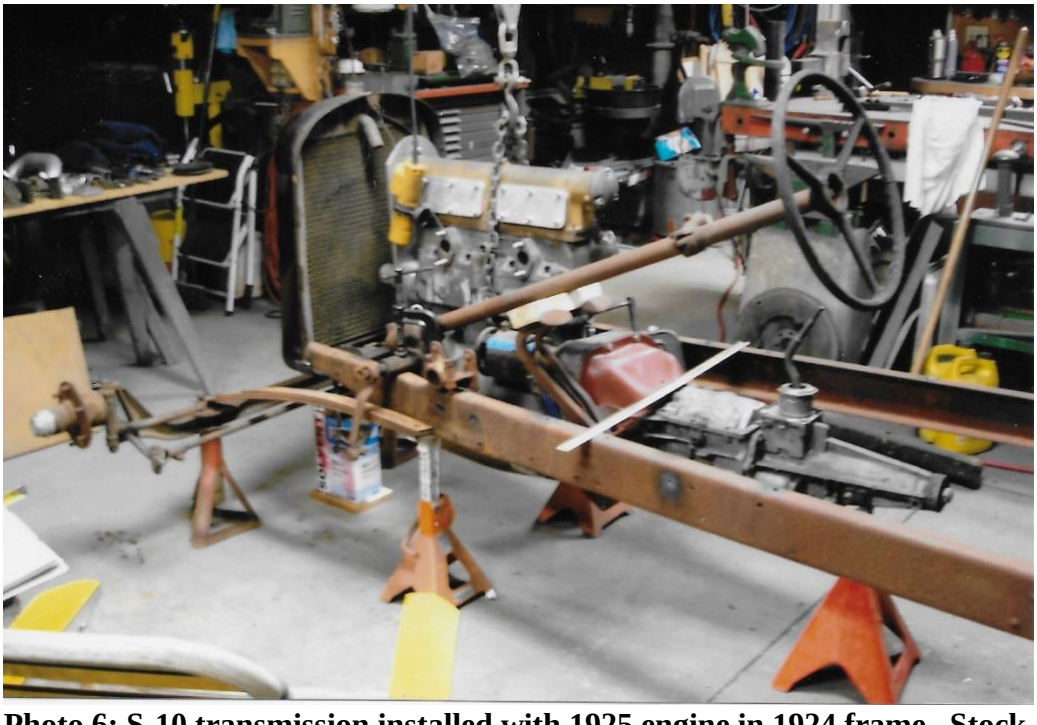
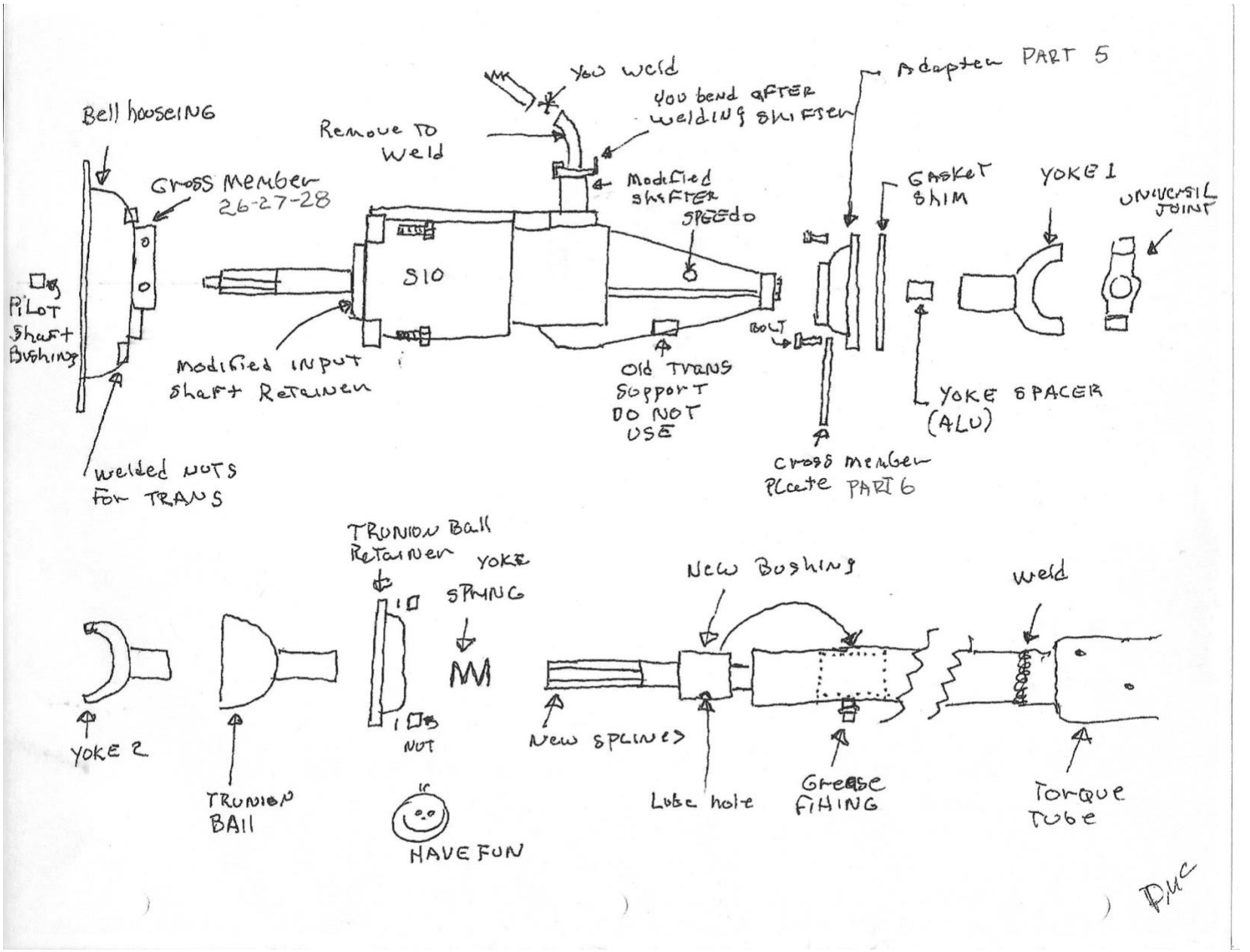
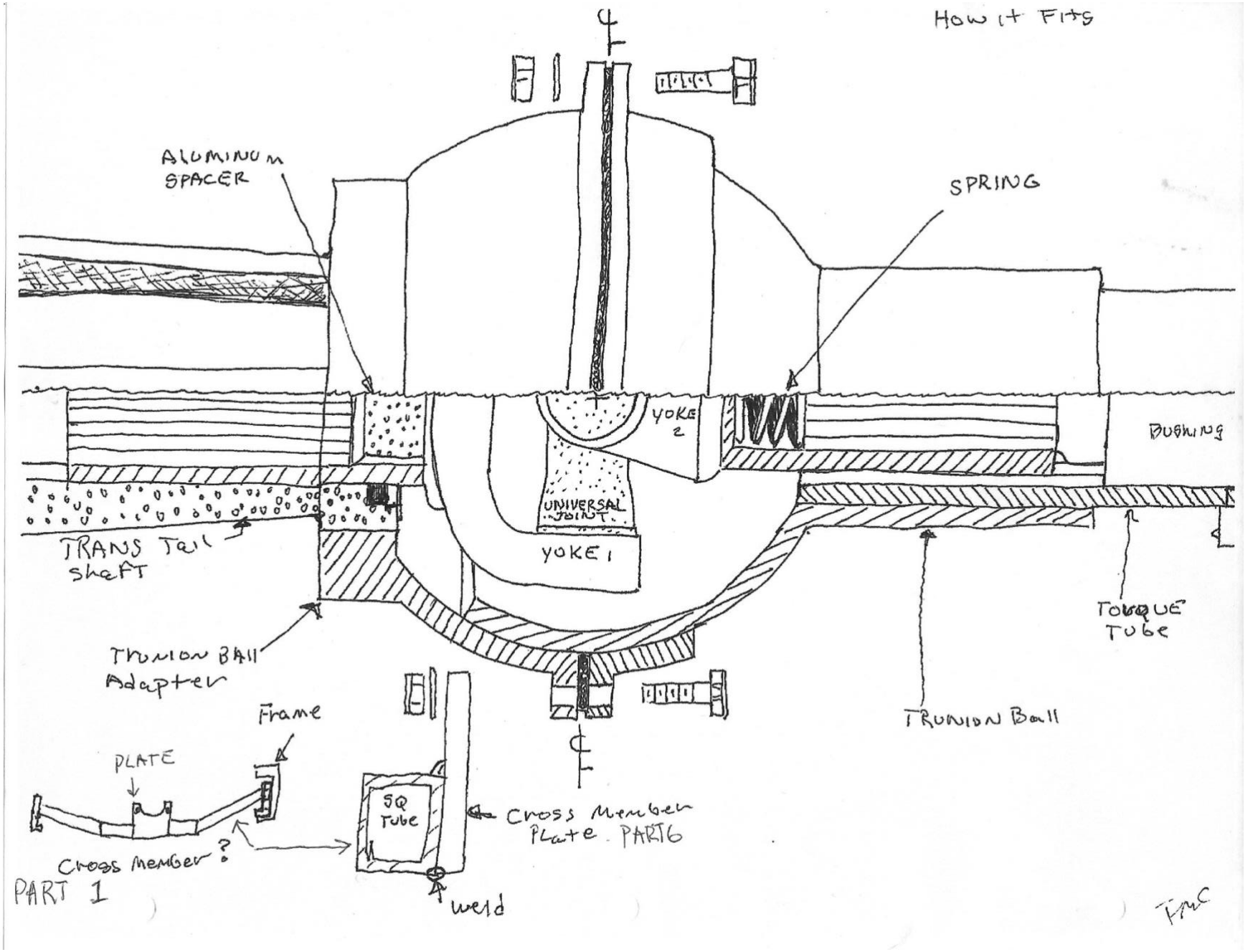


Photo 6: S-10 transmission installed with 1925 engine in 1924 frame. Stock pedal clutch


Bell housing
Cross Member 26-27-28
Pilot Shaft Bushing
Welded NUTS for TRANS
Remove TO Weld
You weld
You bend AFTER welding SHIFTER
Modified SHIFTER
SPEEDO
S10
Modified INPUT Shaft Retainer
Old TRANS Support DO NOT USE
Adapter PART 5
GASKET SHIM
YOKE 1
UNIVERSAL JOINT
BOLT
YOKE SPACER (ALU)
Cross member Plate PART 6
TRUNION Ball Retainer
YOKE SPRING
NUT
YOKE 2
TRUNION BALL
HAVE FUN
New Bushing
Weld
New SPLINES
Lube hole
Grease FITTING
Torque Tube
PMC

Drawing 1


How it Fits
ALUMINUM SPACER
SPRING
YOKE 2
UNIVERSAL JOINT
YOKE 1
BUSHING
TRANS TAIL SHAFT
TRUNION BALL Adapter
TORQUE TUBE
TRUNION Ball
Frame
PLATE
Cross Member ?
PART 1
SQ Tube
Cross Member Plate PART6
weld
TMC

Drawing 2