



www.OdometerGears.com

Porsche 911 20 x? Odometer Gear Replacement

This is a combination of several different sources to ensure the most accurate information.
<http://forums.pelicanparts.com/porsche-911-technical-forum/196987-odometer-gear-replacement-electronic-speedometers-long.html>

<http://dwaynesgarage.norcal928.org/1984%20Odometer%20Repair%20Procedure.htm>

Please read the first few steps carefully as these are our most common questions we receive after a client has performed a repair and the odometer still does not work.

The reason the original gear or gears have failed is that they are made of urethane and lubricated with petroleum grease. This combination breaks down the urethane into a waxy substance which flakes and breaks away. This will also leave a waxy film and deposits on the shafts, gears, housing and peg on the pods.

* Work smart, meaning have a clean area to work and the proper tools to perform the repair. General tools that will be needed depending on the vehicle are small standard screwdriver, small Phillips screwdriver, assortment of torx drivers, diagonal cutters (dikes), 1/4" socket set are just a few of the items that may be needed.

* No grease is needed with the new gears. Our gears are made using Celcon® which has graphite mixed into the material and does not require any additional lubricant.

* Make sure that you have blown the speedometer and odometer assembly clean with high pressure compressed air. **Even if you think that you have found all of the broken pieces you still need to perform this step.**

* Wipe the area around the gears, any shaft or shafts that the gears may ride on, the motor shaft and the peg on the pod that the small gear spins on clean, using a clean cloth and rubbing alcohol. Any residue left over from the old gears can allow the new gears to stick and not allow the odometer to work.

You'll need to remove the needle in order to remove the face plate. The Speedo needle is press fitted on a small spindle with fine gear teeth on the end. **DO NOT PRY UP ON THE NEEDLE TO REMOVE!** This is the trickiest part of the job. The needle is pressed onto a shaft that is extremely thin. It feels like a pretty tough metal, but you need to be careful here. Do not pull straight up. **Do not put any torque on the shaft.** Grip the speedometer needle at the center and rotate counter-clockwise, you may have to gently lift the needle above the needle stop, until it hits an internal stop. Gently continue to rotate the needle while also gently applying a small amount of upwards tension at the same time. The friction is all that is holding the needle to the shaft. Keep turning and applying a small amount of upwards tension until the needle comes off. **Do not force it.)**

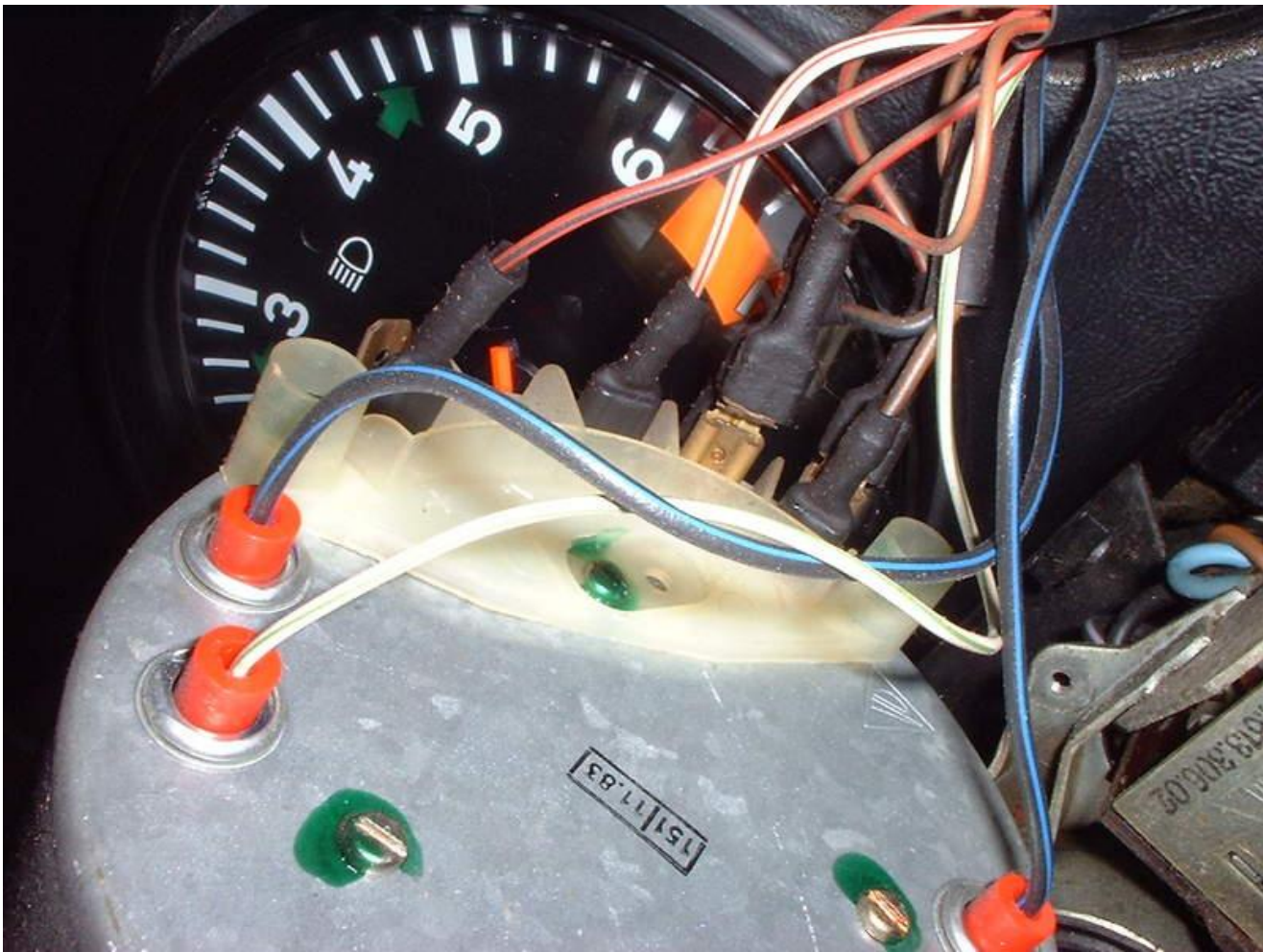
Odometer Gear replacement for Electronic Speedometers (long)

I recently went through this exercise; it's a classic for SC/Carrera. Mine was not related to resetting the odometer while moving, but just an old, tired, disintegrating gear that fell apart when I reset the odometer at the gas station.

Here goes:

This is for those of you with a lot of patience and self-control, because it's tedious and delicate. I approached this one with the attitude that it might take me several sessions over the course of a week, but that I was saving over \$100 by doing it myself – provided I don't break something along the way.

1. The first step for me was removing my steering wheel, which was already done because I was replacing the turn signal switch because of the hi/low headlight switch malfunction. I don't think it's necessary, but may have made it easier to get access to everything.
2. Next, you remove the speedometer case from the dash. This is done by pulling or gently prying under the bezel. There is a rubber gasket surrounding the speedometer case that holds it in the dash – that's it, no screws or other fasteners.
3. Once you have it free, you'll need to remove the illumination bulbs and bases (as a unit), and disconnect the remaining **wiring**. I took some pics to aid in reassembly. To remove the lighting, get a small screwdriver and gently pry up the base; the bulb will stay in the base and it all stays attached to the wire, which remains in the car.

