# Coil Spring Removal

*"An accident waiting to happen" (Part 1)*

**by Bob Mannel**

Often times a disc brake conversion is combined with a freshening up of the whole suspension system. If this includes those squeaky inner A-frame shafts and bushings, the coil springs will need to come out. Perhaps even new coil springs will go in. If you read Larry Schierman's article on restoring his 1964 K-car, you may remember that he said, "I'm hoping that I never have to remove a set of front springs again. In my estimation, that's an accident waiting to happen, even with tools designed for the job." I agree, but only to a point. There are tools that make this job safe.

The typical tool used to remove coil springs is a jackscrew tool with J-hooks. This tool has a center threaded shaft (screw) and two sets of two J-hooks. One set of J-hooks is attached to a stationary hub at the top of the jackscrew and the other set is attached to a moveable hub at the lower end. The J-hooks are usually slightly different lengths to keep the tool centered.

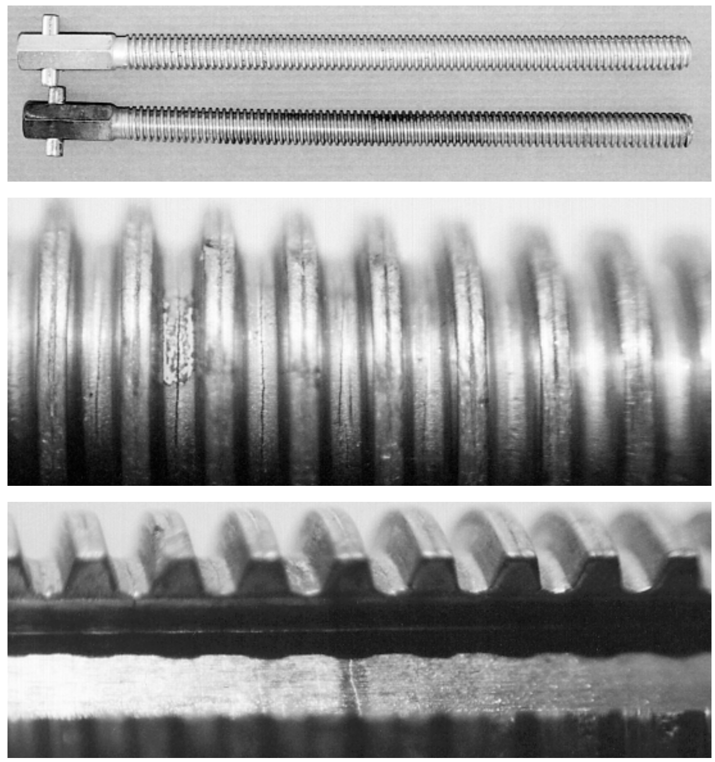
There are two problems with this tool. First, is the hooks are too long, and second, the center shaft is too short. Even with the hooks spread as far apart as possible, once the tool is tightened as far as it can go (hubs drawn together), it can be mighty challenging to get the coil out of the A-frame seat. Wrestling with a compressed coil spring is not my idea of a good time! Then, once the spring is out, the tool does not have a long enough jackscrew to release all the coil spring tension before the lower moveable hub disengages from the center shaft. This results in some real games in getting the spring off the tool! Generally, external hook-type compressor tools must be used to get the tool free.

Installation is even more fun! Any mis-positioning of the tool and you will find out that the J-hooks get wedged between the coils when the spring is on the car, and might require a crow-bar to get them free. Been there, done that! And all the while I kept looking at that small ½" diameter threaded center jackscrew and thoses tiny steel pins holding the J-hooks to those welded-up hubs, and thought about where this tool was probably made, and what life would be like for my widowed wife… yes, I agree with Larry. It is an accident waiting to happen.

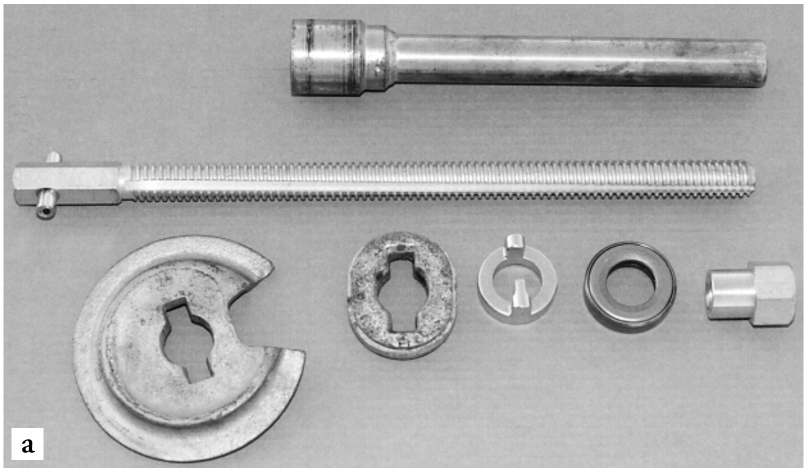
Some time ago I placed a wanted ad for a Ford spring compressor tool. That search produced fruit. First, Myron Collamer got ahold of me and showed me some plans he had used to make his own coil spring compressor. Later, Jack Grice loaned me an original Ford coil spring compressor tool he picked up for a song at a swap meet. Then Harry Hammond called to say he had a Moog coil spring compressor tool with a slight twist to the center shaft, but if interested, he would part with it. Each of these tools are better alternatives to the J-hook inner spring tools currently sold at most auto stores, so we will look at each one. Then you can decide which way you might want to go.

If money is no object—and I know that is seldom true—the tool for this job is made by Moog. And it is still available today new! The tool came out 30 years ago, but was so well designed that its design has remained virtually unchanged. Prices will vary depending on the discount you can get, but expect a new one to run a little over $500. That's a lot of money, but you might be able to shake one loose from someone who no longer needs one. Or, if you have some close friends, you can each pitch in $100 and share the tool—it is not one you need everyday, so that might be a way to go.

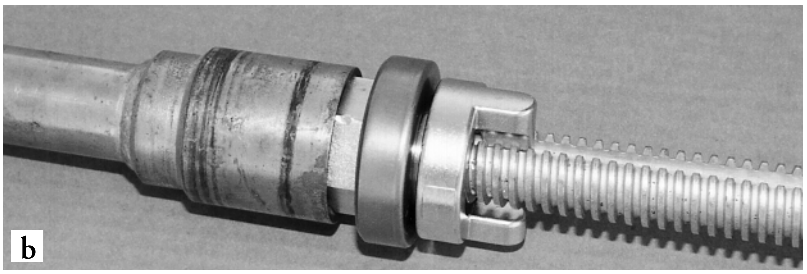
The one I got had a suspect center shaft. The shaft had a slight bend, and its stress cracks made me very uncomfortable. My local independent auto store ordered the replacement parts directly from Moog. The shaft, with discount, was just under $90 (part number T469C1 screw assembly, lists for $105.71). Although not required, the bearing and center thread were recommended for replacement whenever the center shaft was replaced. I opted to do that for another $67 (part number T469C2 screw nut assembly, list $76.66). Both came with a tube of extreme pressure grease. Very sticky stuff that looked a lot like wheel bearing grease.



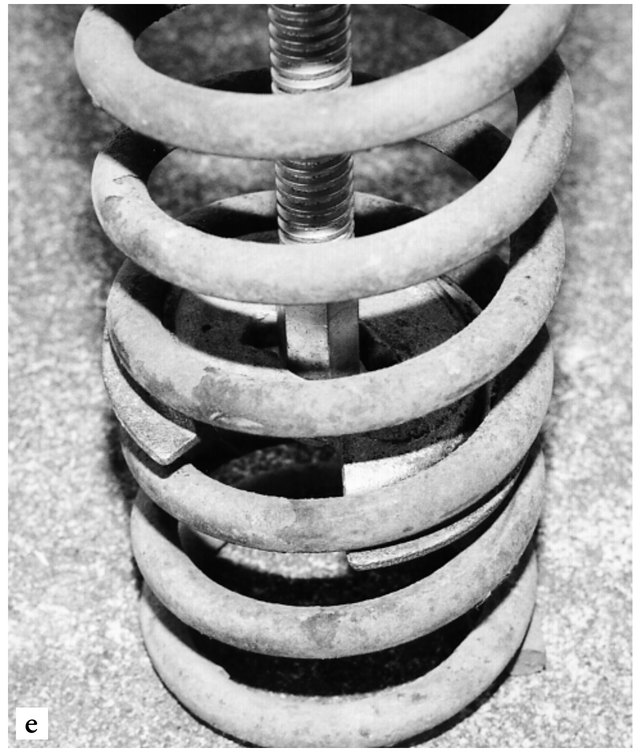
Note that the old shaft has a bow in it. Although it was still pulling duty, I was concerned by the stress cracks visible on the jackscrew. Cracks were visible between the threads, and several traversed across the slot. It was impossible to tell how deep the cracks went. One thing for sure, the cracks will grow deeper with each use of the tool, until fracture occurs. I replaced this shaft with the new one shown at top.



a



b



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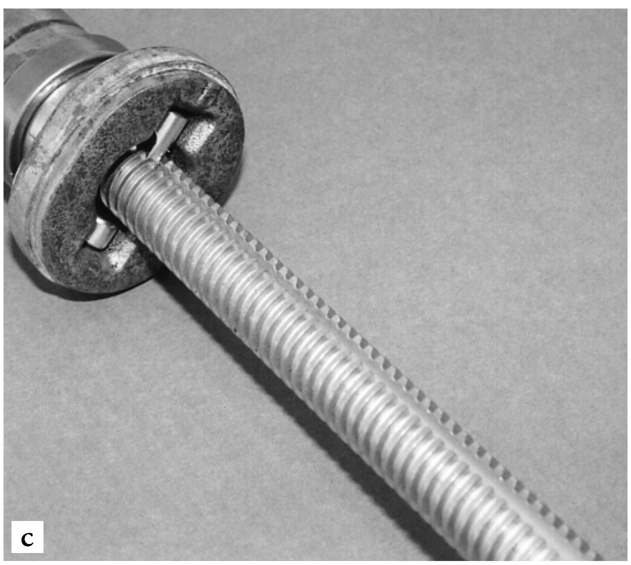


c

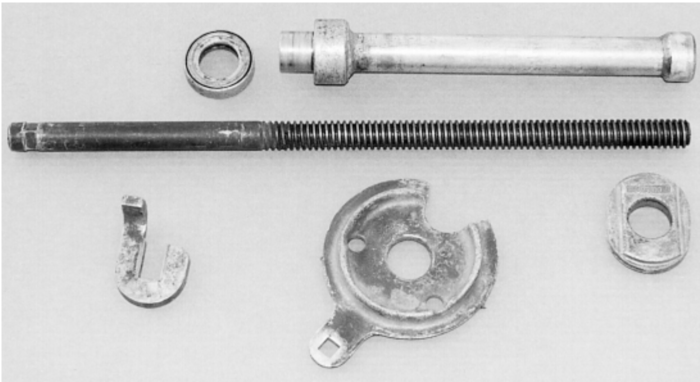
d

f

g

The Moog tool comes with more parts than are needed for the Fairlane. There are several different sized upper and lower plates. The ones shown here are only those used on the Fairlane. The Moog tool is exceptionally well-designed and quite easy to use. A long (deep) socket is used to turn the top nut. The center jackscrew is generously long, but not too long. In fact, it could not be any shorter and work very well with the Fairlane coil spring. From right to left in photo (**a**) are the nut, bearing, collar, upper plate and lower plate. The nut is threaded for the shaft. It rests against the bearing. Below the bearing is the collar. It fits into the upper plate and indexes to the shaft, insuring that the shaft does not rotate. The only rotating part is the nut on top of the bearing. This nut draws the shaft upward. The assembly of the shaft, nut, bearing and collar with the deep socket slid over the nut is shown in photo (**b**). Photo (**c**) shows how the collar fits into the top plate and indexes to the center shaft. The lower plate is designed so that the shaft with roller pin can slide through it, then, when turned 90 degrees, slides into slots (photo (**d**)). The plate is curved like the coils on the spring and an opening allows the coil to pass through, as shown in the photo (**e**). The upper plate (photo (**f**)) is designed with a bevel which slips into the coil spring's upper seat. A bevel keeps the upper plate very secure. The complete assembly is shown on a 1964 coil spring (photo (**g**)). Everything is heavy-duty, fits well, and gives confidence of a safe operation.

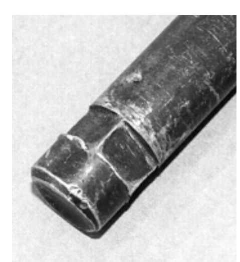
Ford came out with a special spring compressor tool for cars with coils springs above the A-frames back in 1960 when



the new Falcons/Comets were introduced. Fairlanes would use the same tool. The tool was actually made by Manzel and, since its introduction, has gone through a few refinements. The part number is T63P-5310-A, but might also be found under part numbers T63P-5310-B and T63P-5310-C.

The one shown above is the tool Jack Grice loaned me and matches the one shown in Ford's 1965 Special Tools catalog. I have shown only the Fairlane upper and lower plates, whereas the tool set came with additional plates for other cars. This tool differs slightly from the one shown in the 1962 Fairlane shop manual in how the bottom plate attaches to the center shaft.

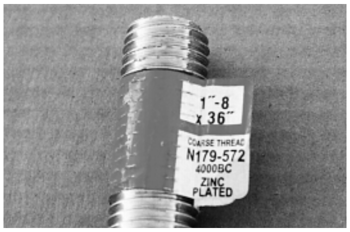
As with the Moog tool, the upper plate fits into the upper coil spring seat and is sized to slide through the opening in the shock tower, allowing the spring and upper seat to be removed as an assembly. The lower plate has a ½" square hole on the handle to keep the plate from turning, should that be necessary.

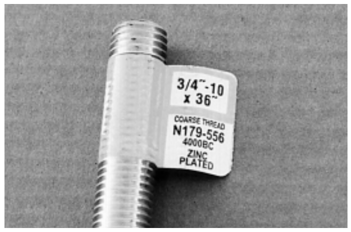


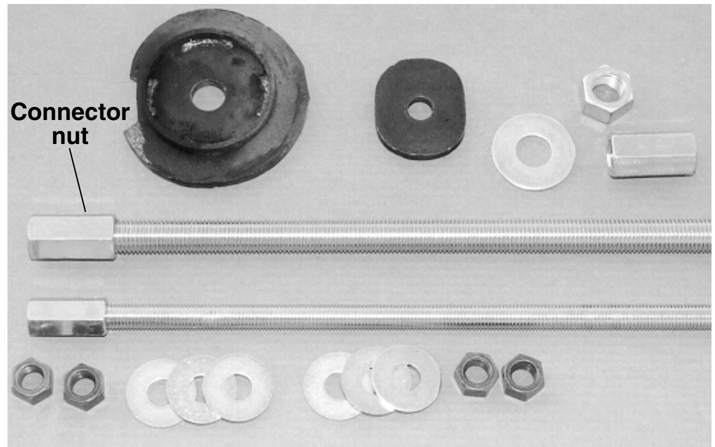
The Ford spring compressor tool is well-designed, although a little cumbersome in the way the lower plate attaches to the shaft. It requires maneuvering the J-hook through the coil spring and sliding it in position on the shaft, and then engaging the upper tab into the lower plate. Once that is accomplished and the slack removed, it works well. I was a bit concerned that the full spring force was supported only along the edges of the slot in the center shaft. If the J-hook is fully seated on the shaft, then three edges are supporting the load. If not fully engaged, then only two edges are supporting the load. It seemed a rather small area for such a high load, but the metal is tempered and seems to do the job. As with the Moog tool, ACME threads are used on the center shaft, which are specifically designed for high loads.

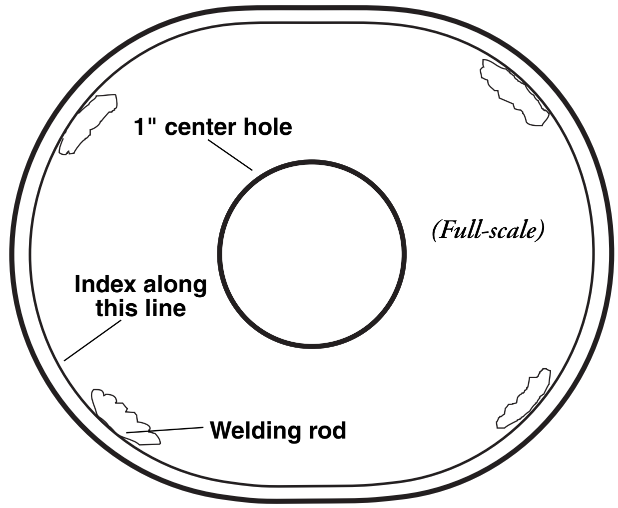
So, what if you can't find a Ford tool and the Moog is just too much money? You can build your own for about $25 in miscellaneous hardware if you can do your own cutting and welding with steel stock.

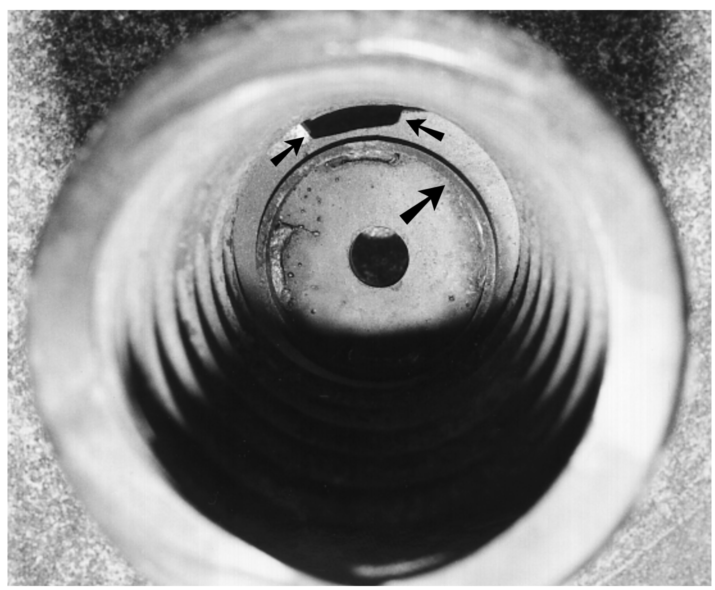
That's what Myron did. I would recommend a couple of refinements to his design. First, use at least a 3⁄4" diameter threaded bar, 1" is even better. There is no reason not to use a nice thick bar that you know will never break. Second, index the top plate so that it cannot shift. The photo above shows Myron's upper plate. The illustration to the right of the above photo shows a full-scale representation of the top plate which will rest on the upper coil spring seat, but still clear the opening in the shock tower. The thinner, inner line is where to index the top plate so it can't shift. The indexing need not be fancy. Just a little welding rod in four places should do the trick. You just don't want this plate to slip off the upper spring seat for any reason!



