

Section 1: General Odometer Surgery & Repair
1981-1985 240 CABLE-DRIVEN (mechanical) Speedometers
(NOT for 1986 and later electronic units)

For these instructions below, I will not go into detail on removing the 240 instrument cluster from the dash. For detailed instructions on that, please refer to my 240 custom gauge face installation instructions at <http://www.davebarton.com/pdf/240faceinstall81-93.pdf>.

Here's the back of your typical '81-'85 240 instrument cluster.



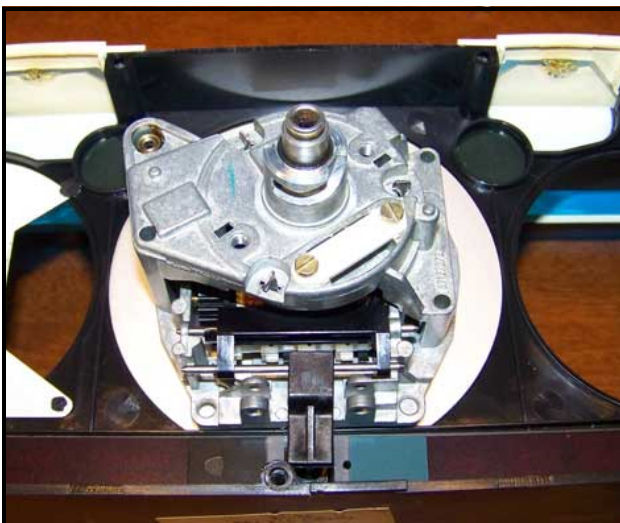
<<< Locate and remove the 7 Phillips head screws around the outer edge (noted by the white arrows).

<<< Also remove the two slotted screws on the back of speedometer (noted by two red arrows).



<<< Some speedometers have these additional electronic connections.

If yours does, then remove the smaller slotted screws shown.



Lift out the circuit board.

<<< Here's what you now have before you. The speedometer remains in the box.

Carefully remove it and have a look if you've never seen one up close before. Take a couple pics and impress your friends.



<<< If your cluster has a tach, you'll see this little item.

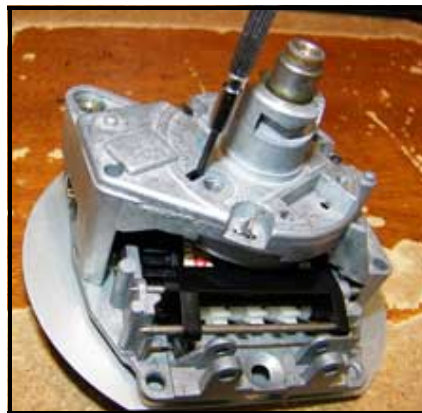
Don't lose it. It often falls out if you turn the box over. How about you just don't tip it over?

Speedometer Needle Removal (Locking the Speed Cup):

On the 1981-85 240, the speedo needle needs to be removed. This is a delicate operation.



<<< Here is the back side of your speedo. Look for two rectangular slotted holes (indicated by the screwdriver).



<<< Insert a small slotted screwdriver (like the one shown) into one of the holes.

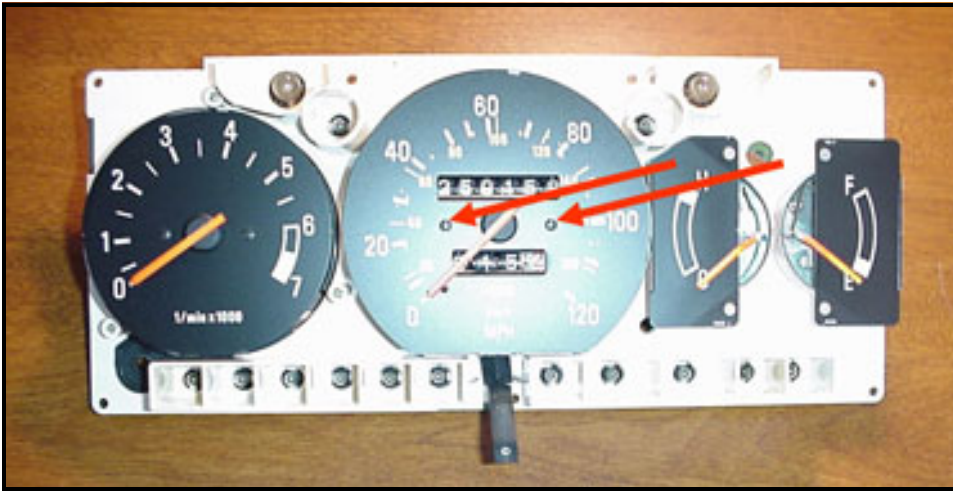
This will lock the speed cup and mechanism inside the speedometer so the needle shaft cannot move.