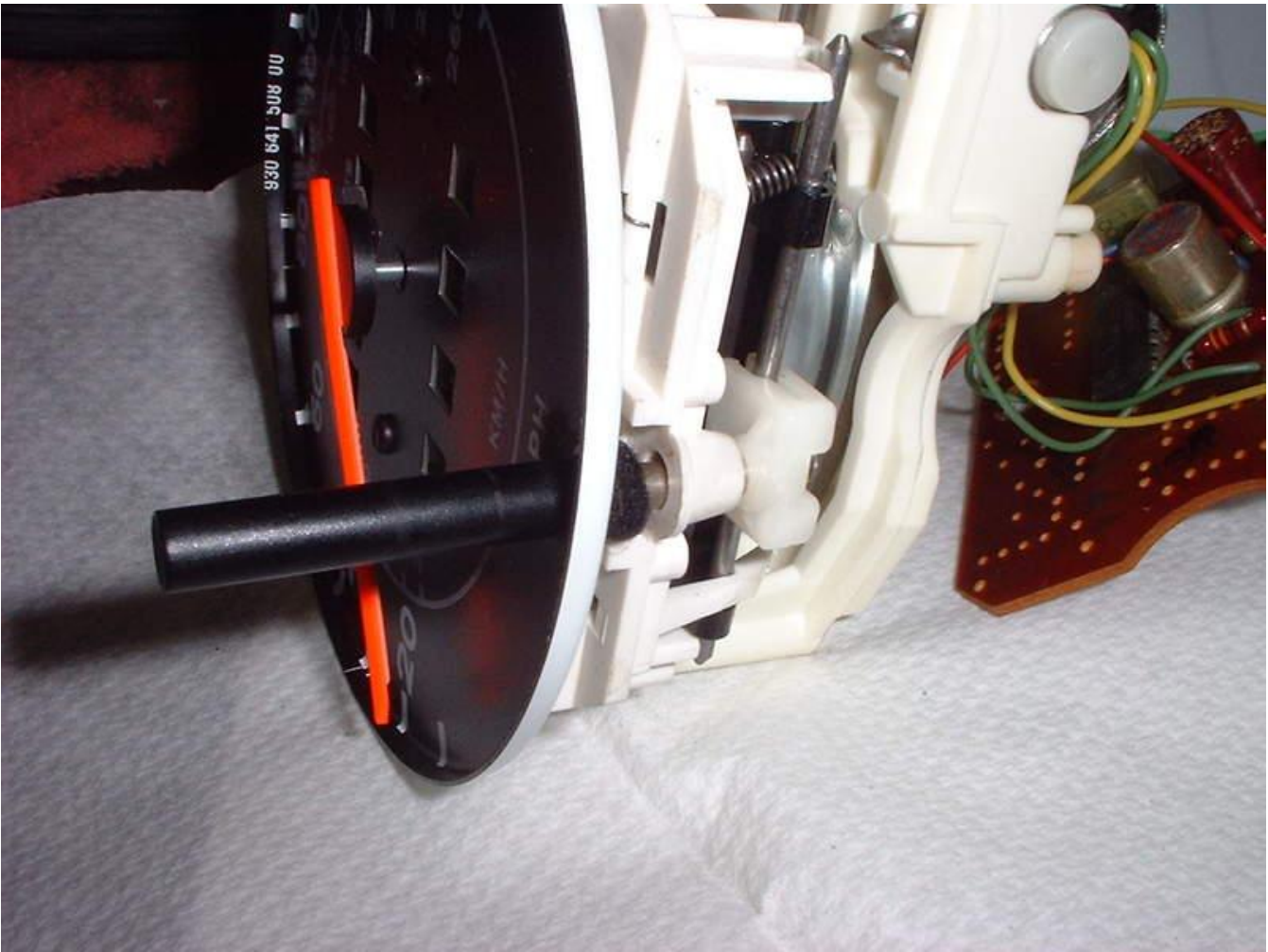


4. Now, for the first fun part: If you're feeling at all tense or agitated, put the **Speedo** on your bench and get a beer or call it a night and return the next day. Removing the bezel and lens is done by many, many small prying motions along the lip of the press-fitting that holds the black bezel that you see from the driver's seat onto the silver aluminum housing that is normally out of sight.

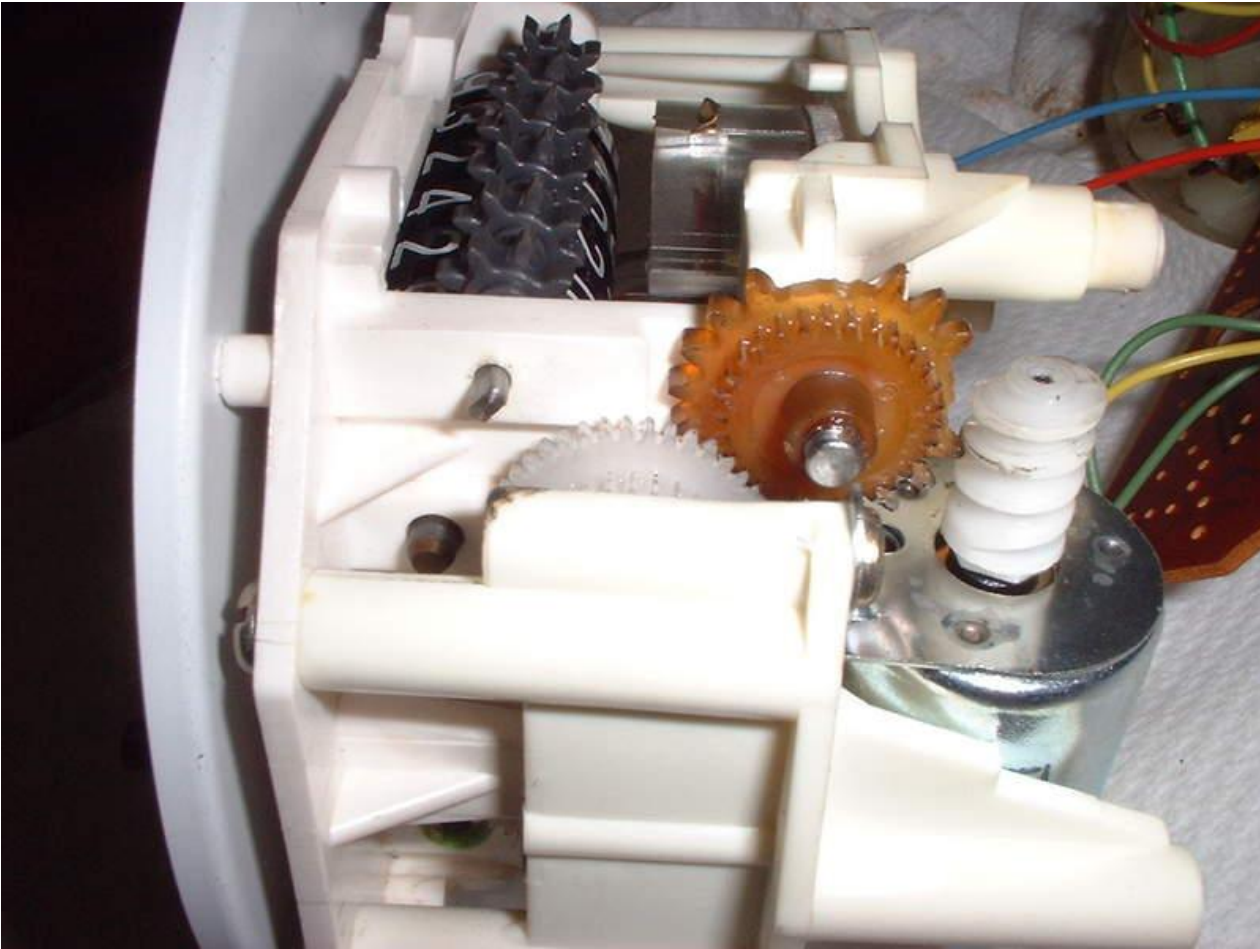
I suggest looking closely at this fitting and look for the largest gap between black and silver – that's where you want to begin "peeling back" the black lip with a small screwdriver. Think "baby steps" here. Otherwise, you'll mangle it and it will "look like you dog has chewed on it" as Wayne wrote in his article. Just work your way around the perimeter, at least 180 degrees, then work your way back. Continue until it starts getting really loose – you'll know when. Then, remove the bezel carefully by pulling it away from the case, using a tilting motion to pull on the loosened side.