Myron made the upper and lower plates out of stock 3⁄8"-thick plate steel. The lower plate was 5 3⁄4" round, and had a 4" O.D. pipe, 1⁄2" high, welded to the lower plate (*see arrow*). The pipe section kept the lower plate from shifting. The plate was also notched and ground to allow the coil to pass by (*small arrows*). The center hole on the bottom plate should be large enough to allow the plate to tilt a bit, but not large enough for the nuts to slip through. Use plenty of thick washers.

The lower plate is best supported on the threaded bar with two nuts locked together. This way they will not "walk" off the threaded bar at an inopportune time! At the top I would use a connector nut. These have three times the number of threads of a normal nut, so will spread out the strain on the threads as the connector moves on the shaft. You can't have too much grease on the shaft! Use washers and plenty of extreme pressure grease anywhere metal is in contact with moving metal. If the shaft tends to rotate while tightening, use a large crescent wrench on the lower nut to prevent rotation. Be sure it's on the lower nut, which will tend to wedge more tightly against the locking nut above it. Go slowly and make sure the lower nuts are not moving on the shaft. The rest is pretty straightforward. Essentially you are drawing the two plates together until the coil is free of the A-frame seat. Myron has used his tool without problems. Just be sure to use top quality hardware, thick plates, indexing to keep things from shifting, and plenty of grease.

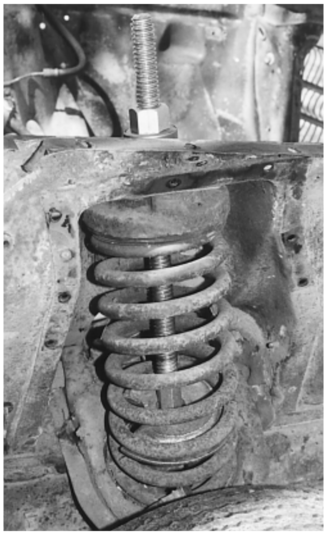
In Part 2, I will actually remove a spring from a 1962 Meteor using the Moog tool.

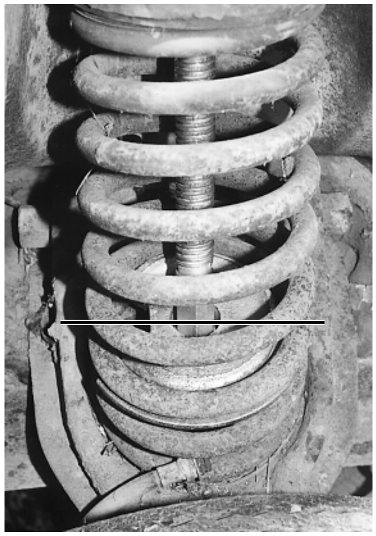
# *Coil Spring Removal*

*With the Right Tool, Coil Spring Removal is Easy! (Part 2)*

**by Bob Mannel**

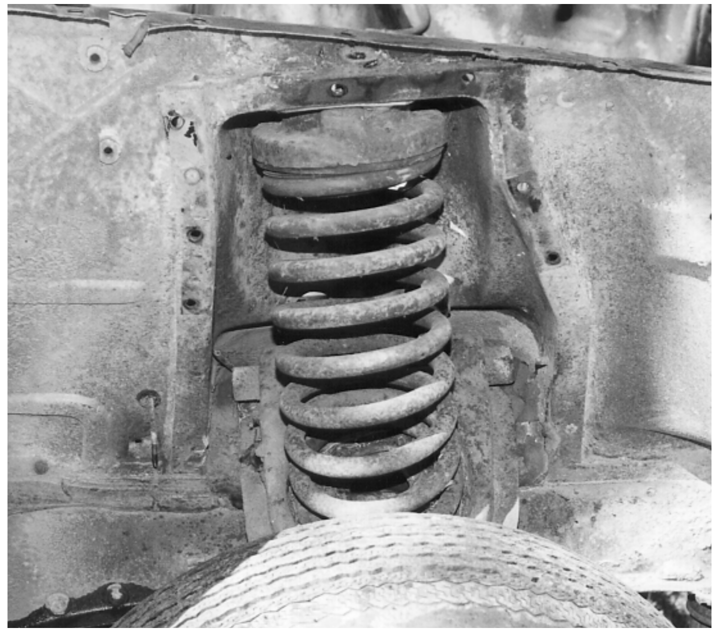
The T469 Moog coil spring compressor tool worked like a champ in my first attempt to remove coil springs from a 1962 Mercury Meteor (*right*). Placing the bottom plate about two





coils up from the bottom draws the spring up to just clear the A-frame seat. On one side I had to use a pry bar to just move the coil a little bit, then it was free. The plate should be oriented so that the roll-pin on the center shaft is fore and aft (*see line in picture above*). This insures the roll-pin is properly seated in the bottom plate notches.

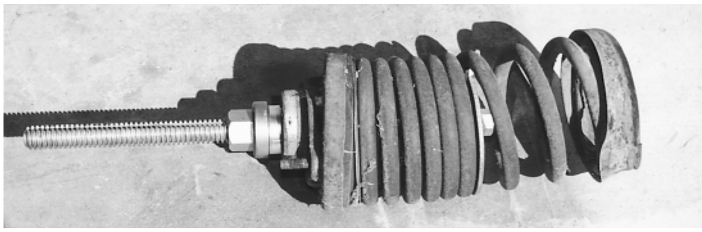
When the tool is snugged up, there should be just under 4" of threads exposed above the nut (*left above*). The coil must be drawn up until just prior to coil bind above the plate. Anything less and the coil will not clear the A-frame seat. Although the shop manual calls for an impact wrench, I used a breakaway bar and it was quite easy to turn the shaft. I would recommend against using the impact wrench so that you do not try to tighten the tool after coil binding occurs. This severely loads the tool and is dangerous. By using hand tools to turn the shaft you will immediately feel the binding. I just watched and stopped when I couldn't see any more space between the coils.



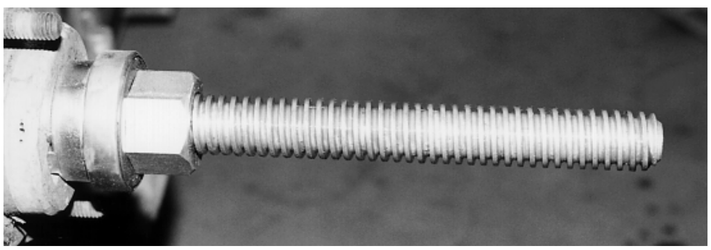
The shop manual talks about installing a bolt to hold the spring upper seat. This only applies to Fairlanes/Meteors before 11/20/1961. After that date the seat was redesigned and has two studs protruding through the shock tower. (These studs hold the shock absorber upper bracket to the shock tower.) A good tip is to thread a nut on the outer spring upper seat stud. When you get the spring clear of the A-frame seat, the nut will keep the spring from dropping to the ground. Instead, it will swing outward nicely. You can then lift up slightly, remove the nut, and lower the spring and tool clear of the car.

The shop manual calls for removing the suspension bumper and bracket assembly before attempting to remove the spring. Although I have managed to remove a coil spring without doing so, you really need the room to swing the spring outward to clear the A-frame, so I highly recommend that assembly's removal.

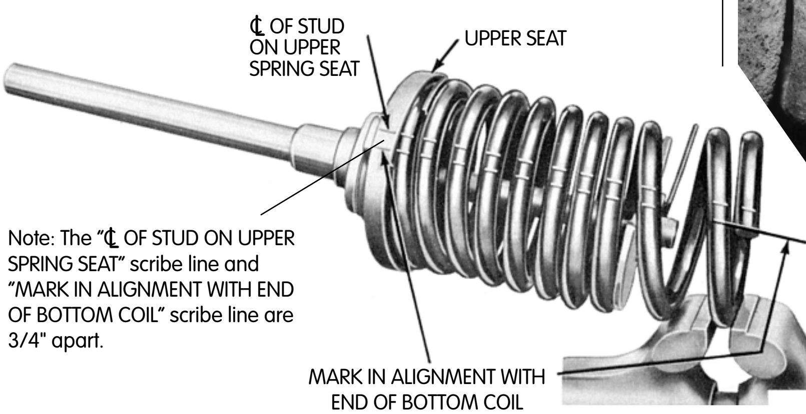
1962 Fairlanes used a lower boot in the A-frame. The boots typically tear where the coil ends. New ones are available. 1963-1965 Fairlanes did not use the boot and the coil sat directly on the A-frame. The boot can be added or deleted as desired.



Once the coil spring was removed from the car, I felt very comfortable handling it attached to the tool (*above*). The next step was to clamp the spring in a vice. About 7 ½" of



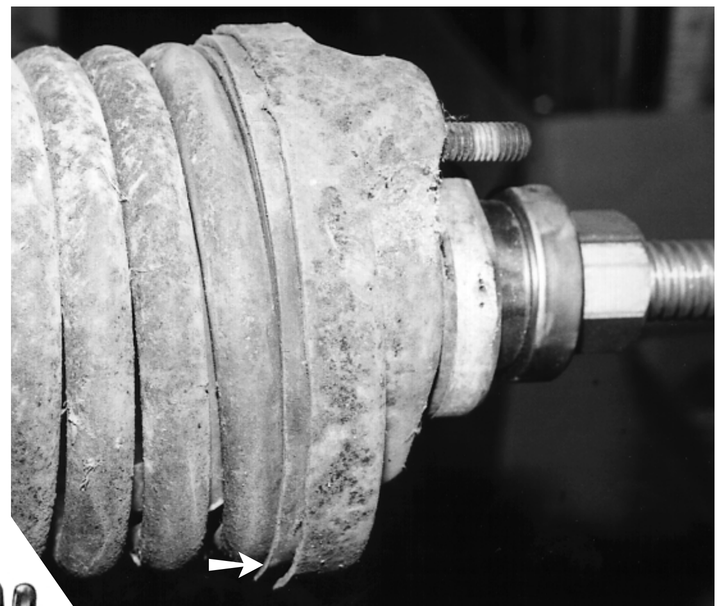
threads are exposed before the loosening begins. It is a good idea to note this measurement for the time of re-installation. The shop manual (*illustration below*) shows where to make scribe marks before removing the tool. These will simplify re-installation. The manual talks about the "narrow side" of



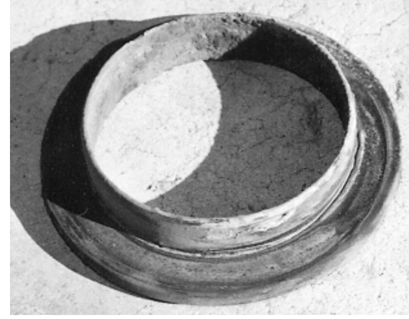

the upper seat. The seat is not symmetrical from inboard to outboard. The outboard side is taller than the inboard side. Ford calls this shorter side, the "narrow side." Here is what the shop manual says,

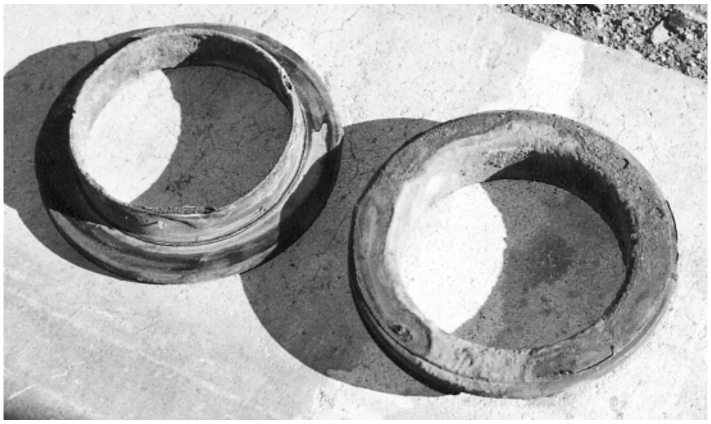
> Position the spring and tool assembly in a vise. Scribe 2 marks on the narrow side of the spring upper seat for proper alignment with the replacement spring. The first mark should be aligned with the center of the caged nut. The second mark should be ¾ inch from the first and in alignment with the end of the bottom coil.

Once all the coil spring tension has been released, not many of the tool's threads remain visible (*above*). Positioning of the tool is crucial as you don't want to run out of threads with tension still on the coil.



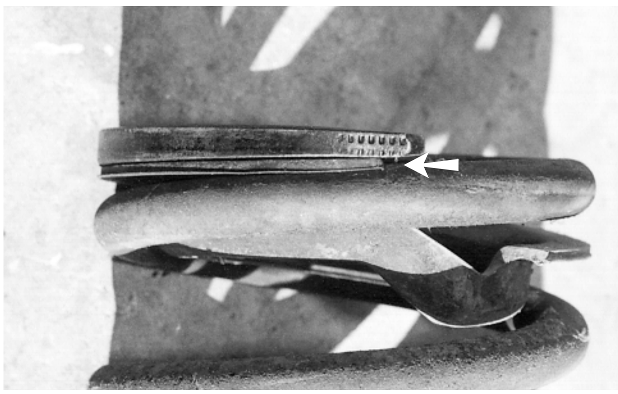
The spring shown above is from a 1962 Meteor with factory air conditioning. These cars, as well as any other 1962-65 Fairlane/Meteor with factory air conditioning, employed a spacer plate under the spring seat. That's why the rubber upper boot is protruding below the seat (*arrow*). The spacer was ⅜" thick and incorporated a skirt to form a coil spring pocket (*below*). The whole spacer assembly was encased in rubber. By using the spacer plate, no special coil springs were required for air conditioning equipped Fairlanes/Meteors. The spacer compensated for the extra weight of the air conditioning components and maintained the proper riding height.



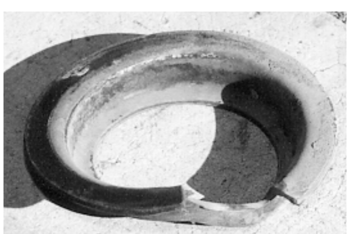


One problem the spacers were susceptible to was corrosion. Since they were encased in rubber, any water getting beneath the rubber had a tendency to remain and cause rust (*above*).

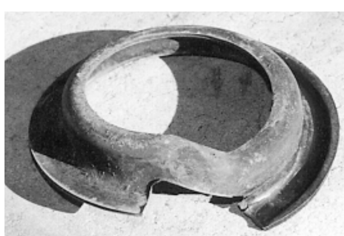
The upper boot differs between the years 1962-63 and 1963-65. The early cars have two boots. One is a complex,



curved piece of rubber between the first two coils (*above*). It is held in position by being wedged between the beginning of the coil and the second loop (*white arrow*). A slotted screwdriver can spread the coil slightly to release or install the rubber. Boot shown again below.



**top view**



**bottom view**

The other boot was installed on top the coil spring. It resembled a cup (*below*). The top of the boot rested in the coil spring seat, or against the spacer plate on cars equipped with factory air conditioning.

**top view**

**bottom view**

In 1964 Ford replaced the two-piece arrangement with a single-piece rubber boot (*below*). It incorporated the upper cup and rubber between the first two coils as one piece. The 1962-63 two-piece boots and 1964-65 single-piece boots can be swapped as desired.

# Coil Spring Removal

*Specifications (Part 3)*

**by Bob Mannel**

There were plenty of springs used for the 1962-65 Fairlanes and 1962-63 Meteors. In the charts in this article are the figures Ford gave for coil springs. To save space, the basic part number (5310) is assumed. It should always be added back in to get the full part number. For example, C2OZ-A becomes C2OZ-5310-A.