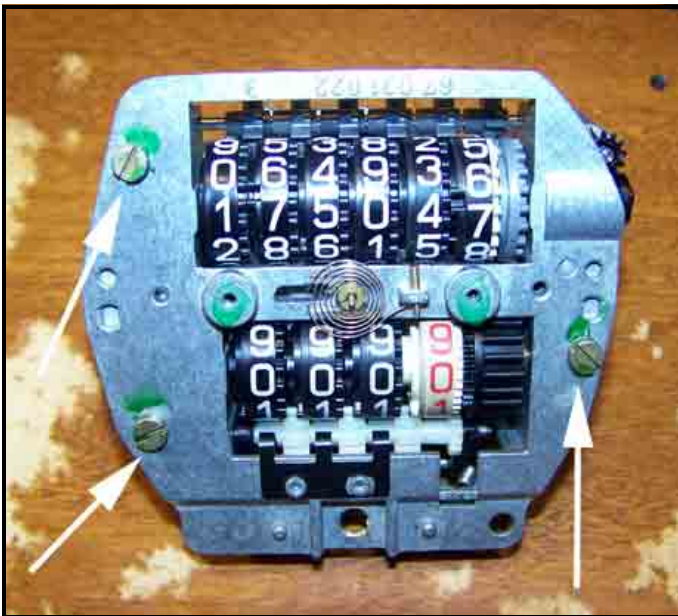
<<< After gently lifting the needle over the ZERO stop pin, take note of its resting position. When re-installing, this is the position you want it to be in.

To remove the needle, grip the center plastic hub of the speedo needle and turn it counter-clockwise (toward the "MPH"). Be careful not to put pressure on the orange needle pointer. It's thin plastic and will snap off in a generally unpleasant way if you do.

Since the internal mechanism inside the speedometer was already locked by you, you will be turning and forcing it counter-clockwise until you feel it come loose and get easier to turn. Now you may turn it back and forth, while at the same time gently pulling it toward you. It'll come off in your hand without any fuss.



<<< Once the needle is off, remove the metal speedometer faceplate using a small flat screwdriver. To do this, remove the 2 tiny screws. Be careful if they're tight. The factory likes to put threadlocker on them. These screws are soft metal and are easy to gouge. Find a screwdriver that fits these small slotted screws well.



<<< Here's the naked speedometer after removing the faceplate.

See those 3 slotted screws? Remove them. They hold the two halves of the speedo together.