The lens and another black piece will come off with the bezel. You should now be at the point where the needle and speedometer face are unprotected – so be careful.

5. Next, you'll need to remove the "guts" of the assembly from the silver housing. On mine, there were 3 screws holding the guts in and 3 more on the plastic **wiring** bus. You'll want to remove all 6 of these and then slide the **wiring** bus into the housing. I suggest inverting the **Speedo** on a clean rag and slowly loosening these screws partially. As you do so, the guts will be lowering toward the rag. When you get close, use your hand (with a glove or other clean rag) to catch the guts as the last screw lets go. There will be one blue wire that is soldered to the case. I chose to leave it in place and work with the case attached, but you may want to remove and re-solder to avoid having the case in the way.



You should now see the deteriorated gear as I did.



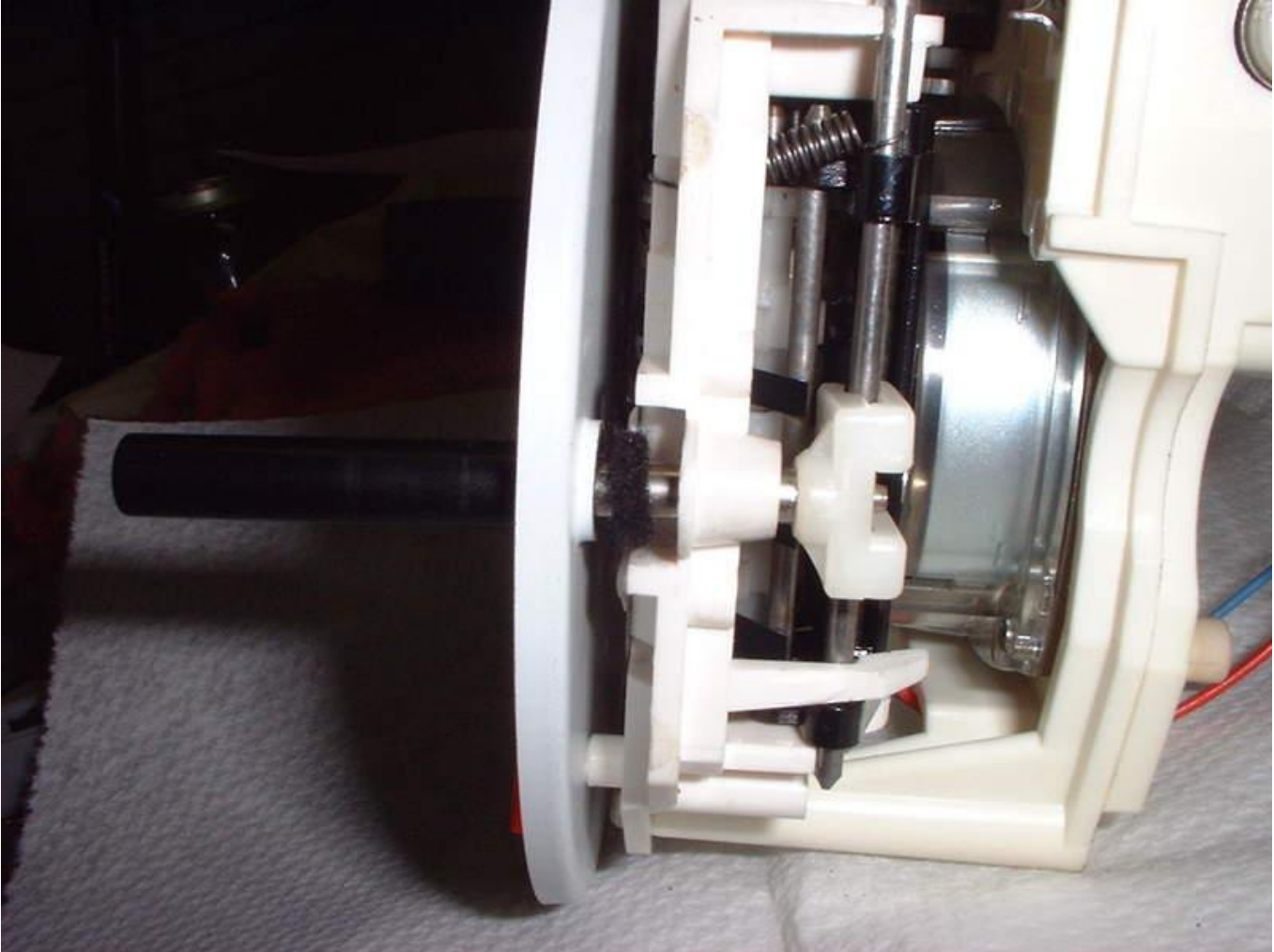
If not, you may not have the same issues as I and so many others before me. I ordered my replacement gear from www.odometergears.com – it was just under \$30 with shipping for an acetal plastic gear smaller than a quarter and weighing a few grams. But, it beats the \$150 to pay a **Speedo** shop.

Here are the old and new gears side by side:

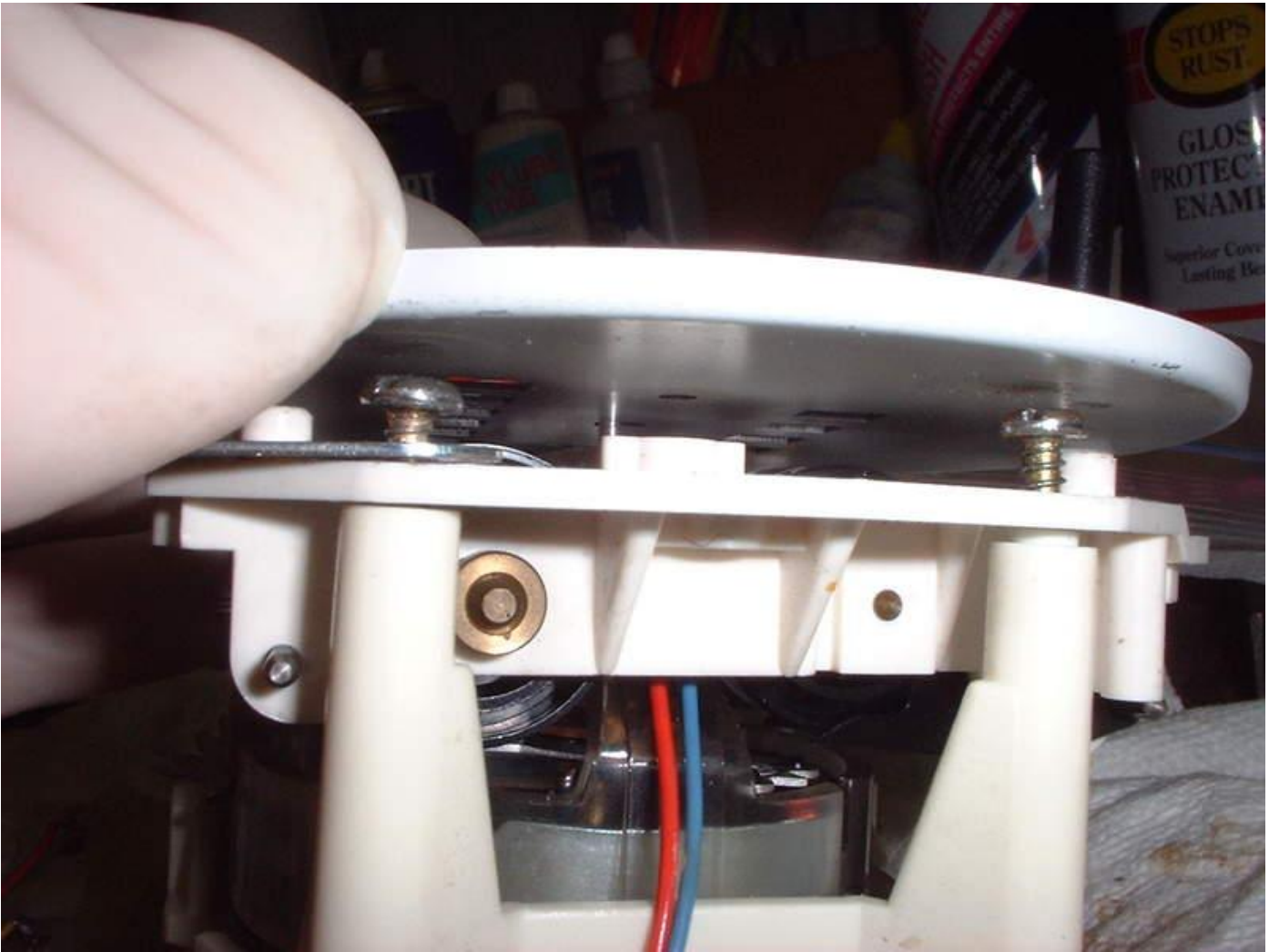


6. it may look like you're just about done, but you need to remove a few items to get that gear out. This is where the biggest dilemma came into play: Remove the needle and lose calibration or try to get the internals out without doing so. I tried to pull the needle, but could not get it to budge, and I thought I'd break it if I tried too much longer.

I had found some posts in the archives where guys said that they removed the reset mechanism and then the two small black screws on the gauge face between the trip odo and regular odo numbers. I could not find a way to do that. Here's a pic of the reset mechanism:



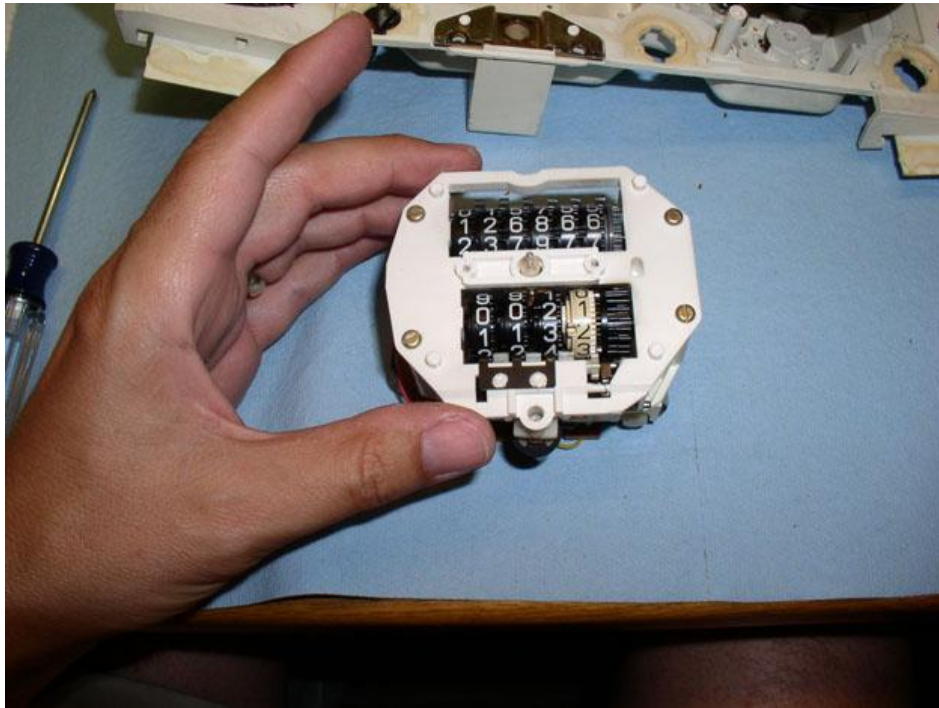
Then another posted how he'd used a very small screwdriver on its side to loosen the 4 screws that hold the mechanism to the "frame". This was very slow going, and it did bend the needle as the face was lifted to get to the screws. I kept the needle 180 degrees from the screw I was working on to minimize the bending. **(See below for needle removal instructions. You will have to remove the trip meter reset knob to accomplish this. In the photo above you can see that the reset button attaches to a metal shaft. With one finger gently pull the metal shaft towards the rear of the speedometer. With your other hand unclip the white retainer from the shaft by pivoting the clip sideways. Once you are unclipped remove the reset shaft)**



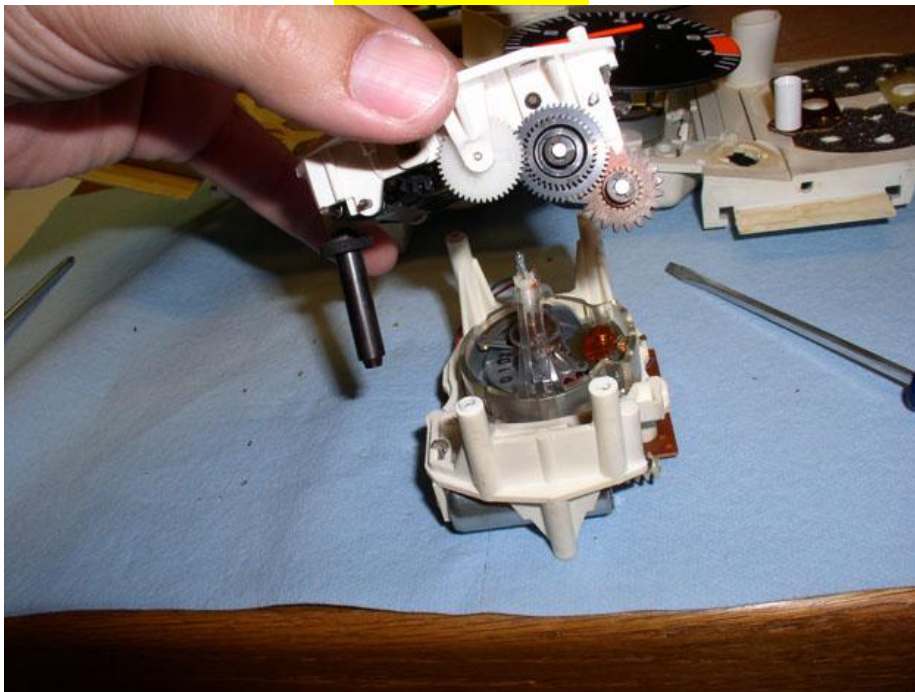
With a lot of small turns, I finally had removed the screws and the mechanism was free – well enough to proceed. *(The alternative is to remove the face completely. You'll need to remove the needle in order to remove the face plate. The Speedo needle is press fitted on a small spindle with fine gear teeth on the end.)*