Ford listed some combinations of engine and transmission that were not used and occasionally left one out. Here are some general rules to keep in mind: ➙

- In 1962 the O/D trans was available only with the 221 & 260.
- In 1962 the 4/S was not available.
- In 1963 the O/D trans was available only with the 221 & 260.
- In 1963 the 4/S was available with the 221, 260, and 289 HiPo.
- In 1963 the 200 6-cylinder was introduced mid-year and used only with the F/M/2 trans.
- In 1963 the 170 with F/M/2 was not available on wagons.
- In 1964 the O/D was available only with the 260 V8.
- In 1964 the 4/S was available with the 289 2V and 289 HiPo.
- In 1965 the O/D was available only with the 289 2V.
- In 1965 the 4/S was available with the 289 4V and 289 HiPo.

| Year | Engine | Trans | Steering | Sedan | Sedan H/D |
|---|---|---|---|---|---|
| 62 | 170 | 3/S | M/S | C2OZ-A | C2OZ-E |
| 62 | 170 | 3/S | P/S | C2OZ-A | C2OZ-E |
| 62 | 170 | F/M/2 | M/S | C2OZ-A | C2OZ-E |
| 62 | 170 | F/M/2 | P/S | C2OZ-B | C2OZ-F |
| 62 | 221 | 3/S | M/S | C3OZ-G | C3OZ-H |
| 62 | 221 | 3/S | P/S | C3OZ-G | C3OZ-H |
| 62 | 221 | F/M/2 | M/S | C3OZ-G | C3OZ-H |
| 62 | 221 | F/M/2 | P/S | C3OZ-J | C3OZ-K |
| 62 | 221 | O/D | M/S | C3OZ-G | C3OZ-H |
| 62 | 221 | O/D | P/S | C3OZ-J | C3OZ-K |
| 62 | 260 | 3/S | M/S | C3OZ-G | C3OZ-H |
| 62 | 260 | 3/S | P/S | C3OZ-J | C3OZ-K |
| 62 | 260 | F/M/2 | P/S | C3OZ-J | C3OZ-K |
| 62 | 260 | F/M/2 | M/S | C3OZ-G | C3OZ-H |
| 62 | 260 | O/D | P/S | C3OZ-J | C3OZ-K |
| 62 | 260 | O/D | M/S | C3OZ-G | C3OZ-H |

Key:
- 3/S - 3-speed manual
- 4/S - 4-speed manual
- F/M/2 - 2-speed Fordomatic
- C4 - 3-speed Cruisomatic
- O/D - 3-speed manual with overdrive
- M/S - manual steering
- P/S - power steering
- H/D - Heavy-duty
- HiPo - High Performance
- 2V - 2-barrel carburetor
- 4V - 4-barrel carburetor
- bef. - before
- fm. - from
- R/B - replaced by

| Year | Engine | Trans | Steering | Sedan | Sedan H/D | Wagon | Wagon H/D |
|---|---|---|---|---|---|---|---|
| 63 | 170 | 3/S | M/S | C2OZ-A | C2OZ-E | C3OZ-A | C3OZ-C |
| 63 | 170 | 3/S | P/S | C2OZ-A | C2OZ-E | C3OZ-A | C3OZ-C |
| 63 | 170 | F/M/2 | M/S | C2OZ-A | | | |
| 63 | 170 | F/M/2 | P/S | C2OZ-B | C2OZ-F | | |
| 63 | 200 | F/M/2 | M/S | C2OZ-A | | C3OZ-A | C3OZ-C |
| 63 | 200 | F/M/2 | P/S | C2OZ-B | C2OZ-F | C2OZ-A | C3OZ-E |
| 63 | 221 | 3/S | M/S | C3OZ-G | C3OZ-H | C2OZ-A | C2OZ-F |
| 63 | 221 | 3/S | P/S | C3OZ-G | C3OZ-H | C3OZ-B | C3OZ-D |
| 63 | 221 | F/M/2 | M/S | C3OZ-G | C3OZ-H | C3OZ-B | C3OZ-D |
| 63 | 221 | F/M/2 | P/S | C3OZ-J | C3OZ-K | C3OZ-B | C3OZ-D |
| 63 | 221 | O/D | M/S | C3OZ-G | C3OZ-H | C3OZ-B | C3OZ-D |
| 63 | 221 | O/D | P/S | C3OZ-J | C3OZ-K | C3OZ-B | C3OZ-D |
| 63 | 260 | 3/S | M/S | C3OZ-G | C3OZ-H | C2OZ-A | C2OZ-F |
| 63 | 260 | 3/S | P/S | C3OZ-J | C3OZ-K | C3OZ-B | C3OZ-D |
| 63 | 260 | F/M/2 | P/S | C3OZ-J | C3OZ-K | C3OZ-G | |
| 63 | 260 | F/M/2 | M/S | C3OZ-J | C3OZ-K | C3OZ-B | C3OZ-D |
| 63 | 260 | O/D | P/S | C3OZ-J | C3OZ-K | C3OZ-G | |
| 63 | 260 | O/D | M/S | C3OZ-J | C3OZ-K | C3OZ-B | C3OZ-D |
| 63 | 289 HiPo | 3/S | M/S | C3OZ-G | C3OZ-H | | |
| 63 | 289 HiPo | 4/S | M/S | C3OZ-G | C3OZ-H | | |

Note:
Hardtop used the same springs as the sedan.

In the charts below, the 2-door hardtop used the same springs as the sedan unless noted with an entry in the "Hardtop" column.

Also, for the first time, Ford used different springs between right and left sides on 6-cylinder cars after March 2, 1964. These springs are listed together. For example C4OZ-A & B means that C4OZ-5310-A was installed on the right side and C4OZ-5310-B was installed on the left side. The load difference was 50 pounds. Apparently the right side of the 6-cylinder car was slightly heavier than the left side. Only two pairs were used—C4OZ-A & B, or C4OZ-B & C. In both cases the difference between springs was 50 pounds, and the difference between sets was 50 pounds.

| Year | Engine | Trans | Steering | Sedan | Sedan H/D | Hardtop | Wagon | Wagon H/D |
|---|---|---|---|---|---|---|---|---|
| 64 (bef. 3/2/64) | 170 | 3/S | M/S | C2OZ-E | | | C3OZ-A | C3OZ-C |
| 64 (fr. 3/2/64) | 170 | 3/S | M/S | C4OZ-A & B | | | C3OZ-A | C3OZ-C |
| 64 (bef. 3/2/64) | 170 | 3/S | P/S | C2OZ-E | | C2OZ-F | C3OZ-A | C3OZ-C |
| 64 (fr. 3/2/64) | 170 | 3/S | P/S | C4OZ-A & B | | C4OZ-B & C | C3OZ-A | C3OZ-C |
| 64 (bef. 3/2/64) | 200 | F/M/2 | M/S | C2OZ-E | | C2OZ-F | C3OZ-A | C3OZ-C |
| 64 (fr. 3/2/64) | 200 | F/M/2 | M/S | C4OZ-A & B | | C4OZ-B & C | C3OZ-A | C3OZ-C |
| 64 (bef. 3/2/64) | 200 | F/M/2 | P/S | C2OZ-E | | | C2OZ-A | C2OZ-E |
| 64 (fr. 3/2/64) | 200 | F/M/2 | P/S | C4OZ-B & C | | C4OZ-B & C | C4OZ-B | C2OZ-E |
| 64 | 260 | 3/S | M/S | C3OZ-G | C3OZ-H | | C2OZ-B | C2OZ-F |
| 64 | 260 | 3/S | P/S | C3OZ-J | C3OZ-K | | C3OZ-B | C3OZ-D |
| 64 | 260 | F/M/2 | M/S | C3OZ-J | C3OZ-K | | C3OZ-B | C3OZ-D |
| 64 | 260 | F/M/2 | P/S | C3OZ-J | C3OZ-K | | C3OZ-G | C3OZ-H |
| 64 | 260 | O/D | M/S | C3OZ-J | C3OZ-K | | C3OZ-B | C3OZ-D |
| 64 | 260 | O/D | P/S | C3OZ-J | C3OZ-K | | C3OZ-G | |
| 64 (bef. 3/2/64) | 260 | O/D | P/S | | | | | C3OZ-B |
| 64 (fr. 3/2/64) | 260 | O/D | P/S | | | | | C4OZ-B |
| 64 | 289 2V | 3/S | M/S | C3OZ-G | C3OZ-H | | C2OZ-B | |
| 64 | 289 2V | 3/S | P/S | C3OZ-J | C3OZ-K | | C3OZ-B | C3OZ-D |
| 64 (bef. 3/2/64) | 289 2V | 3/S | M/S | | | | | C2OZ-F |
| 64 (fr. 3/2/64) | 289 2V | 3/S | M/S | | | | | C4OZ-B |
| 64 | 289 2V | 4/S | M/S | C3OZ-J | C3OZ-K | | C3OZ-G | C3OZ-H |
| 64 | 289 2V | 4/S | P/S | C3OZ-J | C3OZ-K | | C3OZ-G | C3OZ-H |
| 64 | 289 2V | C4 | M/S | C3OZ-J | C3OZ-K | | C3OZ-G | C3OZ-H |
| 64 | 289 2V | C4 | P/S | C3OZ-J | C3OZ-K | | C3OZ-G | C3OZ-H |
| 64 | 289 HiPo | 4/S | M/S | C3OZ-K | | | | |
| 64 | 289 HiPo | C4 | M/S | C3OZ-K | | | | |

| Year | Engine | Trans | Steering | Sedan | Sedan H/D | Hardtop | Wagon | Wagon H/D |
|---|---|---|---|---|---|---|---|---|
| 65 | 200 | 3/S | M/S | C4OZ-A & B | | | C3OZ-A | C3OZ-A |
| 65 | 200 | C4 | M/S | C4OZ-A & B | | C4OZ-B & C | C3OZ-A | C3OZ-A |
| 65 | 200 | C4 | P/S | C4OZ-B & C | | | C2OZ-A | C4OZ-B |
| 65 | 289 2V | 3/S | M/S | C3OZ-G | C3OZ-H | | C2OZ-B | C4OZ-B |
| 65 | 289 2V | 3/S | P/S | C3OZ-J | C3OZ-K | | C3OZ-B | C3OZ-D |
| 65 | 289 2V | C4 | M/S | C3OZ-J | C3OZ-K | | C3OZ-G | C3OZ-H |
| 65 | 289 2V | C4 | P/S | C3OZ-J | C3OZ-K | | C3OZ-G | C3OZ-H |
| 65 | 289 2V | O/D | M/S | C3OZ-J | C3OZ-K | | C3OZ-B | C3OZ-D |
| 65 | 289 2V | O/D | P/S | C3OZ-J | C3OZ-K | | C3OZ-G | C3OZ-H |
| 65 | 289 4V | 3/S | M/S | C3OZ-G | C3OZ-H | | C2OZ-B | C4OZ-B |
| 65 | 289 4V | 3/S | P/S | C3OZ-J | C3OZ-K | | C3OZ-B | C3OZ-D |
| 65 | 289 4V | 4/S | M/S | C3OZ-J | C3OZ-K | | | |
| 65 | 289 4V | 4/S | P/S | C3OZ-J | C3OZ-K | | | |
| 65 | 289 4V | C4 | M/S | C3OZ-J | C3OZ-K | | C3OZ-G | C3OZ-H |
| 65 | 289 4V | C4 | P/S | C3OZ-J | C3OZ-K | | C3OZ-G | C3OZ-H |
| 65 | 289 HiPo | 4/S | M/S | C3OZ-K | | | | |
| 65 | 289 HiPo | C4 | M/S | C3OZ-K | | | | |

| Year | Engine | Trans | Steering | Sedan | Sedan H/D |
|---|---|---|---|---|---|
| 62 | 170 | 3/S | M/S | C2OZ-A | C2OZ-E |
| 62 | 170 | 3/S | P/S | C2OZ-A | C2OZ-E |
| 62 | 170 | F/M/2 | M/S | C2OZ-B | C2OZ-F |
| 62 | 170 | F/M/2 | P/S | C2OZ-B | C2OZ-F |
| 62 | 221 | 3/S | M/S | C2OZ-C | C3OZ-H |
| 62 | 221 | 3/S | P/S | C2OZ-C | C3OZ-H |
| 62 | 221 | F/M/2 | M/S | C2OZ-C | C2OZ-K |
| 62 | 221 | F/M/2 | P/S | C2OZ-C | C3OZ-J |
| 62 | 221 | O/D | M/S | C2OZ-C | C2OZ-K |
| 62 | 221 | O/D | P/S | C2OZ-C | C3OZ-J |
| 62 | 260 | 3/S | M/S | C2OZ-C | C3OZ-H |
| 62 | 260 | 3/S | P/S | C2OZ-C | C3OZ-H |
| 62 | 260 | F/M/2 | M/S | | C2OZ-K |
| 62 | 260 | F/M/2 | P/S | | C3OZ-J |
| 62 | 260 | O/D | M/S | | C2OZ-K |
| 62 | 260 | O/D | P/S | | C3OZ-J |

Mercury Meteors were listed just a little differently than the Fairlanes. Notice that in some cases, Mercury did not list a standard spring, but only the heavy-duty one. It might be an oversight, or perhaps Mercury felt the added weight of the special Meteor suspension warranted listing only the heavy-duty springs for the heavier 260 V8 applications.

In 1963 Mercury broke out the hardtop and S-33 (bucket seat/console model) from the sedans. Even so, most listed the same springs as the sedans. Only in the cases listed for the 170 6-cylinder did Mercury list different springs for the hardtop, and in one case only for the S-33 hardtop.

Unlike Ford, Mercury listed its station wagons as 6-passenger or 8-passenger cars. (Ford listed only 6-passenger cars. If 8-passenger versions were desired, the customer ordered the third seat as an option.) The 8-passenger wagons were models 71A (Custom), 71C (non-Custom), and 71F (Cruiser). The 6-passenger wagons were 71B (non-Custom), 71D (Cruiser), and 71E (Custom). The extra two people were aft of the rear tires, so they actually lightened the weight on the front springs. Hence the 8-passenger wagon front springs have a lower load rating than those for the 6-passenger's.

| Year | Engine | Trans | Steering | Sedan | Sedan H/D | Hardtop | Hardtop H/D | Wagon | Wagon H/D | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 63 | 170 | 3/S | M/S | C2OZ-A | C2OZ-E | | | C3OZ-A | C3OZ-C | |
| 63 | 170 | 3/S | P/S | C2OZ-A | C2OZ-E | C2OZ-B | C2OZ-F | C3OZ-A | C3OZ-C | S-33 only |
| 63 | 170 | F/M/2 | M/S | C2OZ-A | C2OZ-E | C2OZ-B | C2OZ-F | C3OZ-A | C3OZ-C | |
| 63 | 170 | F/M/2 | P/S | C2OZ-B | C2OZ-F | | | | | |
| 63 | 200 | F/M/2 | M/S | C2OZ-A | C2OZ-B | | | C3OZ-A | C3OZ-C | |
| 63 | 200 | F/M/2 | P/S | C2OZ-B | C2OZ-F | | | C2OZ-A | C2OZ-E | |
| 63 | 221 | 3/S | M/S | C3OZ-G | C3OZ-H | | | C2OZ-B | C2OZ-F | |
| 63 | 221 | 3/S | P/S | C3OZ-J | C3OZ-K | | | | | |
| 63 | 221 | 3/S | P/S | | | | | C2OZ-B | C2OZ-F | 71A, 71C, 71F |
| 63 | 221 | 3/S | P/S | | | | | C3OZ-B | C3OZ-D | 71B, 71D, 71E |
| 63 | 221 | F/M/2 | M/S | C3OZ-G | C3OZ-H | | | | | |
| 63 | 221 | F/M/2 | M/S | | | | | C2OZ-B | C2OZ-F | 71A, 71C, 71F |
| 63 | 221 | F/M/2 | M/S | | | | | C3OZ-B | C3OZ-D | 71B, 71D, 71E |
| 63 | 221 | F/M/2 | P/S | C3OZ-J | C3OZ-K | | | | | |
| 63 | 221 | F/M/2 | P/S | | | | | C3OZ-B | C3OZ-D | 71A, 71C, 71F |
| 63 | 221 | F/M/2 | P/S | | | | | C3OZ-G | C3OZ-H | 71B, 71D, 71E |
| 63 | 221 | O/D | M/S | C3OZ-G | C3OZ-H | | | | | |
| 63 | 221 | O/D | M/S | | | | | C2OZ-B | C2OZ-F | 71A, 71C, 71F |
| 63 | 221 | O/D | M/S | | | | | C3OZ-B | C3OZ-D | 71B, 71D, 71E |
| 63 | 221 | O/D | P/S | C3OZ-J | C3OZ-K | | | | | |
| 63 | 221 | O/D | P/S | | | | | C3OZ-B | C3OZ-D | 71A, 71C, 71F |
| 63 | 221 | O/D | P/S | | | | | C3OZ-G | C3OZ-H | 71B, 71D, 71E |
| 63 | 260 | 3/S | M/S | C3OZ-G | C3OZ-H | | | | | |
| 63 | 260 | 3/S | M/S | | | | | C2OZ-B | C2OZ-F | 71A, 71C, 71F |
| 63 | 260 | 3/S | M/S | | | | | C3OZ-B | C3OZ-D | 71B, 71D, 71E |
| 63 | 260 | 3/S | P/S | C3OZ-J | C3OZ-K | | | C3OZ-B | C3OZ-D | |
| 63 | 260 | F/M/2 | M/S | C3OZ-J | C3OZ-K | | | C3OZ-B | C3OZ-D | |
| 63 | 260 | F/M/2 | P/S | C3OZ-J | C3OZ-K | | | | | |
| 63 | 260 | F/M/2 | P/S | | | | | C3OZ-B | C3OZ-D | 71A, 71C, 71F |
| 63 | 260 | F/M/2 | P/S | | | | | C3OZ-G | C3OZ-H | 71B, 71D, 71E |
| 63 | 260 | O/D | M/S | C3OZ-J | C3OZ-K | | | C3OZ-B | C3OZ-D | |
| 63 | 260 | O/D | P/S | C3OZ-J | C3OZ-K | | | | | |
| 63 | 260 | O/D | P/S | | | | | C3OZ-B | C3OZ-D | 71A, 71C, 71F |
| 63 | 260 | O/D | P/S | | | | | C3OZ-G | C3OZ-H | 71B, 71D, 71E |

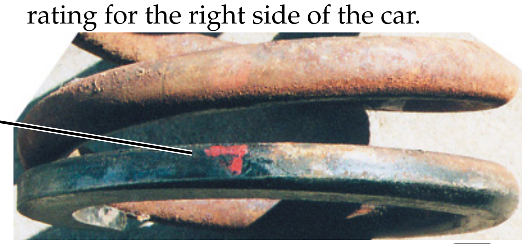
Here is a summary of all the known coil springs, which ones were replaced by what (see R/B columns), what the engineering numbers might be in case one is seen stamped into the coils, and the color coding Ford used. Also included are the Ford published specifications for the spring. The shaded rows are springs that were no longer used as replacements by the time of the 1964 production year.