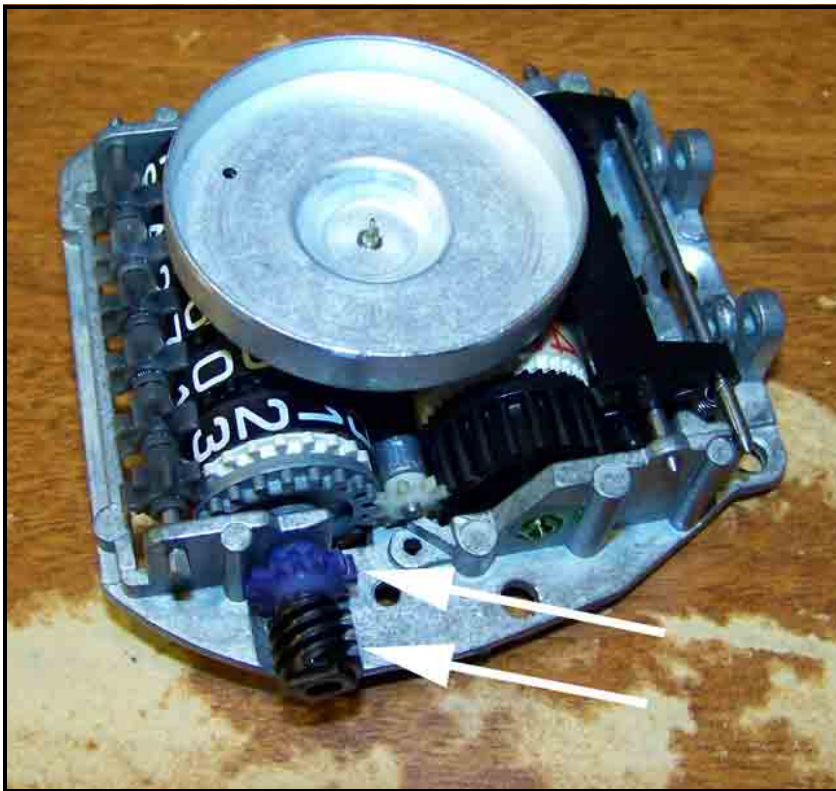
Once the screws are removed, be gentle when pulling in apart. The parts inside are delicate, but it won't explode in a shower of parts... trust me.

You'll see one piece (below photo) that can fall out at this point. Not to worry, just put it back like shown in the photo.



Here's the back half of the speedo.

<<< The thing with the arrow is what I was talking about. Just be sure to put it back before you reassemble.



Here's the front half of the speedo, viewed from the back.

See these two gears (one is blue and one is black)? To avoid confusion, I'll call these them "outside gears" since they're on the outside of the odometer assembly. This blue plastic gear is often the culprit for a failed odometer in a cable-driven speedo, but not always as I discovered.

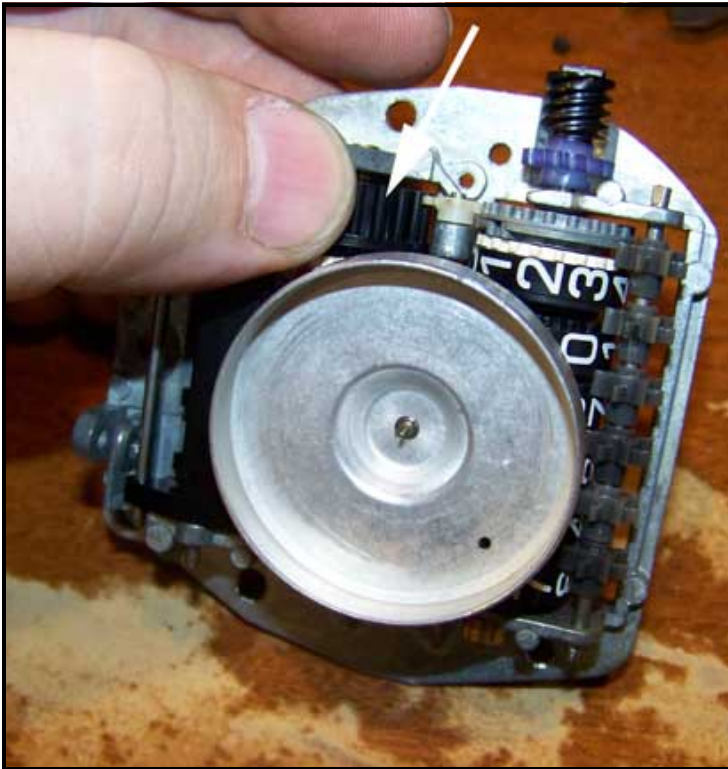
You'll notice in this photo the odometer reset button is missing from the bottom of the speedo. I removed it so it wouldn't get in my way. It pops off quite easily. They also tend to break after years of getting pushed and pushed.



Here's a closer look at the blue gear. Your gear may be a different color, possibly white, since some had a different tooth count. I haven't seen very many different ones.

This gear has a habit of cracking. Or it might also lose teeth after years of use. There is a long metal shaft going through these outside gears. In order for the odometer to function correctly, these gears need to grip the shaft... so slipping is NOT allowed.

I found nothing obviously wrong with either of these outside gears during my exploration on my speedometer. No cracks and no missing teeth. And they appeared to be gripping the shaft from what I could see. This was a mystery, since my odometer clearly was not working.