DO NOT PRY UP ON THE NEEDLE TO REMOVE! This is the trickiest part of the job. The needle is pressed onto a shaft that is extremely thin. It feels like a pretty tough metal, but you need to be careful here. Do not pull straight up. ***Do not put any torque on the shaft.*** Grip the speedometer needle at the center and rotate counter-clockwise, you may have to gently lift the needle above the needle stop, until it hits an internal stop. Gently continue to rotate the needle while also gently applying a small amount of upwards tension at the same time. The friction is all that is holding the needle to the shaft. Keep turning and applying a small amount of upwards tension until the needle comes off. ***Do not force it.)***

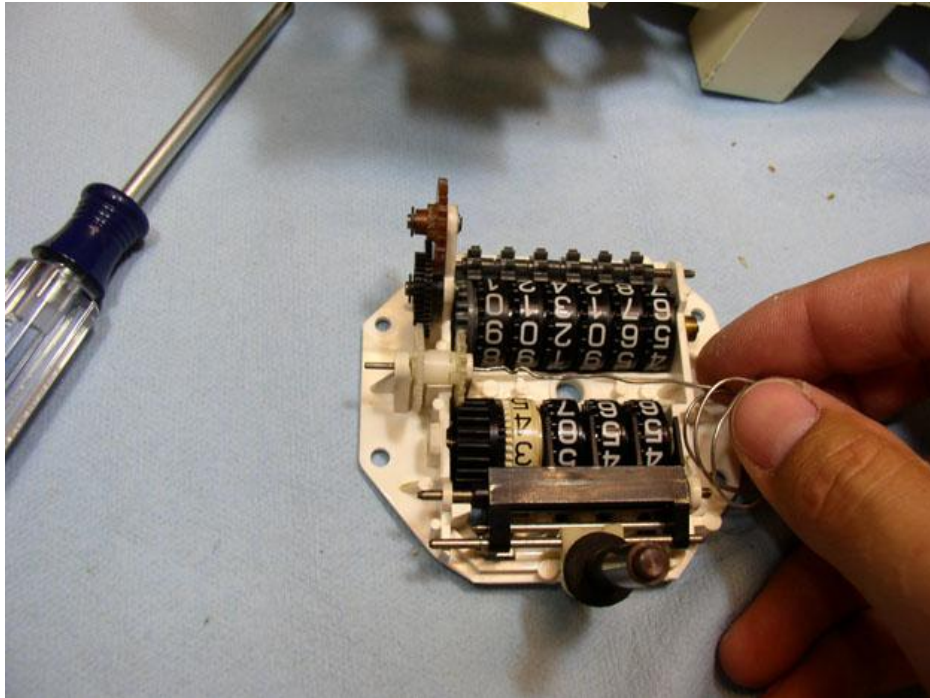
If you remove the face you will see this. Remove the 4 screws in order to separate the mechanical half with tumblers from the electronics half.



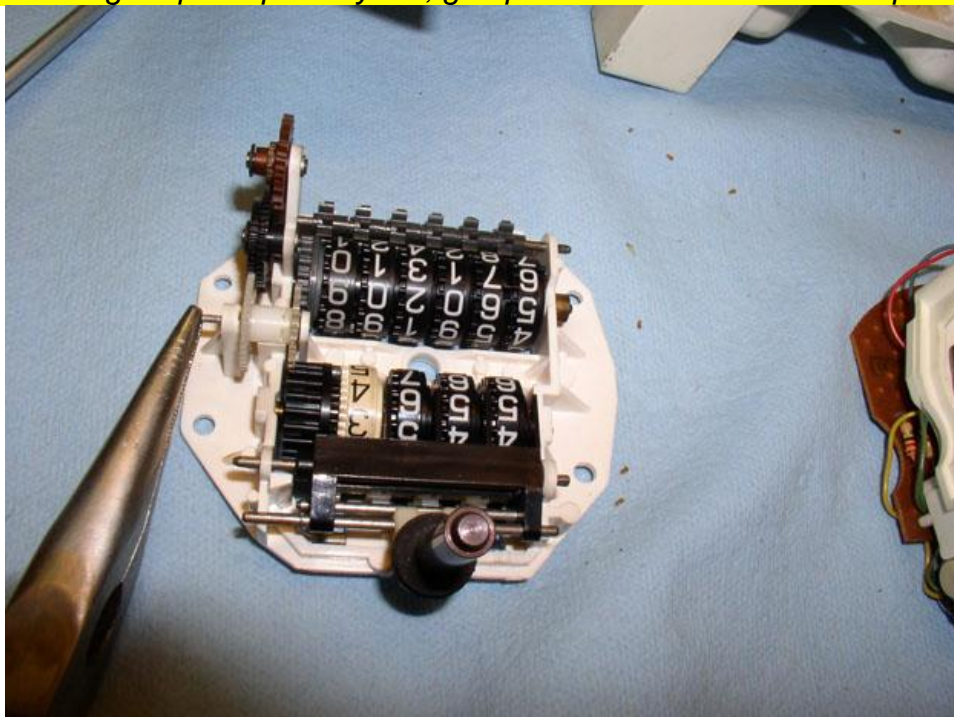
After the screws are removed, carefully separate the two halves by lifting up on the odo tumbler section as shown.



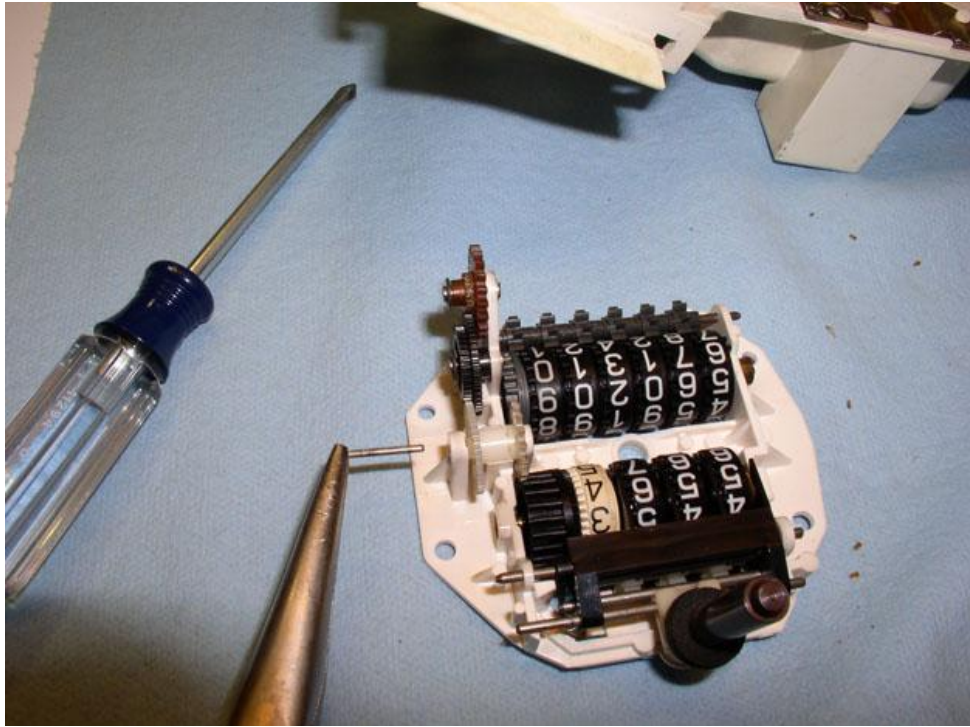
Next you need to remove two gears in order to get at the failed gear. To remove the drum gear, I used a small thin wire to "push out" the gear pin holding the gear in place.