| Part Number | R/B | R/B | Engineering | Color | Coils | Wire | Free length | Load |
|---|---|---|---|---|---|---|---|---|
| C2OA-5310-A | C2OZ-A | | | | | | | |
| C2OA-5310-B | C2OZ-B | | | | | | | |
| C2OA-5310-C | C2OZ-C | C3OZ-G | | | | | | |
| C2OA-5310-D | C2OZ-E | | | | | | | |
| C2OA-5310-E | C2OZ-F | | | | | | | |
| C2OZ-5310-A | | | C2OA-K, U, AD | yellow | 10-3/4 | .665 | 19-3/4 | 1610 |
| C2OZ-5310-B | | | C2OA-J, T, AD | green | 10-3/4 | .665 | 20 | 1660 |
| C2OZ-5310-C | C3OZ-G | | C2OA-H, S, AE | silver | | | | 1735 |
| C2OZ-5310-D | C2OZ-C | C3OZ-G | C2OA-G | | | | | 1785 |
| C2OZ-5310-E | | | C2OA-Y, AG | blue | 9-3/4 | .675 | 18-1/2 | 1610 |
| C2OZ-5310-F | | | C2OA-M, Z, AH | orange | 9-3/4 | .675 | 18-3/4 | 1660 |
| C2OZ-5310-G | C3OZ-H | | C2OA-F, N, AA, AJ | pink | | | | 1740 |
| C2OZ-5310-H | C2OZ-G | | C2OA-R | | | | | 1785 |
| C2OZ-5310-J | C3OZ-J | | C2OA-AF | red | | | | 1790 |
| C2OZ-5310-K | C3OZ-K | | C2OA-AK | white | | | | 1790 |
| C3OZ-5310-A | | | C3OA-A | violet | 10-3/4 | .665 | 19-3/8 | 1550 |
| C3OZ-5310-B | | | C3OA-B | brown | 11 | .685 | 19-1/2 | 1700 |
| C3OZ-5310-C | | | C3OA-C | (2) yellow | 9-3/4 | .675 | 18-1/4 | 1550 |
| C3OZ-5310-D | | | C3OA-D | (2) green | 9-3/4 | .695 | 18-1/8 | 1700 |
| C3OZ-5310-E | | | 3827601 | | | | | |
| C3OZ-5310-F | | | 3827608 | | | | | |
| C3OZ-5310-G | | | C3OA-J | silver | 10-3/4 | .685 | 19-3/4 | 1765 |
| C3OZ-5310-H | | | C3OA-K | pink | 9-3/4 | .695 | 18-3/8 | 1765 |
| C3OZ-5310-J | | | C3OA-L | red | 10-3/4 | .685 | 20 | 1815 |
| C3OZ-5310-K | | | C3OA-M | white | 9-3/4 | .695 | 18-1/2 | 1815 |
| C3OZ-5310-L | | | 3827952 | | | | | |
| C4OZ-5310-A | | | C4OA-A | red | 9-3/4 | .675 | 18-1/2 | 1585 |
| C4OZ-5310-B | | | C4OA-B | brown | 9-3/4 | .675 | 18-5/8 | 1635 |
| C4OZ-5310-C | | | C4OA-C | (2) yellow | 9-3/4 | .675 | 18-7/8 | 1685 |

The chart below gives the crux of the matter. The springs are shown in sets (standard and heavy-duty), and in ascending order of increasing load. The lightest springs were for station wagons and 6-cylinder sedans/hardtops. The V-8s with heavy transmissions (F/M/2, C4, 4/S, O/D) with power steering received the heaviest. Note that the load was the same for standard and heavy duty springs. The difference was generally that the heavy-duty spring had one less coil, but .01" greater wire diameter. It was also between 1⅛" and 1½" shorter in free length. It could be expected to give a quicker response to the suspension.

The last group of three springs were exactly alike except for free length. These were used on some 6-cylinder applications in mixed pairs to give 50 pounds more load rating for the right side of the car.

| Part Number | Color | Coils | Wire | Free length | Load |
|---|---|---|---|---|---|
| C3OZ-5310-A | violet | 10-3/4 | .665 | 19-3/8 | 1550 |
| C3OZ-5310-C | (2) yellow | 9-3/4 | .675 | 18-1/4 | 1550 |
| C2OZ-5310-A | yellow | 10-3/4 | .665 | 19-3/4 | 1610 |
| C2OZ-5310-E | blue | 9-3/4 | .675 | 18-1/2 | 1610 |
| C2OZ-5310-B | green | 10-3/4 | .665 | 20 | 1660 |
| C2OZ-5310-F | orange | 9-3/4 | .675 | 18-3/4 | 1660 |
| C3OZ-5310-B | brown | 11 | .685 | 19-1/2 | 1700 |
| C3OZ-5310-D | (2) green | 9-3/4 | .695 | 18-1/8 | 1700 |
| C3OZ-5310-G | silver | 10-3/4 | .685 | 19-3/4 | 1765 |
| C3OZ-5310-H | pink | 9-3/4 | .695 | 18-3/8 | 1765 |
| C3OZ-5310-J | red | 10-3/4 | .685 | 20 | 1815 |
| C3OZ-5310-K | white | 9-3/4 | .695 | 18-1/2 | 1815 |
| C4OZ-5310-A | red | 9-3/4 | .675 | 18-1/2 | 1585 |
| C4OZ-5310-B | brown | 9-3/4 | .675 | 18-5/8 | 1635 |
| C4OZ-5310-C | (2) yellow | 9-3/4 | .675 | 18-7/8 | 1685 |


Red color code still visible.

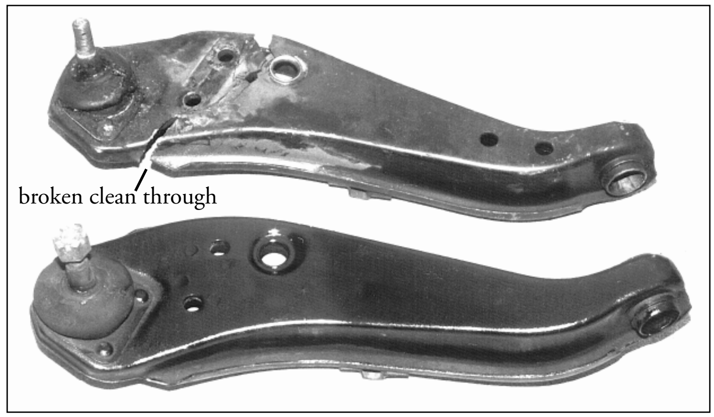
# 62/65 Safety Alert!

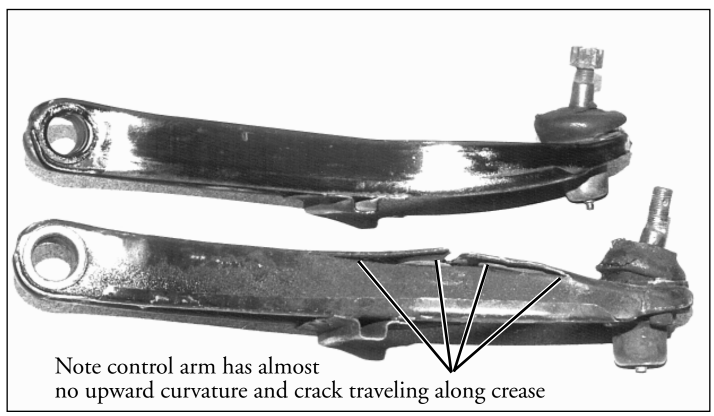
*Control Arm Failure*

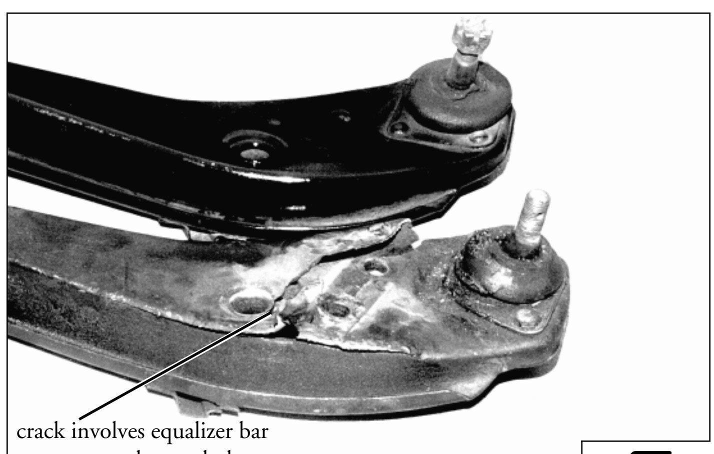
**reported by James Peterson**
**story by Bob Mannel**

James found a Fairlane with a severely broken lower control arm. He sent pictures comparing the broken one with a new one. The break went through the equalizer strut mounting hole and extended to both edges. The aft side broke clear through. On the forward side the crack split in two directions, traveling along the crease in the metal stamping.

Needless to say, this car was on its way to an extreme disaster. I have never seen this kind of failure and don't know what caused it. However, since it involves the equalizer bar strut attachment point, I recommend that those using heavy-duty 1" diameter front sway bars keep an eye on this area. Others might want to do a one-time inspection of this area, too.



# Letters to the Editor

Editor,

My 1964 Fairlane 500 has squeaky upper control arm bushings. I have been unable to find a mechanic who would replace these. Any ideas?

I live in the San Francisco area. My 2-door post is a daily driver and a curve-filled mountain road is my 15 miles to work. I have added a plate of steel to each lower control arm as the sway bar hardware to the lower control arm has ripped through the hole in the lower control arm. I've replaced inner/outer tie rods and ball-joints.

Is it me or would you agree that the front end is just a bit underdeveloped?

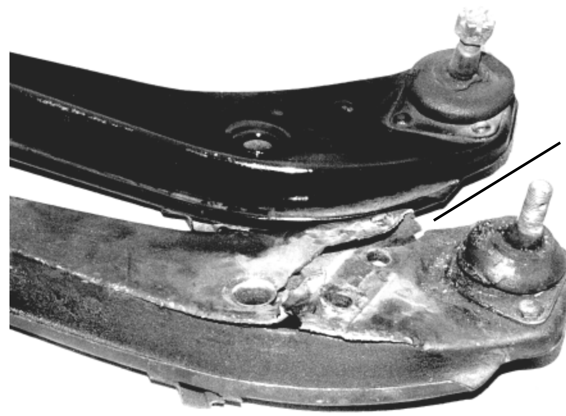
Bob (La Honda, CA)

*Bob, Part of the problem is that we compare a car's thirty-year-old technology against a modern car's suspension system. There is just no comparison. Today's cars are superior in every way except in beauty and raw horsepower. But, that is enough for me, as I know it is for you.*

*To stiffen the Fairlane's old suspension system we use thick sway bars and tough shocks. Unfortunately, the supporting metal was never made to handle the increased stress that imposes. We are starting to see more lower control arm metal failures. A sway bar attempts to use one coil spring to assist the other. Centrifugal force not only increases the total weight, but transfers inside weight to the outside front tire during cornering. As the car rotates around its center of gravity, the outer coil gets an increased load (and wants to compress) while the inner coil unloads (and wants to extend). The sway bar tries to equalize the compression and extension by opposing uneven movement through torsion forces (twisting). The thicker the bar, the more resistance to twist, the more equalizing of outer coil compression against inner coil extension.*

*Sounds great. Only one problem. The sway bar opposes the coil spring through the lower control arm, lower ball-joint, spindle, upper ball-joint, and upper control arm. And the lower control arm is supported by inner rubber bushings while the upper control arm is supported by steel bushings. The increased transfer of loads by the thicker sway bar increases the loads on all these suspension components. Right now, the weak link is the lower control arm. Remember that in straight-ahead driving, the lower control arm does not see any of the car's weight. All the weight from the car is transferred to the coil across the upper control arm, into the upper ball-joint, through the spindle, across the wheel bearings, to the hub, rim and tire. The lower control arm's job is to keep the tire in proper alignment. It primarily sees side loads.*

*However, during cornering, some vertical loads are transferred across the lower control arms though the action of the sway bar. Put a one-inch-thick sway bar on, then drive extremely hard into a corner, and you might get close to putting half the car's front end weight on each of the lower control arms! That means that 750# might be going through that long bolt connecting the sway bar to the lower control arm. The stresses along the lower control arm rails and around the hole are enormous. Add in sudden shock loads and you can begin to understand why these lower control arms are not holding up.*



Note how badly this lower control arm is torn.

*I don't have answers for this problem beyond your basic hot rodding techniques of reinforcing whatever is breaking. Sometimes, solving a weakness problem in one area just transfers the problem to the next weakest link. For example, stiffer shock absorbers sometimes just cause the brackets they are attached to to start breaking.*

*As for squeaking upper control arm bushings, you can replace them yourself. See the tech article beginning next page. - Editor*

# Upper Control Arm Bushing Replacement

**by Bob Mannel**

Although this article is written specifically for 1962 through 1965 Fairlanes, the same principles apply to other Fairlanes and Torinos. I have replaced upper control arm inner shafts and bushings three times. The first time was for a persistent squeak I could not get rid of with my usual remedy. The article below was originally written based on that experience. The second time I replaced an upper control arm shaft was to do the same thing on the other side of the same vehicle, even though it was not making noise. Examination of that upper shaft suggested that just because one side is bad does not necessarily mean the other is also. I could have gotten many more miles out of the shaft as it was well lubricated and not worn significantly. The third replacement was for another 1963 Fairlane which had started squeaking. This time I replaced only the bad side. The other side is still quiet after more than six years since only the one side was replaced. So, here is the article written eleven years ago with updates as I know them today.…

When the upper control arm bushings (sometimes called 'A-frame' bushings) squeak, the usual remedy is a good soaking with penetrating oil such as WD-40. A few pushes up and down on the appropriate fender and the squeak gradually disappears. The next squeak may be months or perhaps years away.

So goes the battle against squeaking bushings until one day that technique does not work. The driveway is covered with penetrating oil, one empty can of WD-40 is in the trash and the one being used is half empty, shoulders are sore from pushing the front fender up and down, and still the squeak persists. The war has been lost. The bushings must come out.

So what are these things we call bushings? What are they made of? How do they work? Why do they squeak? We think of bushings as rubber or occasionally brass or aluminum. The upper control arm bushings are actually made of case-hardened steel. They function very much like a bolt and nut. See Figure 1. The nut (bushing) is attached to the control arm and the bolt (inner shaft) is fixed to the car frame. As the wheel moves up and down, the bolt turns on the nut. It is that simple. The bolt is actually called the upper control arm inner shaft. It has threads at each end, measures about 9½" long and has two equally spaced holes approximately 4¼" apart. The shaft is flattened around the bolt holes with one side of the hole smooth and the other side knurled. The knurled side always mounts against the car's frame. The shaft is held in position by two massive ⅝" diameter special bolts. These bolts incorporate an integral washer and are designed for torques of 125 to 150 foot-pounds (ft-lbs). (Sources disagree on these torque values. The ones quoted here are from the 1963 Fairlane/Meteor shop manual. The 1962 Meteor shop manual specifies 150-160 ft-lbs, the 1962 Fairlane manual says 115-135 ft-lbs, and the 1964 and 1965 Fairlane manual says 125-166 ft-lbs.) These large bolts initially used a fine (S.A.E.) thread, which was changed to a coarse (U.S.) thread possibly sometime in late 1964. The bolts and special knurled nuts with either thread type can be replaced as sets. You can mix one coarse set with one fine set. Just keep the bolt and nut threads consistent.

The bushings at each end of the inner shaft thread down tight against the upper control arm. As they are threaded down, they also thread down loosely on the upper control arm inner shaft. In effect, the shaft is trapped between the two bushings but is free to rotate. As it rotates, it is threading into one bushing and out of the other. Because the control arm's actual rotation is quite small in operation, the forward and aft movement on the shaft is only about 1⁄128"—insignificant in the overall geometry of the suspension system.

The original bushings installed at the factory were "permanently" lubricated. A rubber 'O'-ring trapped the lubricant in the bushing. Somehow it just never really worked out that way in the real world. Ford soon recognized its mistake and about 1965 began installing grease fittings in the bushings. They even came up with a way to install grease fittings into the older bushings via a Technical Service Bulletin (TSB). The procedure defined in the TSB was difficult and could introduce metal shavings into the bushing. This TSB might have been worth a try back in the early 1960's but by now you can count on the bushings being worn anyway and, if squeaking, it's time for replacement.

New bushings, now obsolete under Ford's C3OZ-3047-B part number, are available from other sources. I bought mine from Kanter Auto Products (800-526-1096) back in the 1980s for $50 each. Kanter still sells them today for the same price! When I received mine from Kanter, they were identical to the Ford shafts, right down to the knurls. I suspect that those made today are from the original Ford supplier, but I have no confirmation of that. The replacements do have the grease fitting provisions. The older kits include the inner shaft, two bushings, grease fittings, 'O'-rings, attaching bolts and the special nuts for those bolts. The new bolts use a coarse thread design whereas the old ones I removed from a 1963 Fairlane use a fine thread. As long as you keep bolt and nut threads consistent, you can use either thread. I chose to retain my old hardware which was in excellent shape.