Instead, I found a way to test the odometer to see where my problem was.

As I mentioned, that blue gear could be cracked, missing teeth or just plain slipping on the shaft, although I could find no problem at this point.

I needed to see for certain if that gear was gripping or slipping on the shaft. To test this, pick up the assembly and grip the wide black inside gear (like I am in the photo) and hold it so it can't turn. Now see if you can turn the two outside gears on the end of the shaft. Don't force them.... be gentle. You should NOT be able to turn the two outside gears without the wide black inside gear turning also. If you can spin the outer gears without the inside gear turning, you know something is slipping somewhere. It's important to find out exactly what is slipping before

you pull anything apart.

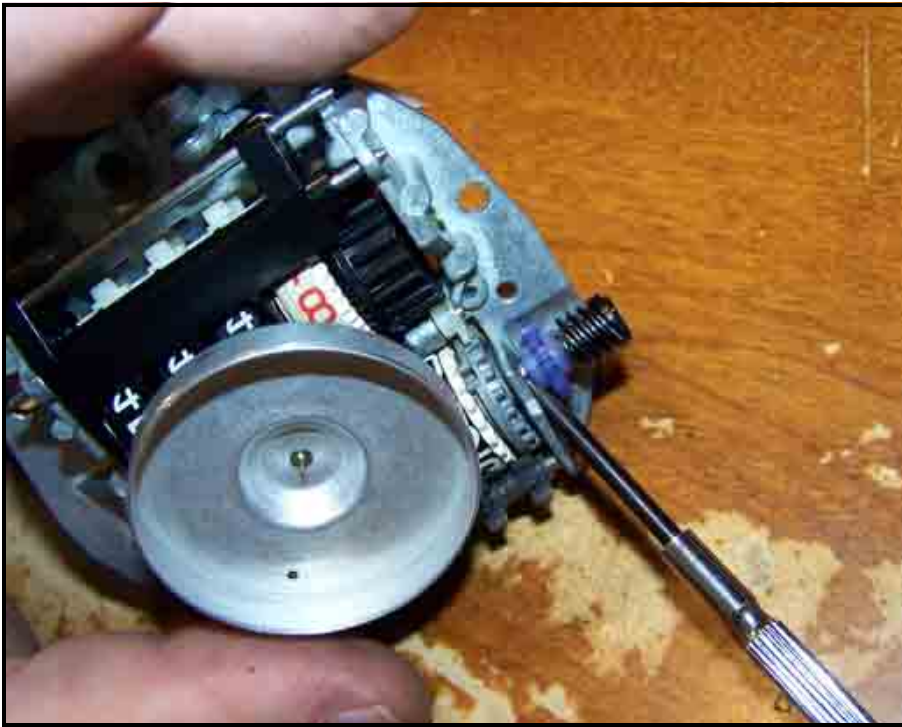
If you find one of the plastic outside gears is slipping, your best solution is probably to replace it. If these gears seem tight on the shaft as they should be, or if you're still not sure what's wrong, then keep reading....



See this brass collar? It's pressed onto the shaft (opposite end from the outside gears). This shaft goes through the odometer number wheels and through the two outside gears on the other side. When you try to spin the outside gears (while holding the wide black inside gear steady), have a look at this collar to see if the shaft/collar is spinning along with them.

If the shaft is NOT spinning, then one or both outside gears are loose.

If the shaft/collar IS spinning and it still appears the outside gears are gripping the shaft, then something else is slipping. I will cover this a little further below, so don't be a cheater and skip ahead.