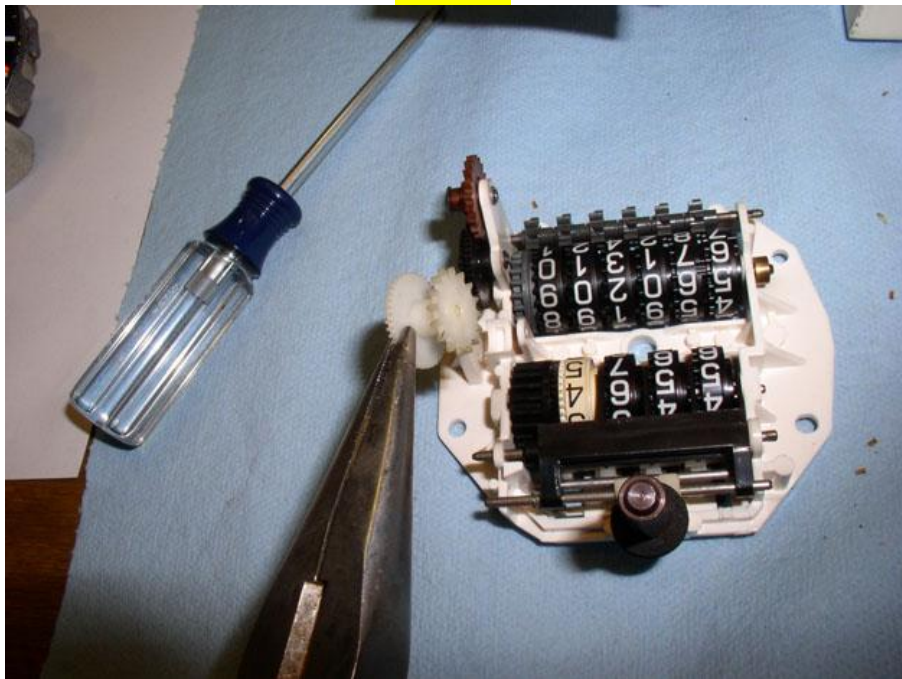
Once the gear pin is partially out, grasp it with some needle nose pliers...



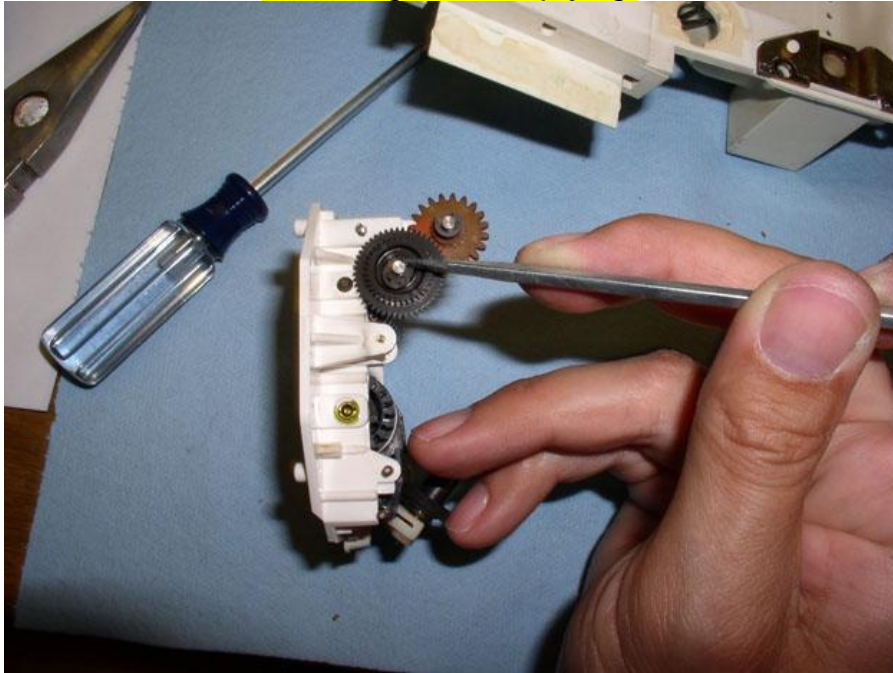
...and remove it. Set it aside on a clean paper towel or other organized parts collection area.



After the pin is removed, you can grasp the drum gear with the needle nose pliers as shown and remove.



Next, you will need to remove the black intermediate gear. This gear and the first gear are held in place by a very small circlip. I used a small flat blade screwdriver to pry off the clip. Be very careful when prying the clip off as it can fly off and get lost. To prevent loss of the clip, I cupped my hand over the gear while prying.



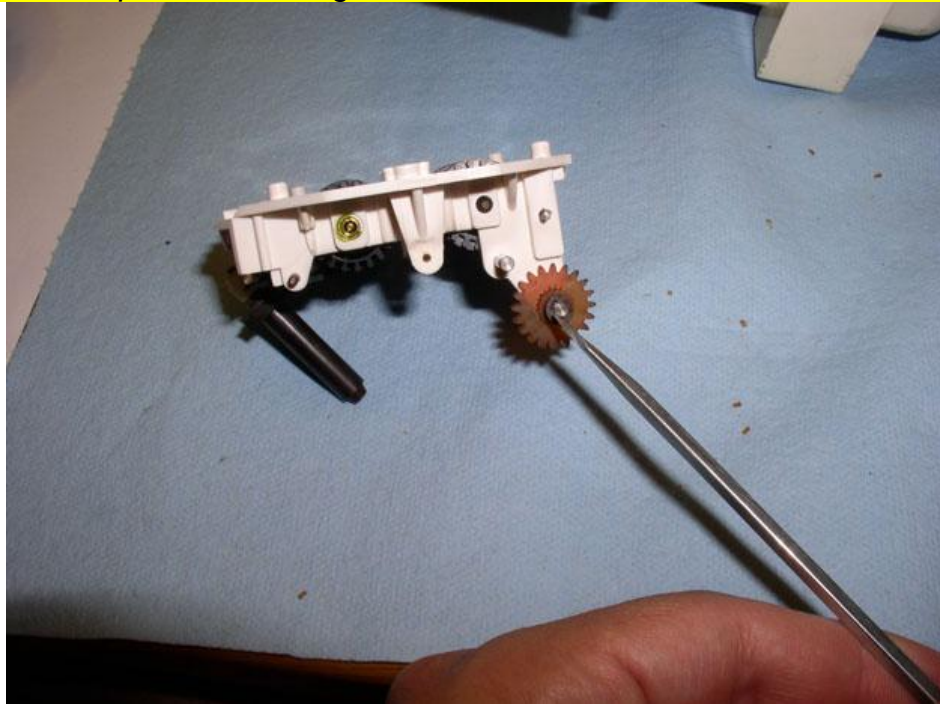
Here's a pic of the clip when removed. Be careful to not lose.