Newer kits were like the older ones but did not include the "O"-rings. In their place was a wide rubber band that was supposed to be placed over the shaft and bushing to seal the bushing opening. I knew why they did this, but I didn't like it. With the grease fittings and 'O'-rings, it is possible to blowout the 'O'-ring by applying too much hydraulic pressure with a grease gun. Using the rubber band avoided this problem, allowing easy greasing. Unfortunately, the rubber band would eventually fail and then you would be in a bind because you could not replace the rubber band without removing the inner shaft. A better choice, if you could not use your old 'O'-rings, was to go to an Ace Hardware store, buy an 'O'-ring with the correct thickness, and cut a section out to make it the correct diameter. By using the bushing channel as a guide, you could cut just enough out so that the cut ends would butt tightly against each other. This is just about as good as using an original seal. In talking to Kanter Auto Products for this article's updates they told me that the

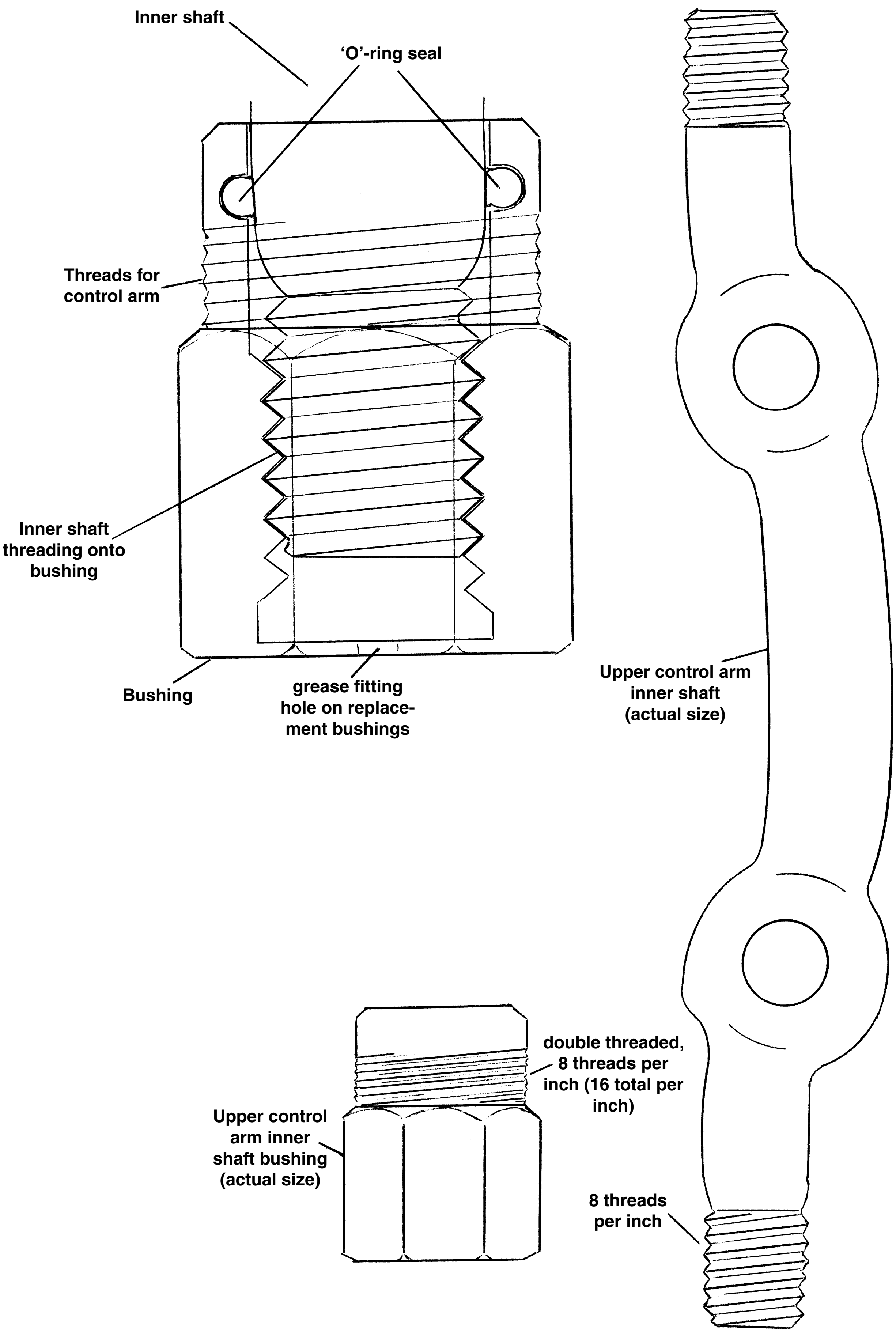

Inner shaft
'O'-ring seal
Threads for control arm
Inner shaft threading onto bushing
Bushing
grease fitting hole on replacement bushings
Upper control arm inner shaft (actual size)
double threaded, 8 threads per inch (16 total per inch)
Upper control arm inner shaft bushing (actual size)
8 threads per inch

Figure 1

rubber bands have been discontinued and the 'O'-rings are again supplied. In any case, when installing the bushings, pack them with grease, but be careful not to over pressure the bushing area and put undue stress on the 'O'-ring. If the 'O'-ring is working, the grease cannot escape. The grease fitting only needs to be used if the seal is broken. I do not grease the bushings as a routine. I think you can cause more trouble than you prevent.

To do the job required some special tools. First, a coil spring compressor was needed. For safety reasons I did not use, nor do I recommend the externally mounted hook-on type—usually three to a set. Rent a good spring compressor from an automotive store. Better yet, buy yourself a new one. That way you know the threads have not been overstressed. J.C. Whitney sells one that might work for $35.95 (#12KE6859R). Other tools required included a 13⁄16" six-sided socket with ½" drive, 10" long by ½" drive extension, 2" long by ½" drive extension (the last two extensions hooked together to make a 12" extension), ½" drive breakaway bar, 1¼" socket with ½" drive, and a ½" drive torque wrench.

One additional special tool called for in the shop manual was an 8" spacer bar. This bar prevents any collapse or distortion at the control arm bushing ends while torquing the bushings to 160-190 ft-lbs. With care I do not feel this bar is necessary, however a simple one can be made for next to nothing. At a local welding shop I bought an 8¼" length 1" x ¼" steel stock. At home I ground one end down so that it just slipped between the bushing ends on the control arm. The length turned out to be just a little over 8" (about 8⅛"). To hold the bar in place I drilled two 7⁄16" holes spaced 4¼" apart. See Figure 2. Using two long V-8 exhaust manifold bolts and washers plus a couple of nuts, the bar could be mounted into position on the inner shaft. This prevented any slipping of the bar during the torquing sequence.

Before going into the repair procedure, I must mention that I desired to replace the upper ball-joint at the same time as the upper bushings. The ball-joints were the originals with about 150,000 miles on them. These ball-joints were riveted to the upper control arm. I wisely elected to disconnect the ball-joint from the spindle and remove the upper control arm and ball-joint as an assembly. This allowed me to grind off the rivet heads on a wheel grinder which sure beat the method of chiseling them off. I will cover that more at the appropriate time.

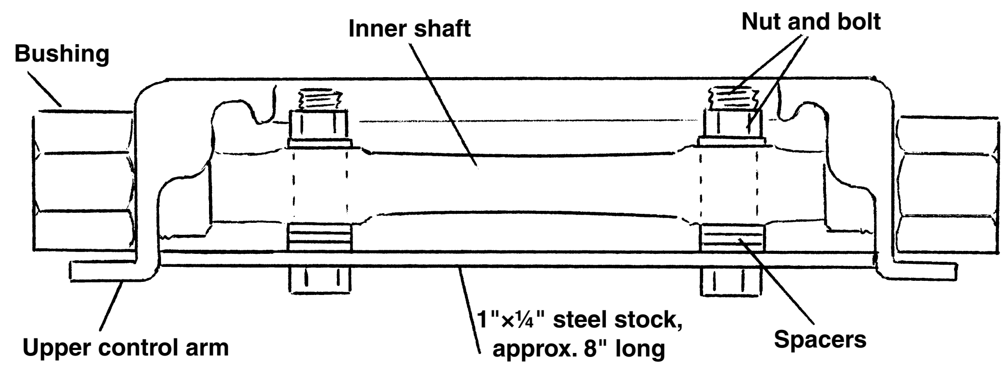


Figure 2

I started the job with the car still on the ground. First the stablizer-to-lower control arm bushing nut, bolt spacer, washers and rubber bushings were removed. Then working from inside the engine compartment, the left engine compartment support brace and upper shock absorber mount were removed. The shock absorber rod was extended fully so the rod would not disappear as the car was raised. Next the left side of the car was raised and wheel removed. I supported the car with a jack stand along with a bunper jack snugged into position on the front bumper just as an extra precaution. Then the shock absorber lower nuts were taken off and the shock removed.

The next job was to install the coil spring compressor tool. The tool consisted of two lower hook-type fingers and two upper hook-type fingers. With the coil spring fully extended these sets of fingers were spaced *as far apart as possible* on the coil—if they were not, the spring would not be compressed sufficiently to come out of its seat. The two lower fingers were positioned as close to the upper control arm as possible and the upper fingers were moved as close to the upper coil spring seat as possible. This required rotating the fingers along the spring coils until they could go no farther. The set of fingers must be perpendicular to each other to assure coil spring stability in the compressed position. Therefore I positioned the upper fingers exactly centered on the coil and parallel to the car (fore and aft). The lower fingers were also centered but perpendicular to the car (side to side). The tool was then snugged down.

Next the wheel was reinstalled and steering turned to the extreme right to facilitate checking the tool as the spring was compressed. The car was then lowered slowly on its tire and slack in the tool taken up. The purpose of this technique was to allow the car to do much of the spring compression vice the tool. Once the normal weight of the car was back on the coil, the tool was further tightened, which continued to lower the car. Eventually the upper control arm came to rest against the upper rubber bumper. The tool was then tightened until the coils between the tool's fingers showed almost no gap. (Do not completely bind the coil spring as this could put undue stress on the tool and cause the tool to fail.) The car was next jacked back up and tire removed. The coil spring and tool were then easily lifted out from the bottom of the shock tower. Using this technique it was not necessary to remove the suspension bumper shield as specified in the shop manual because the spring could easily be maneuvered around it.

The cotter pin was then extracted from the upper ball-joint castle nut and castle nut removed. The castle nut was next reinstalled up side-down so that the bottom edge of the castle nut was flush with the end of the ball-joint threads. This was done for two reasons. First, the nut helped support the threads when the ball-joint removal tool was tightened and second, it prevented the ball-joint from springing off the spindle when the two broke free. The tool was installed, tightened down hard, then tapped with a hammer. If that fails to break the connection, then tightened the tool a little more and repeat the sequence until it does break free.

Before taking out the upper control arm, I took a few measurements to help re-install the control arm in the proper place. I used a support brace to hold the control arm in approximately its normal position. Then I marked a spot on the tip of the control arm outboard from the ball-joint. I also marked three places around the fender (a grease pencil works well)—one spot was aft, one forward, and one at the top. A fourth place was on the chassis frame. Each distance was measured with a tape measure and recorded. These measurements would be used on reinstallation before tightening the inner shaft bolts. If I was careful, the alignment would be close enough until I could check it at an alignment shop.

Using the 6-sided 13/16" by 1/2" drive socket, both the 10" and 2" long drive extensions and the 1/2" drive breakaway bar, the two upper control arm-to-body bolts were loosened. Over 150 foot-pounds (ft-lbs) of torque may be required to break the bolts free, so I do not recommend using any 3/8" drive tools. They may well break under the strain. Once loose, a 3/8" drive and extension could be used to remove the bolts if desired. Of course, an air-driven impact wrench is the way to go, if you have those tools available. With these bolts removed, the upper control arm complete with bushings and ball-joint were removed from the car.

Once out of the car, the bushings were removed from the control arm. No easy task, this required the use of a 1 1/4" by 1/2" drive socket with a 1/2" drive breakaway bar. The biggest problem was keeping the upper control arm stationary while applying the necessary torque to loosen the bushings. I was able to use a concrete slab overhang to wedge the upper control arm under, but a large stationary vise would work just as well, or a nice impact wrench. Once the bushings were removed, the shaft slid right out.

I took a few minutes to thoroughly clean the original shaft and inspect its condition. Looking in the bushings I could see which one was the defiant one, emitting its embarassing squeak. Whereas one bushing was wet with lubricant, the forward one was completely dry. After cleaning the shaft, galling was evident on the tops of both threaded ends. However, whereas the thread shape was still well defined on the aft threads, the forward threads showed excessive pitch wear. In addition, the forward bushing was riding lower on the threads than normal causing the bushing to scrape along the shaft. A well defined channel in the shaft cut by the bushing was clearly evident. See Figure 3.

The next step was to remove the ball-joint. I used a 3/8" wide 6" diameter grind wheel on my grinder and ground the rivet heads down level with the upper control arm. Care was taken not to grind into the upper control arm. A couple of sharp blows on a 1/4" pin driver with a carpenter's hammer pushed the rivets through their holes. Once free, the ball-joint fell away from the control arm.

With the upper control arm bare, I took the time to remove 22 years of accumulated dirt, rust, tar and undercoating. The coil spring seat was particularly full of dirt and rust. After cleaning and dipping, the control arm was down to bare metal. Once dry it was heavily coated with Rustoleum Satin Black paint.

While the upper control arm was drying, I cleaned up the bottom of the coil spring (still compressed in its compression tool). As might be expected, there was some rust to be removed from the lowest coil which had been buried under dirt on the upper control arm. However, the integrity of the coil was still in fine shape. (Note: The 1962 Fairlane Shop Manual is the basic repair manual for the 1963 and 1964 Fairlane. In that manual an exploded view of the front suspension is shown. The rubber boot and adjacent small piece shown between the coil spring and upper control arm is applicable to only the 1962 Fairlane. Don't look for them on your 1963/65 Fairlane because you will not find them.)

I was now ready for the assembly. My new upper ball-joint was an NOS Ford item and the upper control arm bushing kits were bought from Ford in the 1980s. I began by installing the bushing kit. Because of the bushing design, some trial and error was required when installing the bushings. The manual alludes to this fact but does not explain the reason. Well here is the reason: The bushing uses a thread which exactly matches the shaft in threads per inch. However, it uses two of them! This is why it appears to have twice as many (fine thread vice coarse). It also means that the bushing can be threaded on two different ways, each 180 degrees (half a turn) opposite each other! Only one way is correct for exactly centering the shaft. If the wrong position is used, the shaft will wind up being 1/2 thread width either forward of center or aft of center. See Figures 4 and 5.

I started the procedure by first packing the bushings with grease. Then the 'O'-rings were coated lightly with grease and inserted in the bushings. Next, one bushing was threaded onto the upper control arm, but not tightened. The inner shaft was then screwed onto the bushing so that the knurled side of the shaft was down when the shaft's bow was outward from the upper control arm. (Note: It can be installed backwards so beware!). See Figure 5. The second bushing was first screwed onto the inner shaft and then onto the control arm. By screwing the bushing onto the shaft first,

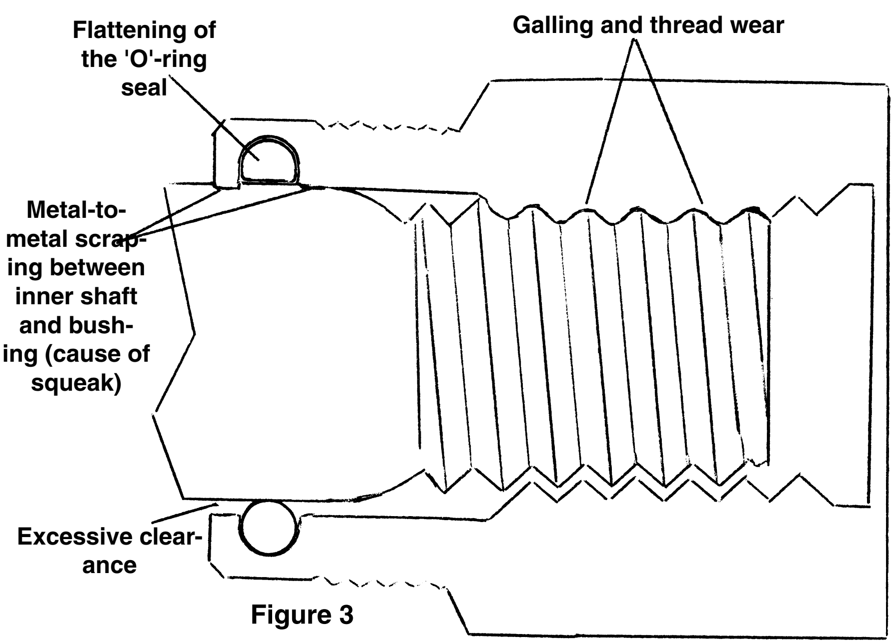


Figure 3

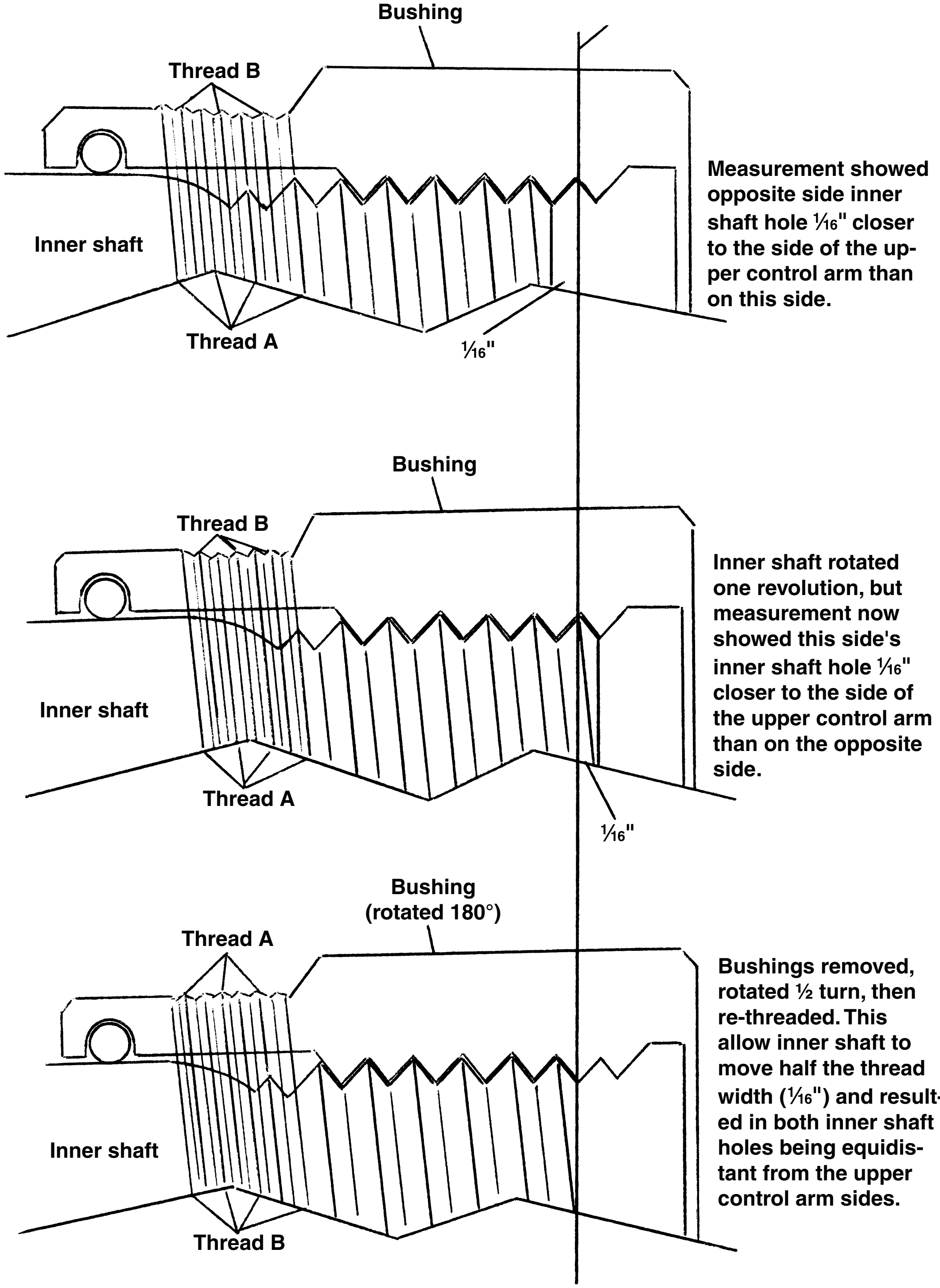



**Figure 4**

the bushing automatically engaged the proper threads on the control arm. Next, I centered the shaft and checked the distance between the shaft mounting holes and the control arm. They should be equal, but on the first try, mine was either 1/16" forward or aft at best, so I removed the bushings, rotated them 180 degrees and tried again. This time the distances were exactly equal.