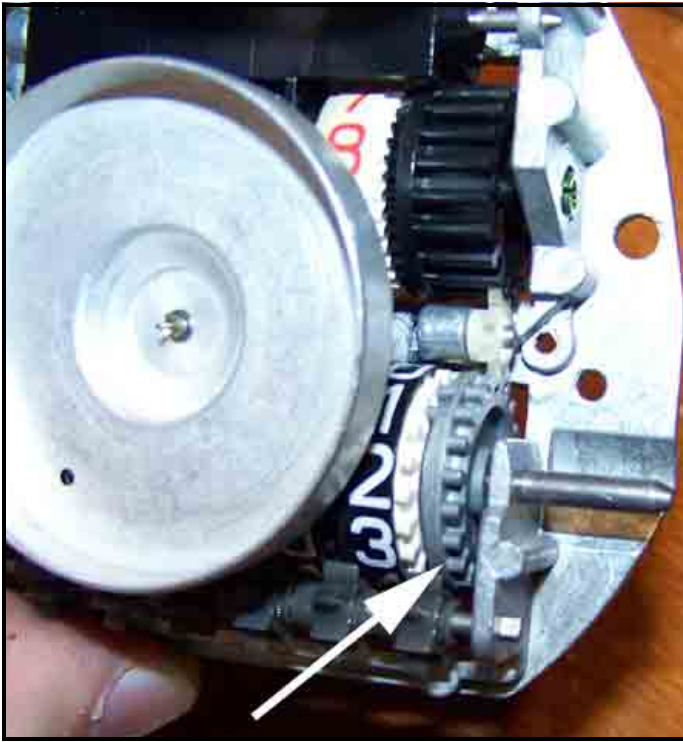
REMOVING THE OUTSIDE GEARS: If you find you need to remove the outside gears, gently pry them with a small flat screwdriver (see photo). I don't know yet if it matters, but for now pay close attention to which direction they face, so you can put them back on the same way.



For those of you who don't read directions very well, here's a close up of these gears. NOTE: The tops of these gears were facing away from the speedo body. Maybe that will help those of you who weren't paying attention to the positions of your outside gears (assuming it really matters).

I found this blue gear to be a 14 tooth unit and may be typical of many 1980s era 240s, like mine.

If you found that one or both of your outside gears were spinning on the shaft, and the gear is not otherwise broken, you could try roughing up the shaft with some sandpaper, although I have not tried this and cannot say if it will help. It's also possible to use a small punch or screwdriver to tap small dents around the gear center hole. This might help close up the hole slightly. Be careful, since beating on your gear may destroy it. With it being so old, it might also be brittle. You will have to decide on the risk. Remember? You're a decisive 240 owner! However, if a new gear is available, I would stop screwing around and just buy a new one.



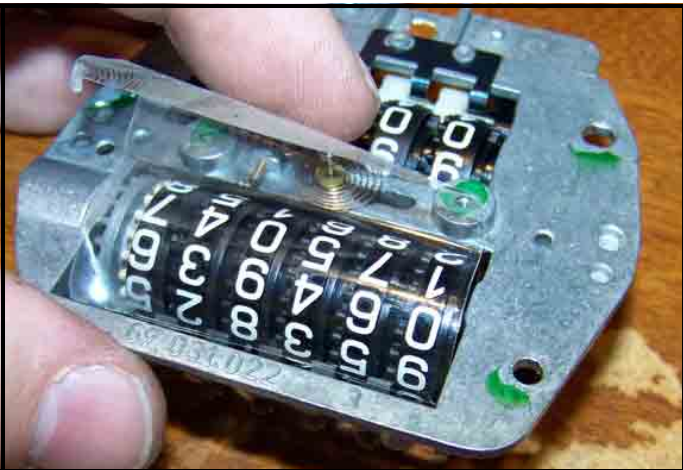
HERE'S WHAT I FOUND THAT WAS DIFFERENT WITH MY ODOMETER FAILURE:

When I tested my outside gears to see if they were gripping or spinning on the shaft, I found they were gripping quite well, but they were spinning the shaft when I turned them while I held the wide black inside gear steady. That was not normal. As it turned out, my outside gears were just fine. What I discovered was that the GRAY METAL GEAR you see in this photo was slipping on the shaft. It's an inside gear. It's supposed to GRIP the shaft. Slipping is bad.

Removing this metal gear is tricky.