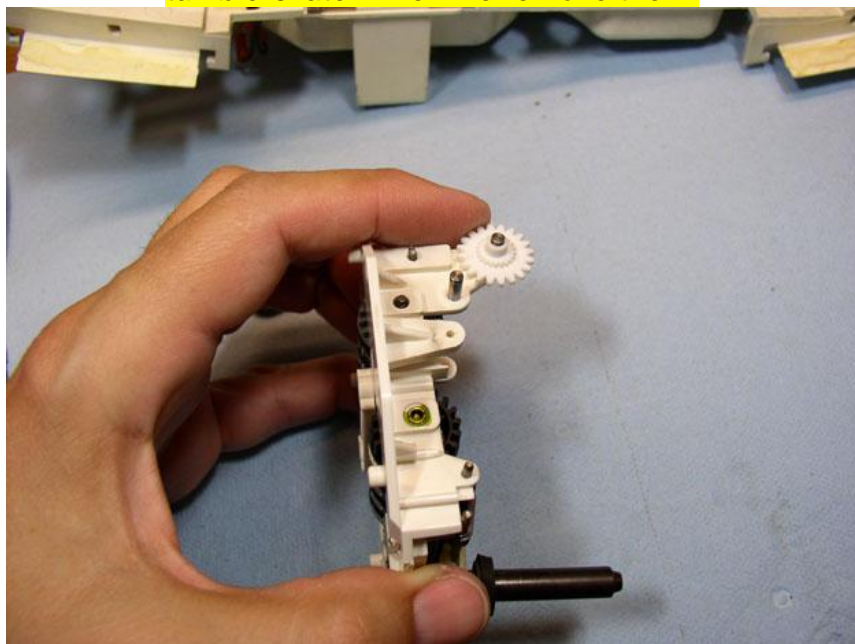
After the clip is removed, you can remove the black intermediate gear as shown.



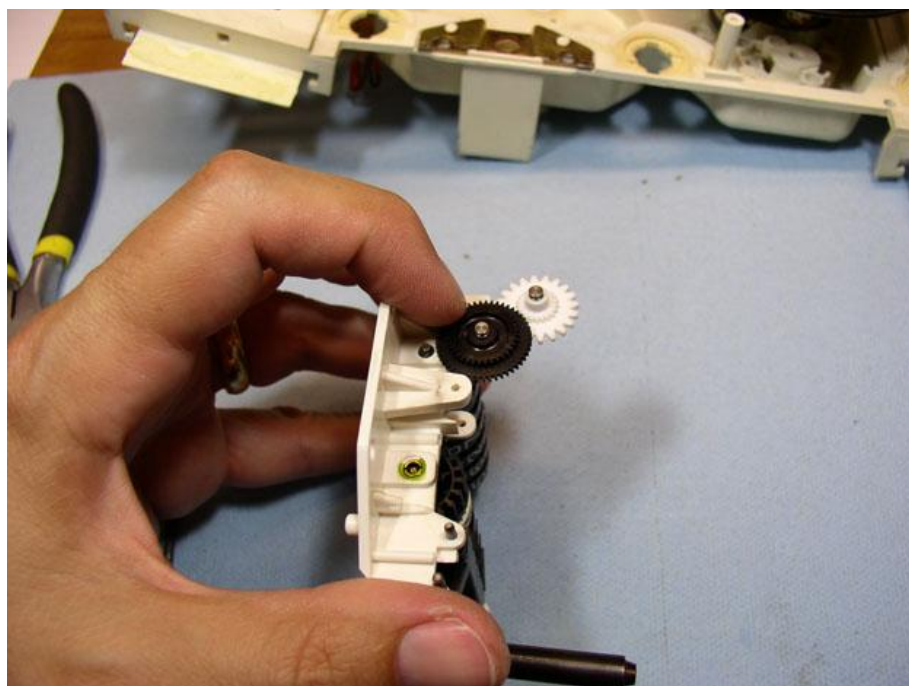
Next, remove the circlip from the first gear wheel in the same manner as the intermediate gear.



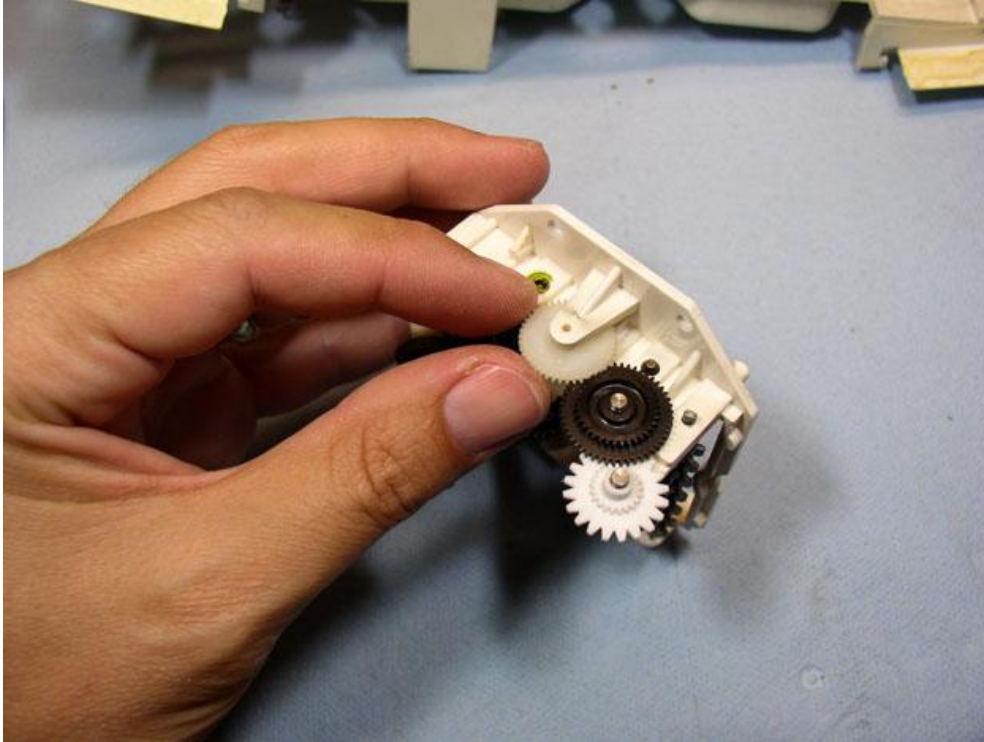
Once you are satisfied all surfaces are flat and smooth, place the gear on the odometer and spin with your finger checking for smooth operation. Now is an excellent time to also look for and clean any debris remaining from the old torn up gear. If there are small pieces of debris from the old gear falling apart left in the odometer tumblers or any of the gears, they can lock up the odometer. Inspect all gears, housing and tumblers for old gear debris while re-assembling the unit. We'll be inspecting the tumblers later when we remove them.



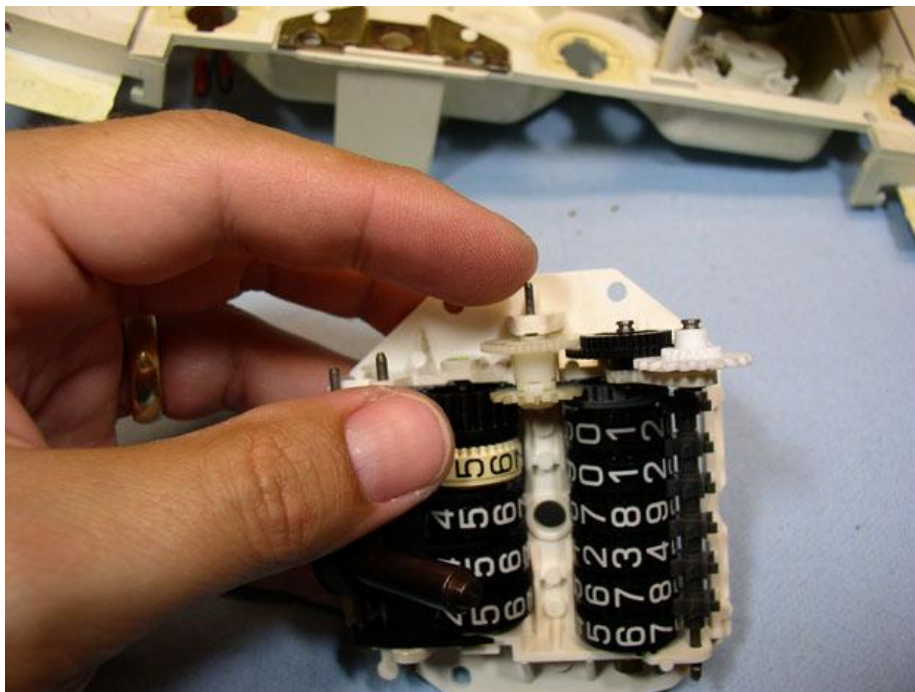
Next, set the black intermediate gear in place and again check for smooth operation. It took me two or three attempts at filing the "knots" off in order to get it perfectly smooth enough to pass this test.