The bushings were now ready for torquing. I installed the special tool as shown in Figure 2 and then torqued the bushings to 175 (160-190) ft-lbs. The special tool was then removed and grease fittings installed.

The new ball-joint was next installed. Three of the mounting nuts were torqued to 10-12 ft-lbs, however the fourth nut was left off so a grease fitting could be installed in place of Ford's grease plug. With the ball-joint in place, the bolt blocking the grease fitting hole was backed out using a 3/16" Allen wrench. Then the plug was removed and grease fitting installed. The bolt and nut would remain out until the spindle was connected.

The upper control arm assembly was now ready for installation. I positioned the assembly as close to the original position as possible using the old knurled pattern on the frame as a guide and all the measurements previously taken between the fender (three) and frame (one). The control arm attachment bolts were then tightened into position but not yet torqued. Next the spindle was attached to the upper ball-joint, torqued to 60-80 ft-lbs and cotter pinned. (The ball-joint was torqued to the low side of the specifications and then tightened to line up the cotter pin hole. The nut should never be loosened to make this alignment.) With the ball-joint attached to the spindle, the ball-joint was filled with grease. I pumped grease until the rubber seal bowed outward slightly. This way there was just a little pressure inside to keep the grease against the rubbing surfaces. I avoided excessive pressure as this would rupture the rubber seal. Once the seal splits, even just a little, it is only a matter of time until water intrusion will ruin the ball-joint. Once greased, I ran the fourth ball-joint mounting bolt up into position with the Allen wrench, installed the nut and torqued it to specifications.

With the upper control arm installed, the tire was snugged on the brake drum and steering centered. The tire was raised to near its normal position. The wheel was visually sighted just to make sure there was no gross misalignment in geometry. There was none, so the upper control arm shaft bolts were torqued to 150 ft-lbs. The tire was then removed to facilitate the next step.

The coil spring was next positioned in the shock tower. A floor jack was used under the lower control arm to raise the upper control arm while checking and double checking the coil spring position. Particular attention was given to insure the upper coil spring seat bolts came through the shock tower in the proper place and that the lower spring coil was seated in the upper control arm properly. (The upper control arm was designed to seat the coil spring in only one position.) Once the coil spring position looked good, the tire was installed and jack pumped up until the upper control arm contacted the upper rubber bumper. The car was further raised to remove the jack stand and then the floor jack bled down to allow full car weight back on the tire. The coil spring compressor tool was then loosened gradually so that the coil spring started carrying the car's weight. (During this process, the car's lowered front end began to rise to its normal position. This technique saves a lot of wear and tear on the compressor tool by transferring the tool's load to the car.) Once the compressor tool was loose, it was unscrewed another several inches. The car was then raised to expand the spring coils to facilitate tool removal. The equalizer-to-lower control arm bolt, nut and bushings were then installed and car lowered. The nut on the equalizer bolt was then tightened. Working inside the engine conpartment and from underneath, the shock was lowered into position, upper shock mount and bar brace installed and shock secured to the upper control arm.

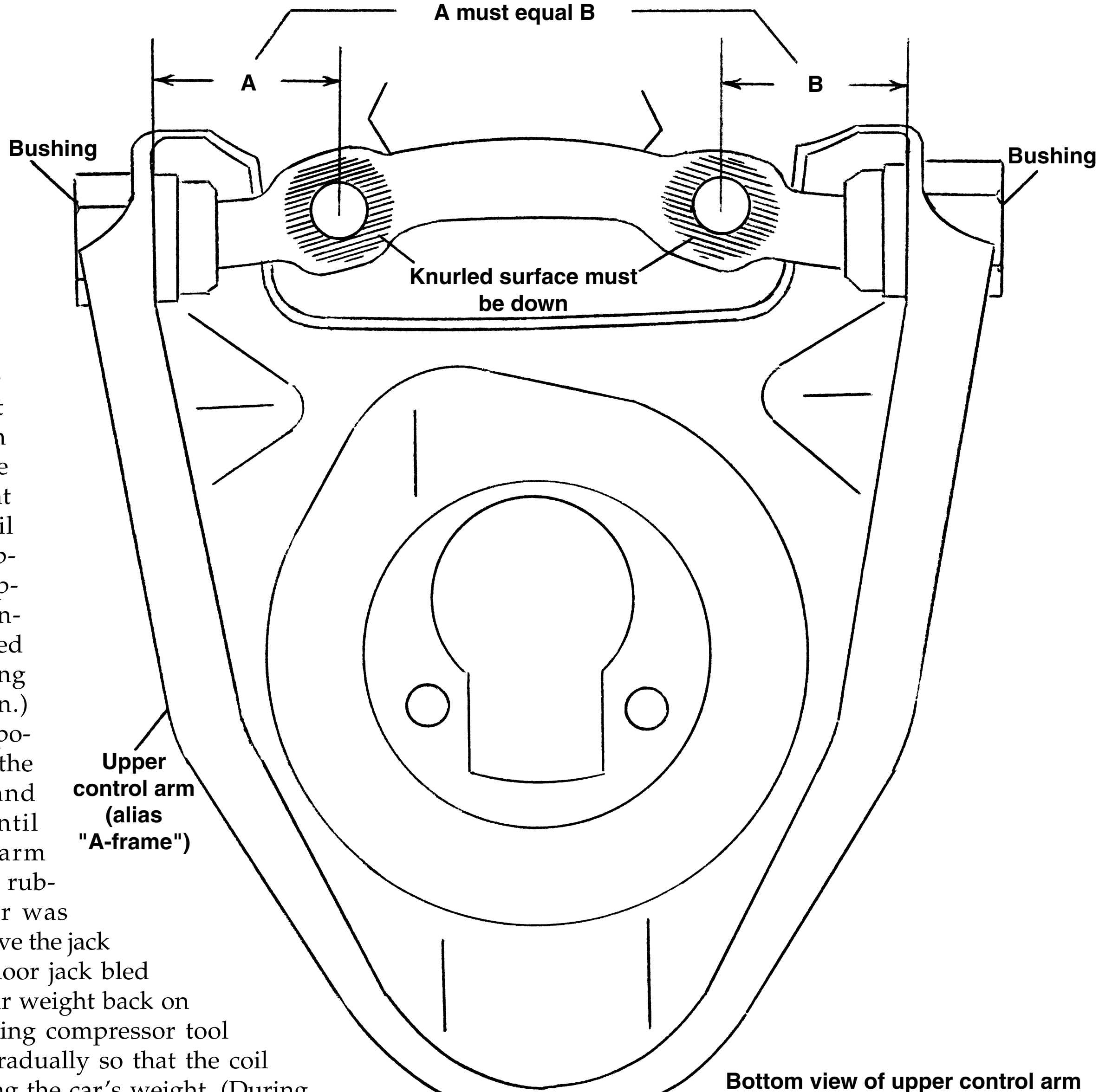


Figure 5

After having done three upper control arm inner shaft replacements, this is not a particularly difficult job in that it requires no special skills. However, whenever dealing with coil springs, a great deal of respect must be afforded a compressed spring. I have already emphasized using a high quality, perferably new, spring compressor tool. You are literally betting your life on the quality of the tool metal, welds, and machining. There is well over 1,000 pounds of force coiled up in the compressed spring. Try to minimize the strain on the tool. This is one of the reasons I use the car's weight to help compress the spring, as it unloads some of the weight off the tool threads. While the coil spring is out of the car, it should be temporarily stored in a safe place. I used a ½" thick horsehair rope which I looped through the center of the spring and tied off. The other end of the rope was tied around the trunk of a thick tree (where no children would play). If the tool failed, the rope would restrict the spring's flight.

If the spring is to be replaced, the tool is going to have to do a lot of work. Be sure the threads are well greased. In most cases, the tool shaft will not be long enough to relieve all spring compression. You should have some outside coil spring compressors (three would be optimum) to hold the coil spring securely while the center coil spring compressor tool is repositioned. The reverse of this process will have to be used on the new spring.

An air-driven impact wrench is very useful in loosening high torque bolts, but you will need a quality torque wrench to tighten them down again.

Expect to spend about eight hours to complete the job the first time and work very carefully. The second time will probably only require half that time.

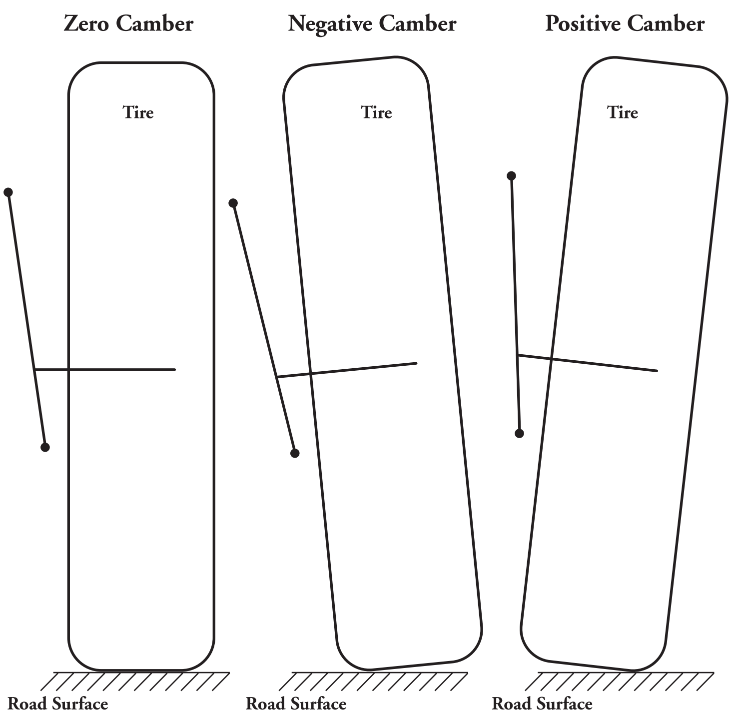
# 1962-65 Front-End Alignment

*Part 1*

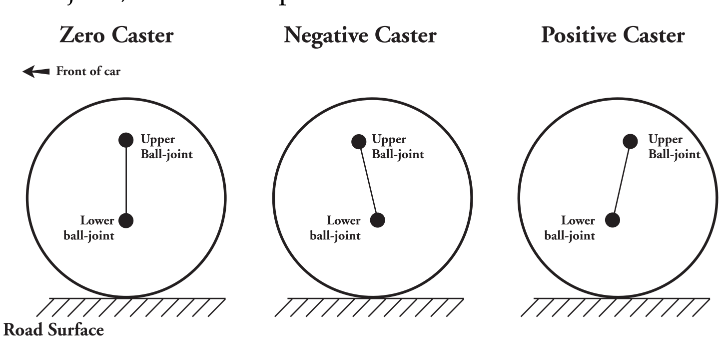
**by Bob Mannel**

The front-end of the new 1962 Fairlane and 1962 Meteor was unique in the fact that the A-frame mounted to a pedestal, rather than to the side of the inner fender, as did the Falcon and Comet. (The later Mustang would use the same system as the Falcon/Comet.) So, whereas the Falcon/Comet caster and camber adjustments were made by adding or subtracting shims to the A-frame inner shaft mounting bolts, the Fairlane/Meteor A-frames were adjusted by actually moving the position of the innershaft on the pedestal.

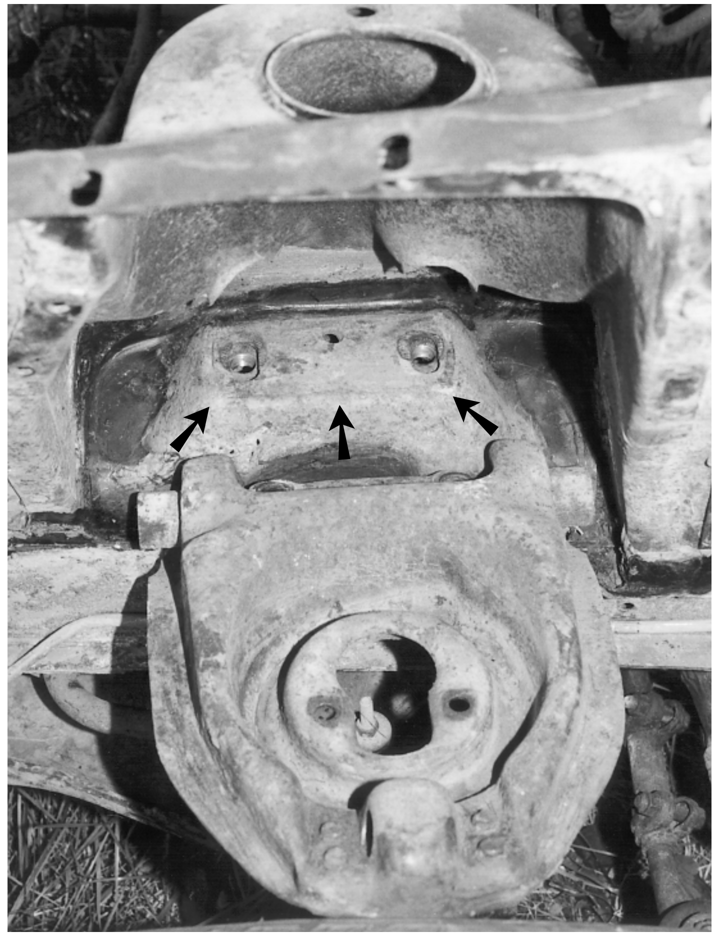
Camber is the in and out tilt of the tire. If the tire is tilted inward toward the center of the car more at the top than at the bottom, the camber is negative. Positive camber indicates the top of the tire is tilted outward.




Caster is the fore and aft tilt of the tire. This is measured as the angle from vertical of the line going through upper and lower ball-joints. If the upper ball-joint is aft of the lower ball-joint, the caster is positive.



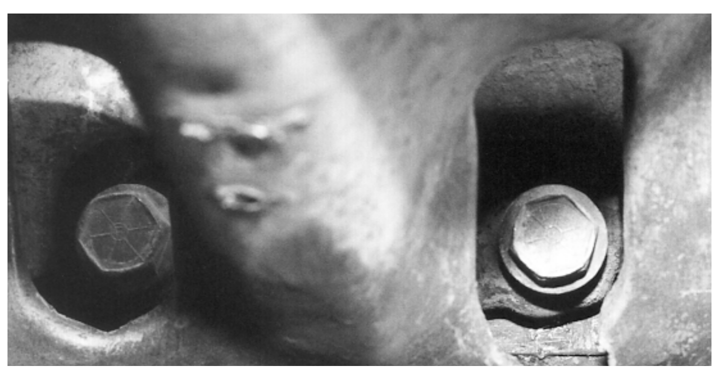

So, if the A-frame is moved outward evenly on the pedestal, camber will increase. If the forward part of the A-frame is moved outward, while the aft part is moved inward an equal amount, caster will increase.



The A-frame has been moved outward so the pedestal can be seen (*arrows*). This area around the pedestal was heavily undercoated with tar to keep moisture from attacking the metal. If detailing this area, be sure to protect it from corrosion.

It is easy to see that changes for camber can change caster and vice versa. If the A-frame is not move outward or inward for camber evenly, caster will change. And, if the forward bolt is not moved in or out an equal, but opposite, amount as the aft bolt while correcting for caster, camber will be changed. In short, the two adjustments can easily affect each other, so both must be "worked" at the same time.