See the shaft going through the gear? Remember how it goes through all the odometer number wheels too? If you remove this shaft, the odometer will explode and a

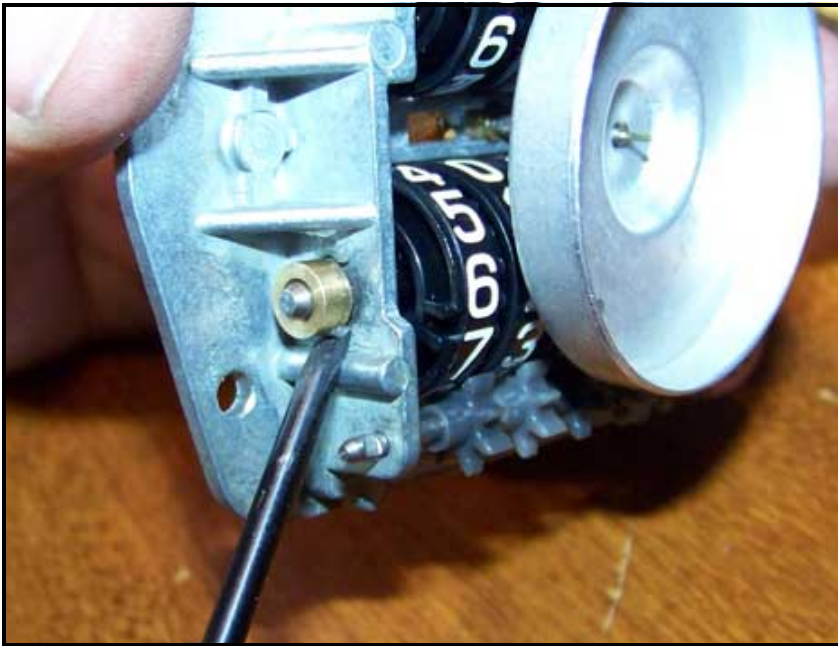
lot of little parts will fall out and bounce everywhere. Not good.



I found a way. The shaft needs to be pulled out just enough to release this metal gear. The last thing I wanted to see was all those little number wheels falling out, or even moving in the slightest amount. So I placed a piece of packing tape across the number wheels (see photo) to keep them snugly together. No moving. Much, much better.



<<< Then I used a felt marker and marked both the gray metal gear and the white plastic one next to it. I wanted the gray metal gear to go back in the exact same position, just in case it made a difference.



First, go back up a few steps and remove those two outside gears.

<<< To slide the shaft out, use a small screwdriver to pry under this brass collar. The collar and shaft are pressed together. The shaft should begin coming out along with the collar.

DO NOT pry the shaft out too far.

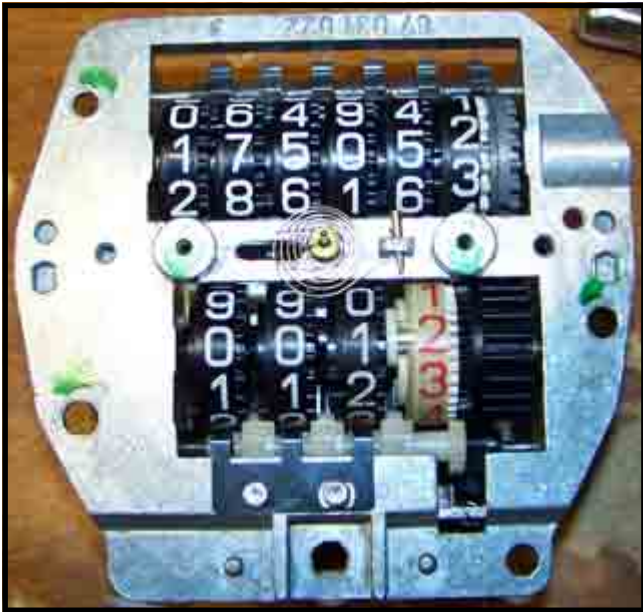
Pry the shaft out just enough so the gray metal gear is free. Then carefully lift the gear out. Try not to disturb the odometer number wheels.



<<< Here's the gray metal gear from my speedometer. This one is 1/8th inch thick (4.57 mm). This gear is made of metal, with the appearance of "lead." If you look very closely, the hole in the center has some very faint splines. These were worn down on my gear, since it was slipping on the shaft.