The A-frame inner shaft is attached to the pedestal by two very large grade-8 bolts. Each bolt goes through the inner

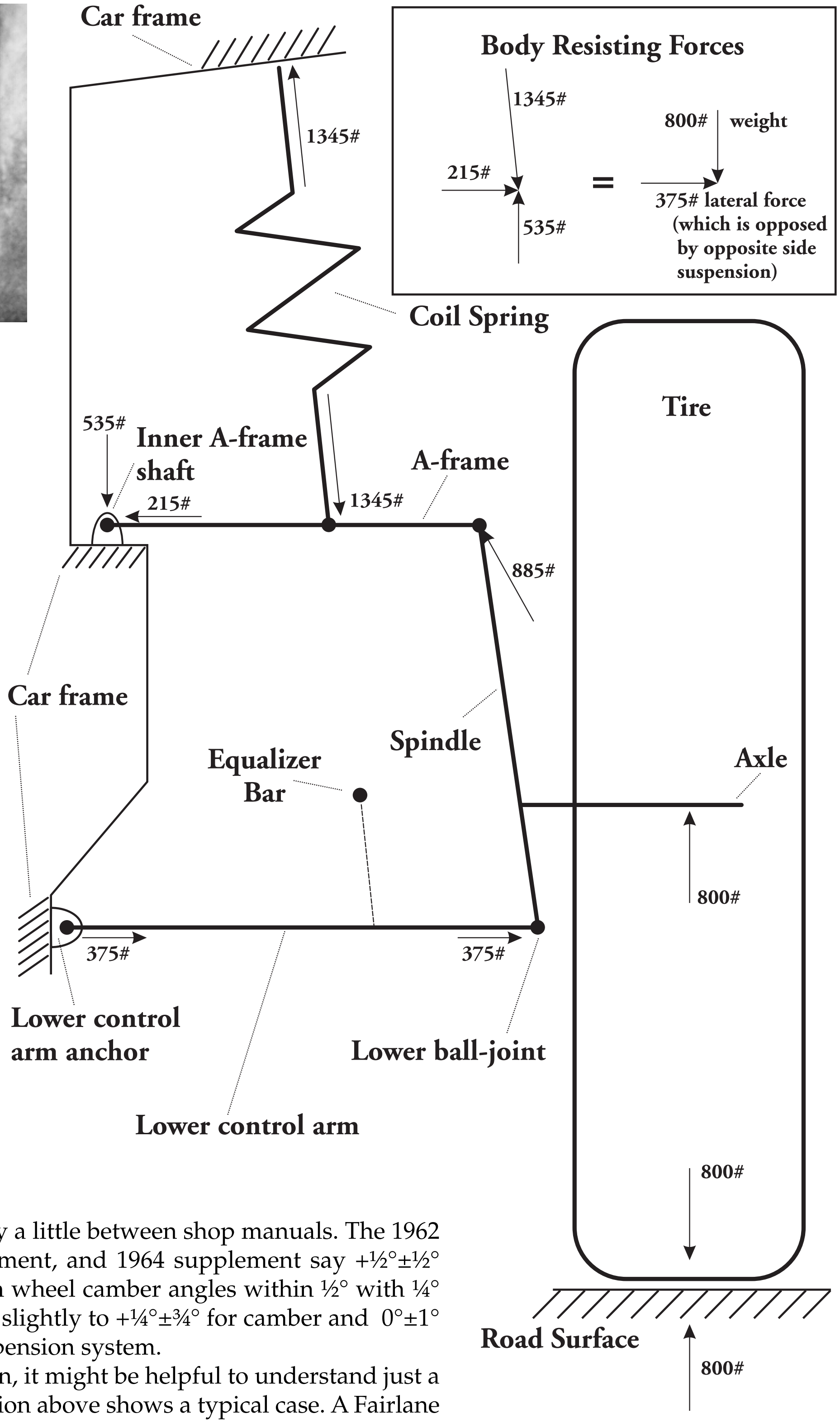


Two heavy grade-8 bolts hold the A-frame in position.

shaft, through the pedestal, and threads to a special nut. This special nut has a serrated side so that it “bites” into the underside of the pedestal when the bolt is torqued to specifications. In addition, the inner shaft has a serrated surface for biting into the top of the pedestal. In the photo at right, the indentation of the inner shaft serrations are clearly visible in the top of the pedestal. The serrated features of the nut and inner shaft make the gripping power to the pedestal extremely effective. In addition, long slots allow for plenty of adjustments for the A-frames.

When loosening the A-frame inner shafts for front-end alignment, Ford stated to loosen the bolts 2 or 3 turns, then turn the wheels to the extreme left and right positions to break the contact of these serrated surfaces with the pedestal. Once the wheels were recentered, then you were to turn the bolts until they were just snug, but not tight.

When the alignment was completed, the bolts were to be tightened and alignment readings rechecked. It was possible that if the bolts were too loose during adjustment that the readings would change as the bolts were tightened. When tightening, be sure a torque wrench is available as these bolts require high torque values. The 1962 Fairlane shop manual says 115-135 ft-pounds. The 1963 supplement say 125-150. And the 1964 supplement and 1965 manuals say 125-166! The 1962 Meteor manual says 150-160. I personally  use 140-150.

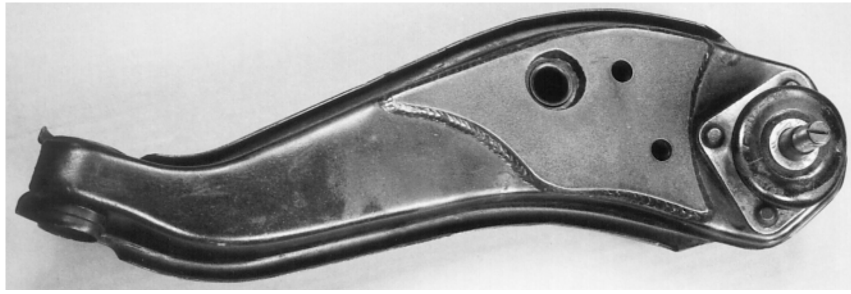


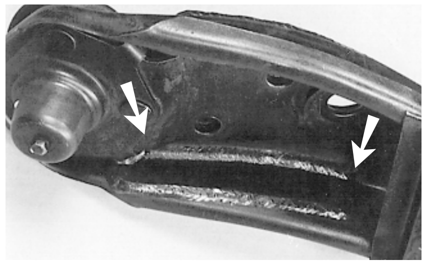

The specs for camber and caster also vary a little between shop manuals. The 1962 manuals (Fairlane & Meteor), 1963 supplement, and 1964 supplement say +½°±½° for camber and  0°±½° for caster (with both wheel camber angles within ½° with ¼° preferred). The 1965 manual changed these slightly to +¼°±¾° for camber and  0°±1° for caster. All these cars share the same suspension system.

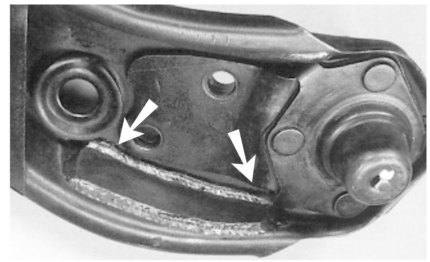
In speaking about the Fairlane suspension, it might be helpful to understand just a little about the forces involved. The illustration above shows a typical case. A Fairlane hardtop weighs about 3,000 pounds with a weight distribution of 53% front and 47% rear. That is about 1600 pounds on the front wheels, or about 800 pounds each. Looking at the static loads at normal riding height, the forces at the A-frame pedestal are 215 pounds of side load trying to push the A-frame inward, and 535 pounds of weight on the inner shaft. Notice that the force load on the coil spring is higher than the weight on the tire! That is because of the leverage effect of the A-frame.

The lower control arm experiences only a side load and supports no weight. Its job, along with the strut, is to stabilize the tire in lateral movement. For the sake of discussion, I have included the attachment point of the equalizer bar. Note that it is in line with the coil spring centerline. This is by design. The equalizer bar will transfer car weight from one side to the other if the tires are not at the same riding height (such as when going around a corner at high speed). This weight gets applied (or subtracted) through the lower control arm. In extreme cases, such as with 1" thick equalizer bars, considerable weight might get carried across the lower control arm, which can flex and crack the arm. Any number of solutions can address the stress problem. One by Total Control Products is shown here (*right*), where a plate has been welded to the top and reinforcing plates welded to the sides underneath (*arrows*). The only issue I see with this solution is the strut bar will not attach in the stock location (will be about ¼" above normal), which will cock the control arm just a slight amount.

Having the actual alignment of the 1962-65 Fairlane and 1962-63 Meteor performed always caused caused me to grit my teeth because no shop ever had the special tools needed. Instead, the alignment man would loosen the inner shaft bolts and begin prying against the slots in the shock towers. And when that didn't work, he just got a bigger pry bar, or added a piece of pipe for more leverage. By the time he got done, you might have a shock tower that looked like the one above. More than likely, you were never

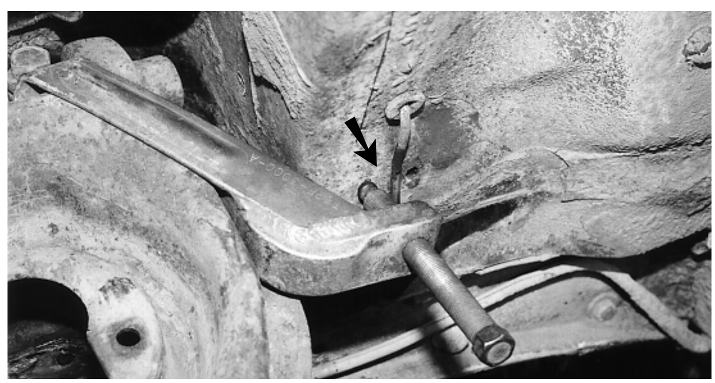


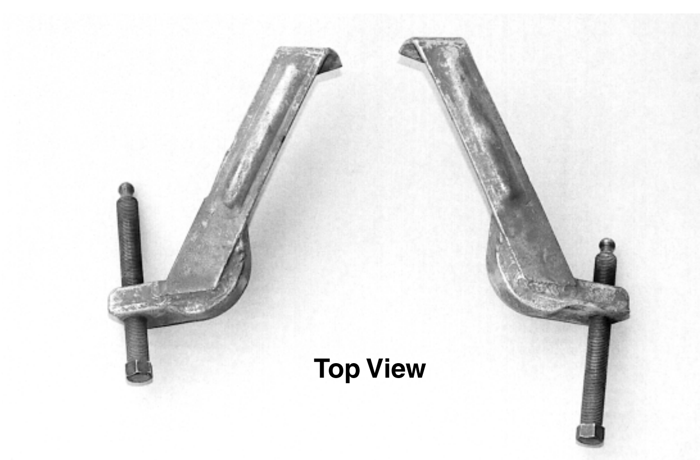




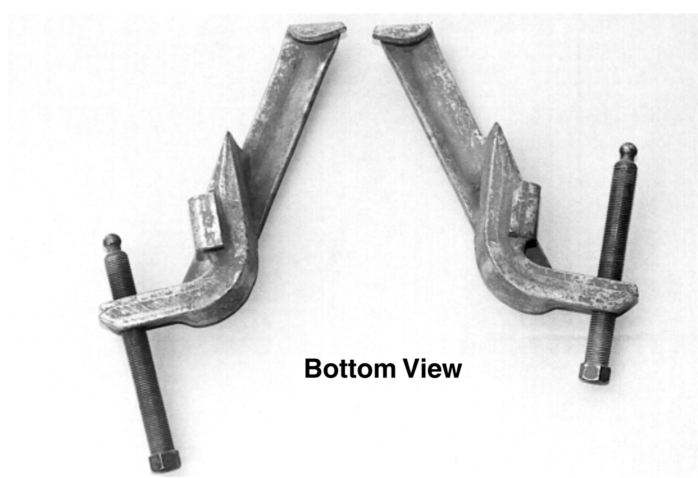
told—and it might be doubtful that your Fairlane front-end was actually aligned!

Ford had its own special tools for this job. The ones shown on this page were borrowed from Jack Grice. They are complete except for the foot-pads at the ends of the screws. The tools fit over the A-frame and snug against the side. The pads rest against the sheet metal and might be off the area where the sheet metal is of double thickness. Also, note that the foot of the jackscrew on the tool installed aft (*see arrow on photo at immediate right*) is very near the brake line. Ford mentioned that you might have to remove the brake line clip until the alignment was complete.



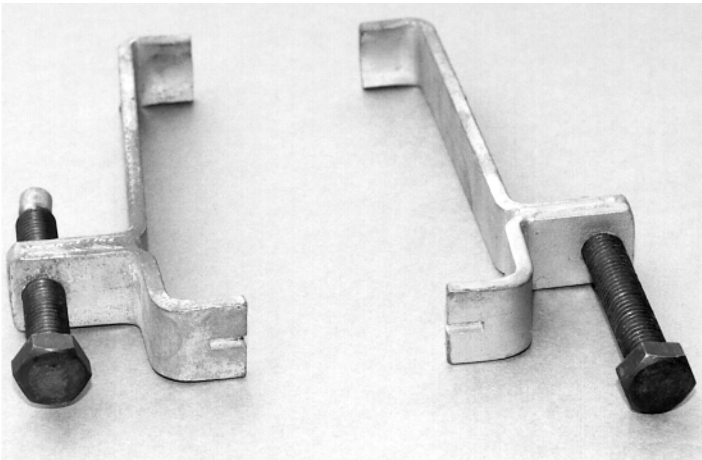


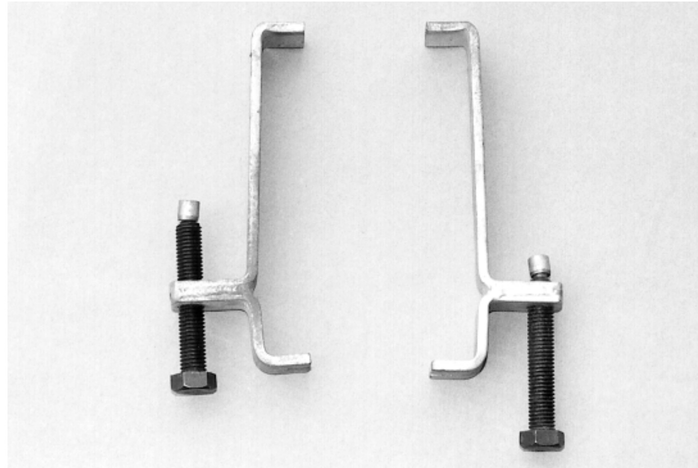
**Top View**

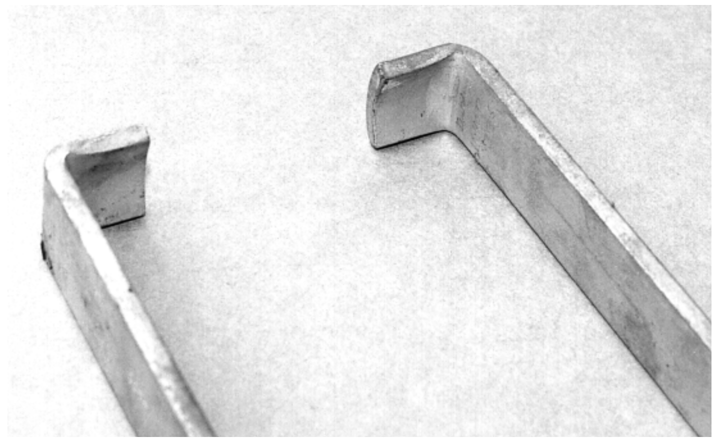


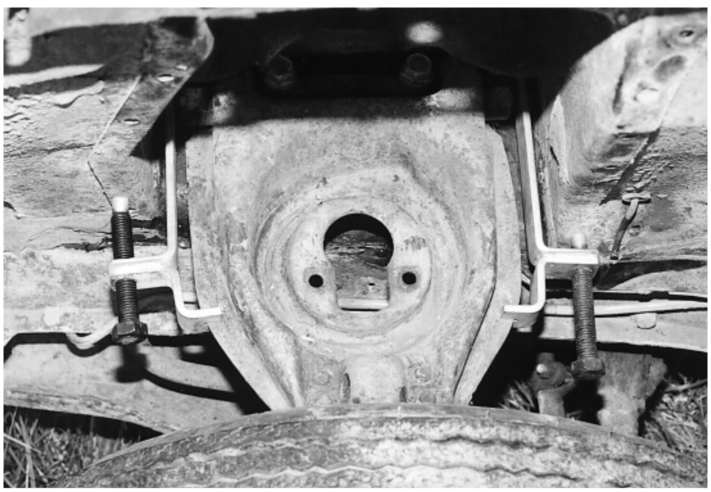
**Bottom View**

In addition to Ford, there were at least two other manufacturers of early Fairlane alignment tools. One was Bender. Another was VIM Tools. Their part number was V-400. The good news is that this tool not only works well, but would be easy to fabricate. For that purpose, I have included a full-scale drawing of the tool (next page).



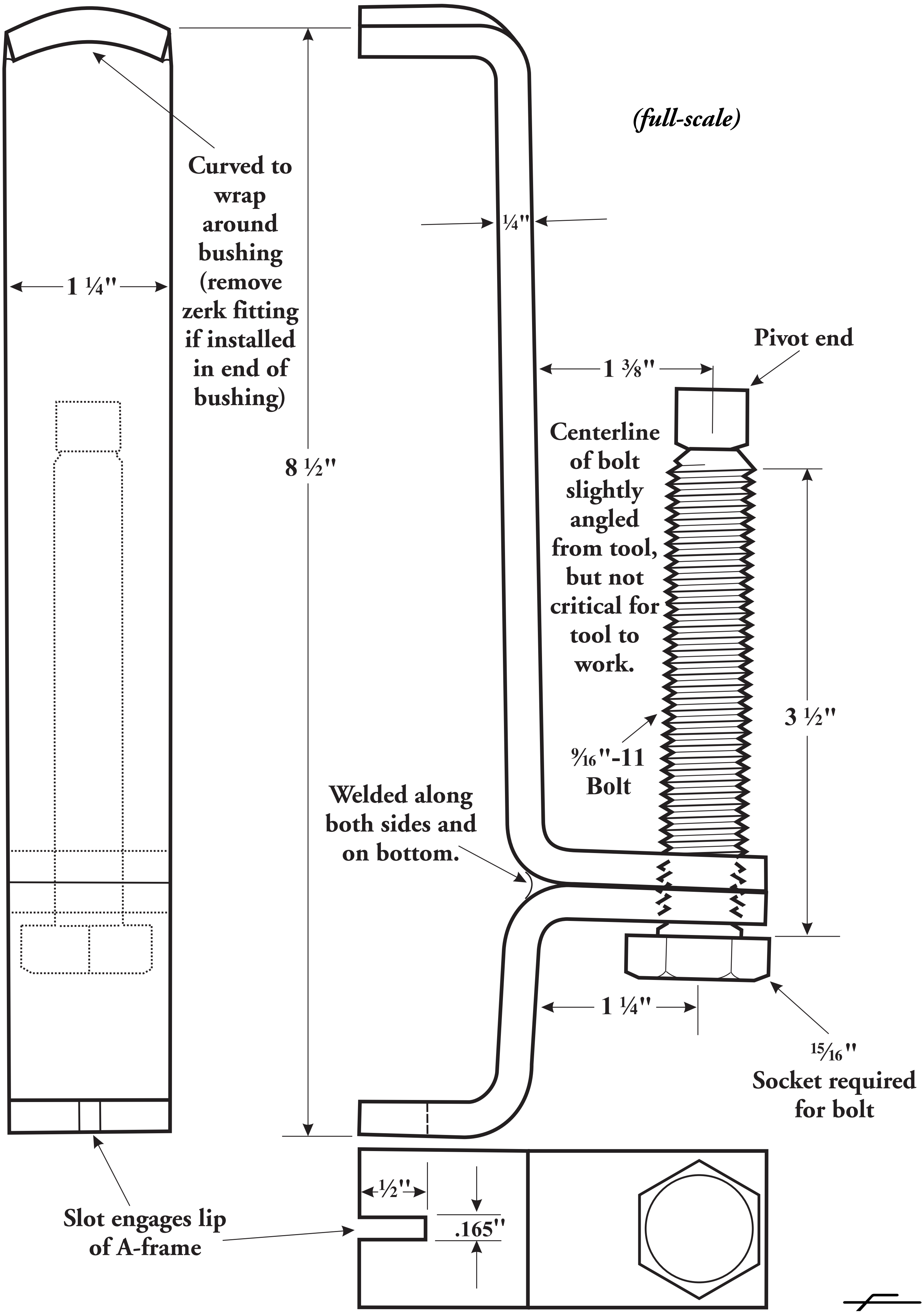






In essence, the VIM tool hugs the inner shaft bushings and has a slot that fits over the A-frame edge. The ends for around the bushing are curved to form a cradle. Two coarse-threaded bolts are used to effect the alignment. What I liked about the tool was that the screw pads were against the shock tower sheet metal, which is where the sheet metal is double in thickness.