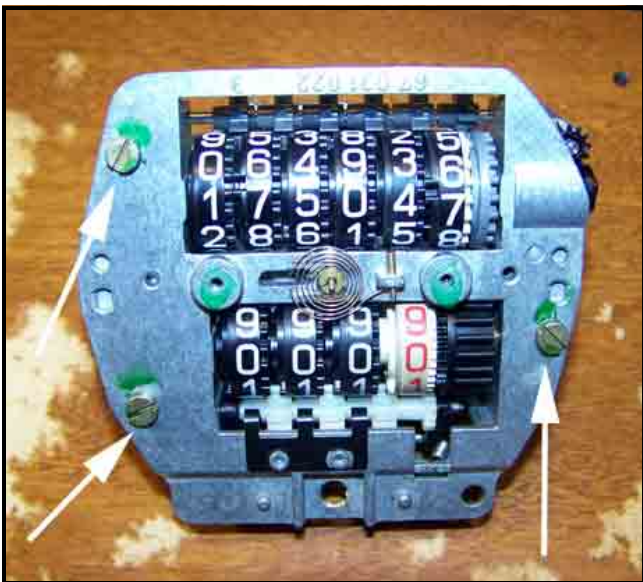
My solution to tighten up this gear on the shaft was to use a pointed tool (a punch or small screwdriver may work) and give the area around the hole a few taps to slightly deform/expand the metal and tighten the grip on the shaft. Three taps on mine worked. The gear went back on and was nice and tight, but after a while it began slipping again. Then I replaced it with a new gear.

Also take note that this gear may be found in three different thicknesses: 1/8 inch (4.57 mm), 3/16 inch (5.44 mm), and 1/4 inch (6.35 mm). The most common one in my experience so far seems to be the 1/8 inch gear.



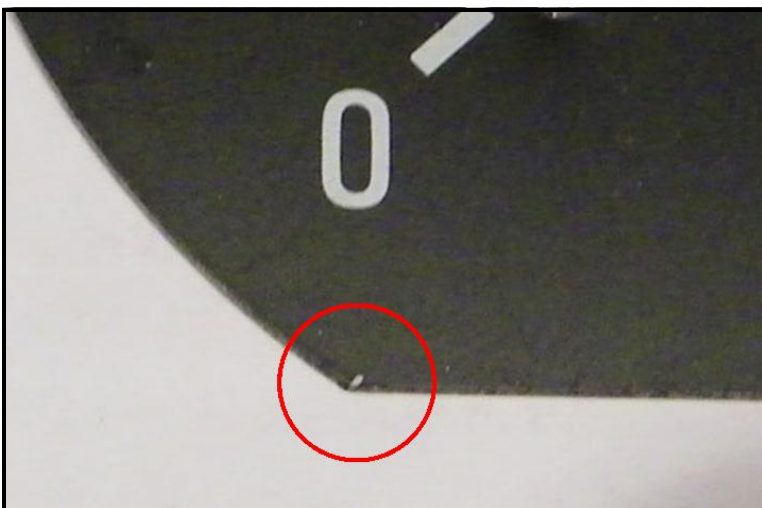
After you re-insert the gray metal gear, push the shaft back through and test the odometer function again before installing the outside gears. Pay attention to the alignment of the top odometer numbers. The first time I re-installed the gray metal gear, I found the far right number wheel was no longer aligned (see photo). This means I allowed that number wheel to slip or perhaps the gray metal gear was installed slightly off the mark.

I pulled it back out and got it right the second time. Now I have a perfect odometer again.



Here's something I discovered on one repair. After re-tightening these three screws and after placing the speedo needle back on, I found that the speed cup mechanism was somehow jamming inside, but it would only occur when these three screws were tight. If I loosened these screws, the needle and shaft would rotate nicely. So it appears it is possible to over-tighten things and make the mechanism bind. On this repair, my solution was three very thin washers placed between the two halves.

Now re-install the face and speedo needle. When re-installing the speedo needle, make sure you gently push down evenly on the center hub of the needle. Once it is on firm enough, if adjustment is needed, you may adjust it to its former position by using the small screwdriver trick to lock the speed cup as discussed earlier.



If you forgot to check its former position, you should know that most mechanical speedo faces will have a small mark on the edge, just below the needle. Point it at that mark. That's where the factory sets it.

Total time, after pulling the instrument cluster out of the car, was less than an hour.

Why don't you fix yours now?