In Part 2, I will publish a Ford Technical Service Bulletin #240, Article No. 12, dated August 27,1962. It was produced in response to a lot of questions and difficulties mechanics were having with Fairlane front-end alignment procedures. The eight-page bulletin looks like something made by a engineer told he had two hours to come up with a working copy before the publishing deadline, so he doodled his thoughts thinking they would be cleaned up later. Still, it is one of the best sources I know on how to go about aligning one of these cars.


(full-scale)
Curved to wrap around bushing (remove zerk fitting if installed in end of bushing)
1 ¼"
¼"
8 ½"
Pivot end
1 ⅜"
Centerline of bolt slightly angled from tool, but not critical for tool to work.
3 ½"
⁹⁄₁₆"-11 Bolt
Welded along both sides and on bottom.
1 ¼"
¹⁵⁄₁₆" Socket required for bolt
½"
.165"
Slot engages lip of A-frame

# 1962-65 Front-end Alignment

*Ford Technical Service Bulletin (Part 2)*

**by Bob Mannel**

Ford TECHNICAL SERVICE BULLETIN **240**

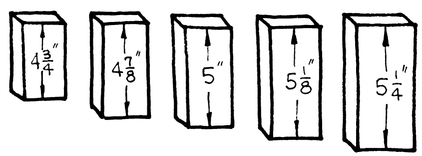
AUGUST 27, 1962 Article No. 12

• SERVICE DEPARTMENT • FORD DIVISION • FORD MOTOR COMPANY •

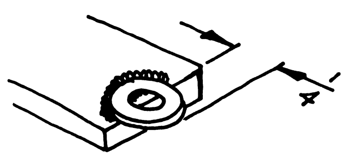
## FAIRLANE

### FRONT SUSPENSION ALIGNMENT

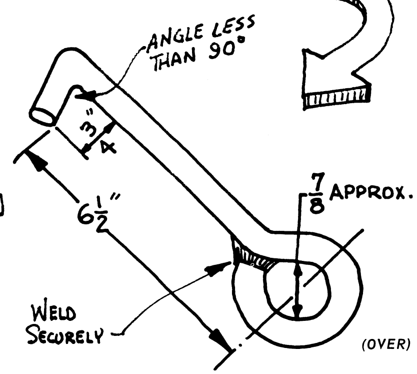
**FIRST** – CUT 5 BARS FROM $\frac{1}{4}$" THICK (MINIMUM) STEEL (PREFERABLY) STOCK $1\frac{1}{2}$" WIDE OF THE FOLLOWING LENGTHS:-




**AND** TO ONE END OF EACH BAR WELD A WASHER LIKE THIS




**SECOND** – FABRICATE A HOOK FROM AN 11" LENGTH OF $\frac{3}{8}$ DIA. (MIN.) STEEL ROD —SO



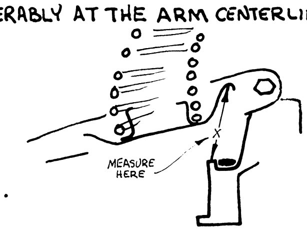

**THIRD** – OIL THE FORCING SCREW THREADS AND THE SWIVEL PAD OF EACH SUSPENSION ADJUSTING TOOL.

1 (OVER)

**THEN** – WITH ALIGNMENT EQUIPMENT IN OPERATING ORDER (*per manufacturers specifications*) AND THE VEHICLE PROPERLY POSITIONED

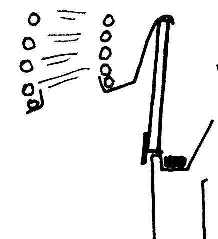
**CHECK** EXISTING CASTER AND CAMBER READINGS.

**IF WHEELS NEED ALIGNING** – MEASURE, WITH VEHICLE IN NORMAL RESTING POSITION, FROM UNDER THE BACK LIP OF THE UPPER ARM SPRING POCKET TO THE TOP OF THE SIDE RAIL SHEET METAL – PREFERABLY AT THE ARM CENTERLINE.




**SELECT** – THE BAR WHICH IS CLOSEST TO $\frac{1}{8}$ INCH **LONGER** THAN THIS MEASURED DIMENSION.

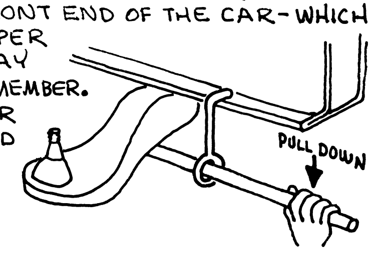
POSITION THIS BAR BETWEEN THE TWO POINTS FROM WHICH THE MEASURMENT WAS TAKEN (ARM CENTERLINE). (*position with washer lip of bar on wheel side of rail as shown*)



**TO DO THIS**

PULL **DOWN**

ON THE FRONT END OF THE CAR – WHICH WILL PIVOT UPPER ARM (UPWARD) AWAY FROM THE FRAME MEMBER. USE A STANDARD BAR THRU THE FABRICATED HOOK. PULL DOWN USING THE LOWER ARM AS A FULCRUM.

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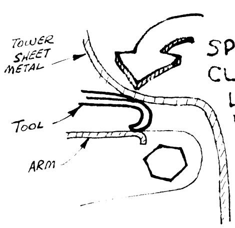
Aug. 27, 1962

**NEXT** – POSITION ALIGNING TOOLS SECURELY ON UPPER ARM AND TURN FORCING SCREWS UNTIL PIVOT PAD OF TOOL SCREW IS SNUG AGAINST SHEET METAL (FINGER TIGHT) THEN TIGHTEN ONE (1) TURN WITH WRENCH.

**NOTE!** SCREWS MUST BE TIGHT AGAINST SHEET METAL (suggest brake line clip be removed and brake line be moved out of way)




IF ADJUSTING TOOL CANNOT BE INSTALLED, SPACING BAR HAS PROBABLY RAISED ARM SO THAT CLEARANCE FOR TOOL IS INSUFFICIENT. REVERSE LAST TWO STEPS. INSTALL TOOL - WITH SCREW FULLY RETRACTED. POSITION SPACING BAR. TIGHTEN ADJUSTING TOOLS.

**NOW LOOSEN CROSS SHAFT** – LOOSEN THE CROSS SHAFT RETAINING BOLTS SEVERAL TURNS UNTIL THEY ARE ABOUT $\frac{3}{16}$" TO $\frac{1}{4}$" AWAY FROM TOP FACE OF SHAFT BOSS.

PUSH UP ON THE FRONT END OF THE CAR - A SHARP CRACK WILL USUALLY BE AUDIBLE WHEN THE CROSS SHAFT SERRATIONS SEPARATE FROM THE SHEET METAL.

**IMPORTANT** – CHECK THE CROSS SHAFT RETAINING BOLTS - THEY **MUST** AT THIS POINT BE LOOSE ENOUGH

(OVER)

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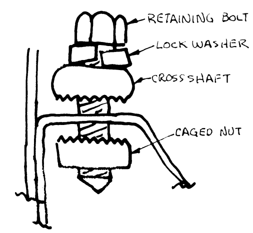
TO HAVE ALLOWED THE CROSS SHAFT TO BE OUT OF ITS SERRATIONS IN THE SHEET METAL AND ALSO TO HAVE ALLOWED THE SERRATED CAGED NUT TO BE DISENGAGED FROM THEIR SERRATIONS BELOW.




**IT IS IMPERATIVE THESE SERRATIONS ARE FREE TO EFFECT AN ADJUSTMENT!**

IF NECESSARY, LOOSEN THE BOLT MORE TO CLEAR THE SHAFT AND STRIKE THE HEAD OF THE RETAINING BOLT A SHARP BLOW (USING A LONG BAR) TO LOOSEN THE CAGED SERRATED LOWER NUT.

**DON'T PANIC NOW!**

AT THIS POINT A SEVERE CHANGE IN THE EXISTING ALIGNMENT WILL OCCUR. THE AMOUNT OF THIS CHANGE, HOWEVER, AND THE ABILITY TO CORRECT THE SETTING QUICKLY AND EASILY IS CONTROLLED EFFECTIVELY **IF** THE TOOLS HAVE BEEN POSITIONED AND TIGHTENED PROPERLY AS OUTLINED.

**ARM IS NOW READY TO ADJUST**

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Ford released a Special Service Tools article in its August 27, 1962 Technical Service Bulletins to cover the 1962 Fairlane front-end alignment. This same procedure applies to all 1962-65 Fairlanes and 1962-63 Meteors. Although the bulletin covers Ford's T62F-3000-B Upper Arm Caster and Camber Adjustor tool, the same procedure can be used with the VIM V-400 Ford Fairlane and Mercury Meteor Caster & Camber Adjustment Tool discussed in the May-June 2001 *Fairlaner*. The V-400 can be fabricated, and all the other pieces shown in this article can be fabricated as well.

*(Illustrations on these pages Courtesy of Ford Motor Company)*

240-12 (Cont'd)
Aug. 27, 1962

**CAUTION** – LOOSEN OR TIGHTEN TOOL SCREWS NOT MORE THAN **2** COMPLETE TURNS **ALTERNATELY** TO AVOID COLLAPSING SHEET METAL.

CHECK READINGS AT INTERVALS DURING ADJUSTMENT PROCESS TO DETERMINE THE EXTENT OF THE CORRECTION.

DO NOT CONSIDER CAMBER MISALIGNMENT DURING CASTER ADJUSTMENT

**CAMBER** – ADJUSTMENT SHOULD BE CHECKED AT COMPLETION OF CASTER ADJUSTMENT TO DETERMINE MOVEMENT REQUIRED (NEGATIVE OR POSITIVE)

RULE OF THUMB

APPROXIMATELY **4** COMPLETE TURNS OF A SCREW WILL CHANGE READING ONE (1°) DEGREE **BUT** THIS SHOULD BE DIVIDED EQUALLY BETWEEN BOTH SCREWS - ALTERNATELY.

**EXAMPLE**

CASTER READING INDICATES $+1\frac{1}{2}$ DEGREES
DESIRED READING SHOULD BE $+\frac{1}{2}$ DEGREE (OR 1° DIFFERENCE TOWARD NEGATIVE)

FIRST - <u>LOOSEN</u> FRONT TOOL SCREW **2** TURNS
SECOND - <u>TIGHTEN</u> REAR TOOL SCREW **2** TURNS

CASTER SHOULD NOW READ $+\frac{1}{2}°$ OR 1° LESS POSITIVE THAN AT START

CAMBER READING INDICATES **—1** DEGREE
DESIRED READING SHOULD BE **0** DEGREE (OR 1° DIFFERENCE TOWARD POSITIVE)

FIRST - <u>TIGHTEN</u> FRONT TOOL SCREW **2** TURNS
SECOND - <u>TIGHTEN</u> REAR TOOL SCREW **2** TURNS
THEN REPEAT – FRONT SCREW 2 TURNS, REAR SCREW 2 TURNS.

CAMBER SHOULD NOW READ 0° OR 1° LESS NEGATIVE THAN AT START.

**NOTE**

ALLOW APPROXIMATELY $+\frac{1}{8}°$ ON CASTER AND CAMBER READINGS FOR TORQUE OF CROSS-SHAFT RETAINING BOLTS.

(OVER)

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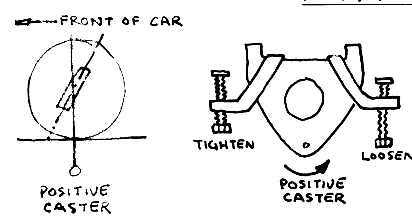
# ADJUST CASTER FIRST

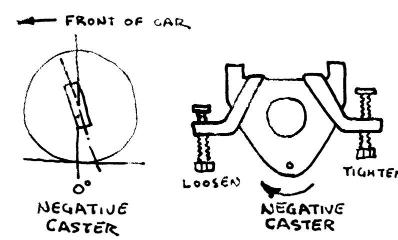
(<u>Disregard</u> CAMBER)

## <u>TO MOVE POSITIVE</u>:-




TO ADJUST FROM NEGATIVE CASTER TOWARD POSITIVE (OR MORE POSITIVE) CASTER TURN (TIGHTEN) SCREW OF FRONT TOOL CLOCKWISE (INTO BODY) TO PULL ARM OUTWARD AND TURN (LOOSEN) SCREW OF REAR TOOL COUNTER-CLOCKWISE (AWAY FROM BODY).
IF REAR TOOL TENDS TO BECOME COMPLETELY LOOSE, TURN WHEELS 20° OUTBOARD THEN BACK THROUGH 0° TO 20° INBOARD THEN RETURN TO 0° (STRAIGHT AHEAD). REAR SCREW SHOULD NOW BE TIGHT. IF IT IS NOT, THE SERRATIONS OF EITHER THE NUTS OR THE CROSS SHAFT ARE NOT FREE.
LOOSEN CROSS SHAFT RETAINING BOLTS A LITTLE MORE - RAISE UP FRONT OF CAR THEN TAP BOLT HEAD TO MAKE SURE SERRATIONS ARE LOOSE.

## <u>TO MOVE NEGATIVE</u>:-




TO ADJUST FROM POSITIVE CASTER TOWARD NEGATIVE (OR MORE NEGATIVE) CASTER TURN (TIGHTEN) SCREW OF REAR TOOL CLOCKWISE (INTO BODY) TO PULL ARM OUTWARD AND TURN (LOOSEN) SCREW OF FRONT TOOL COUNTER CLOCKWISE (AWAY FROM BODY).
IF FRONT TOOL TENDS TO BECOME COMPLETELY LOOSE FOLLOW PROCEDURE OUTLINE FOR THIS CONDITION UNDER "POSITIVE" CASTER MOVEMENT.

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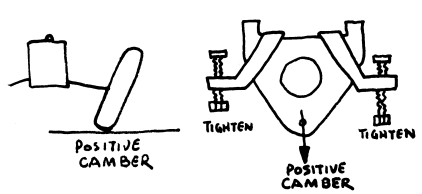
240-12 (Cont'd)
Aug. 27, 1962

# NOW ADJUST CAMBER

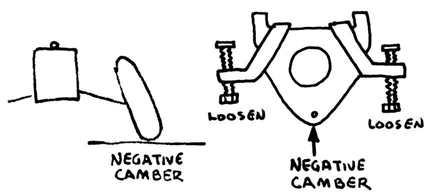
**NOTE!** FOR PROPER CAMBER ADJUSTMENT WITHOUT AFFECTING THE CASTER ADJUSTMENT JUST COMPLETED – WHEN TIGHTENING OR LOOSENING THE SCREWS – **EACH** SCREW **MUST** BE TURNED IN OR OUT AN **EQUAL** NUMBER OF TURNS.

TO MOVE POSITIVE :–




TO ADJUST FROM NEGATIVE CAMBER TO POSITIVE (OR MORE POSITIVE) CAMBER THE UPPER ARM MUST MOVE OUTWARD. TO ACCOMPLISH THIS TIGHTEN EACH SCREW (CLOCKWISE) AGAINST THE SHEET METAL.

TO MOVE NEGATIVE :–




TO ADJUST FROM POSITIVE CAMBER TO NEGATIVE (OR MORE NEGATIVE) CAMBER THE UPPER ARM MUST MOVE INWARD. TO ACCOMPLISH THIS LOOSEN EACH SCREW (COUNTERCLOCKWISE) AWAY FROM THE SHEET METAL.

THE RULE OF THUMB APPLIES – HOWEVER – CHECK CAMBER READINGS AT INTERVALS DURING THIS PROCESS TO DETERMINE EXTENT OF THE CORRECTION.

(OVER)

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WHEN CAMBER HAS BEEN CORRECTED – RECHECK CASTER. IF CASTER IS NOT WITHIN SPECIFICATIONS DETERMINE AMOUNT OF CORRECTION REQUIRED AS OUTLINED UNDER CASTER ADJUSTMENT.

ONLY **SLIGHT** READJUSTMENT SHOULD BE NECESSARY IF THE PROCEDURE HAS BEEN FOLLOWED PROPERLY.

# ADJUSTMENT HAS NOW BEEN COMPLETED!

TIGHTEN AND TORQUE CROSS SHAFT RETAINING BOLTS TO SPECIFICATIONS.

# REMOVE TOOLS

(Re-attach brake line and clip)

EXPERIENCE WITH THIS PROCEDURE WILL IMPROVE ONES ABILITY TO ACCURATELY ALIGN ANY FAIRLANE FRONT SUSPENSION.

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(Illustrations on these pages Courtesy of Ford Motor Company)