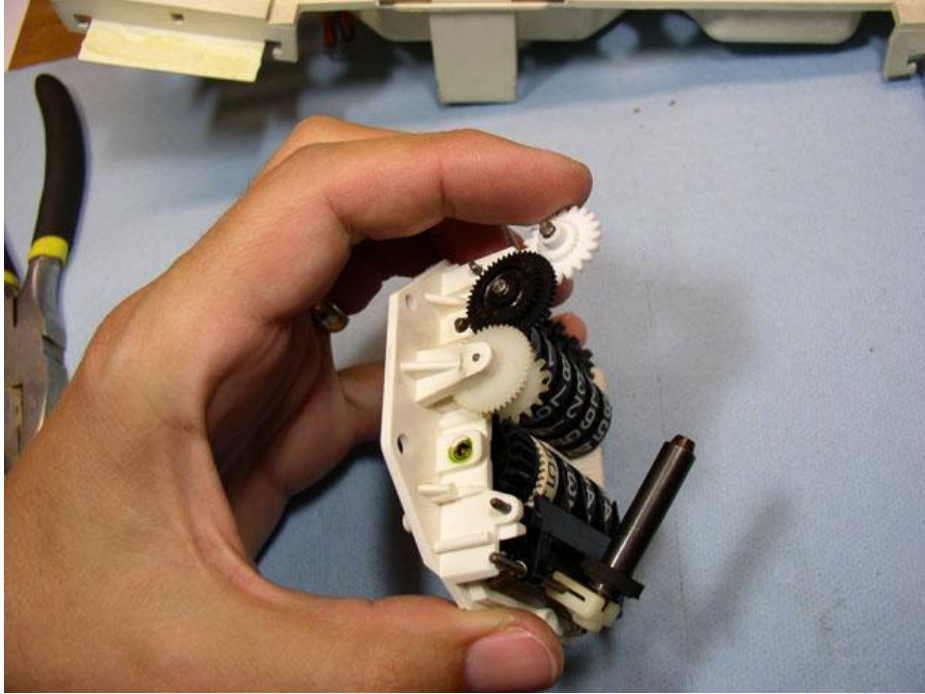
Then, you can insert the drum gear as shown.....



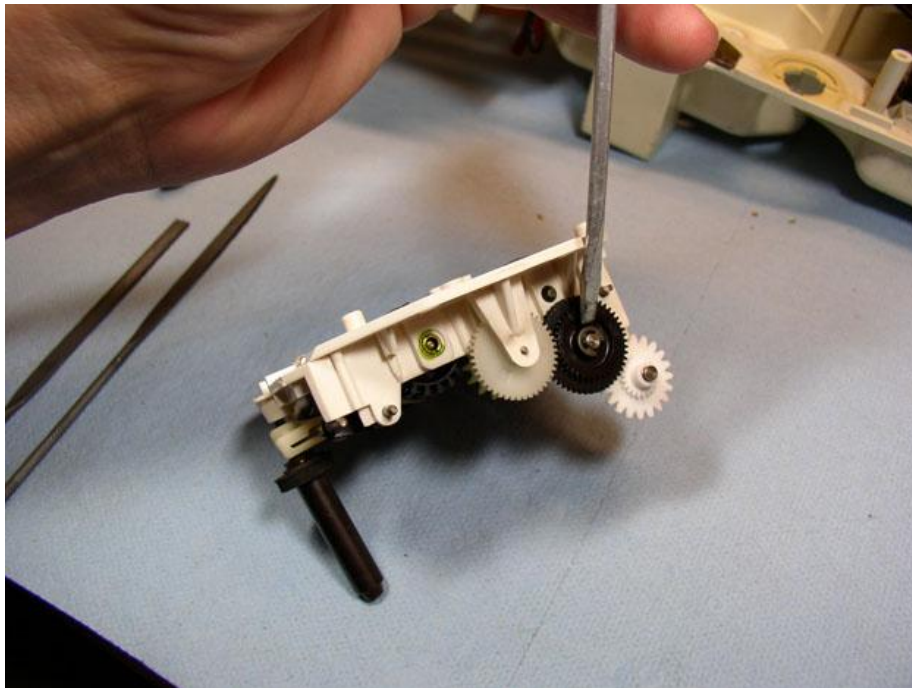
...and insert the drum gear pin as pictured below.



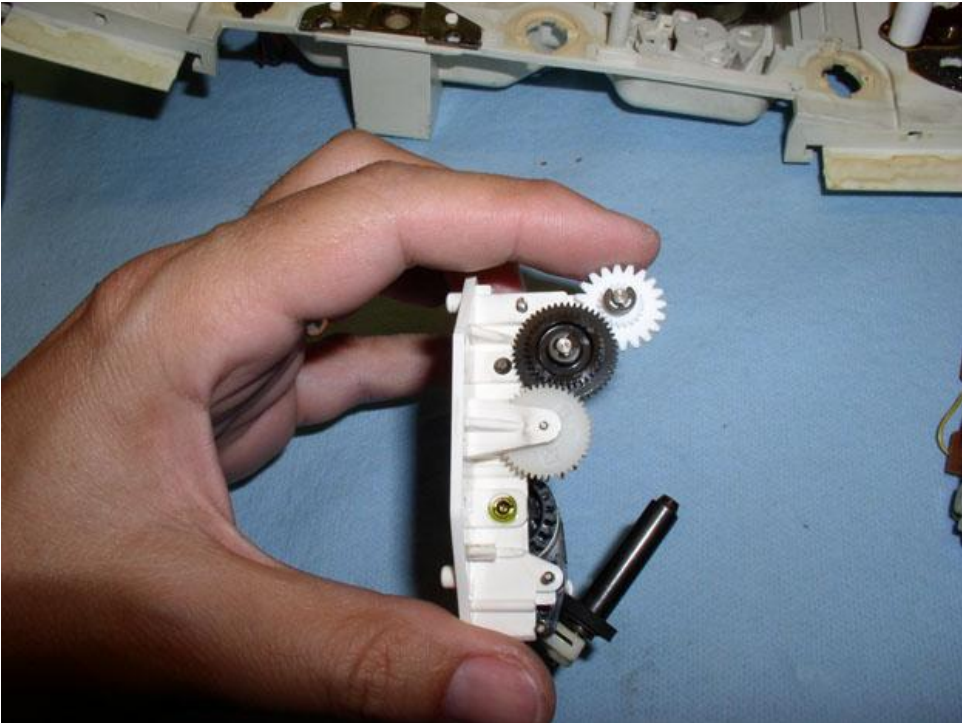
Now, check again for smooth operation. At this point, the odo tumblers should move as well.



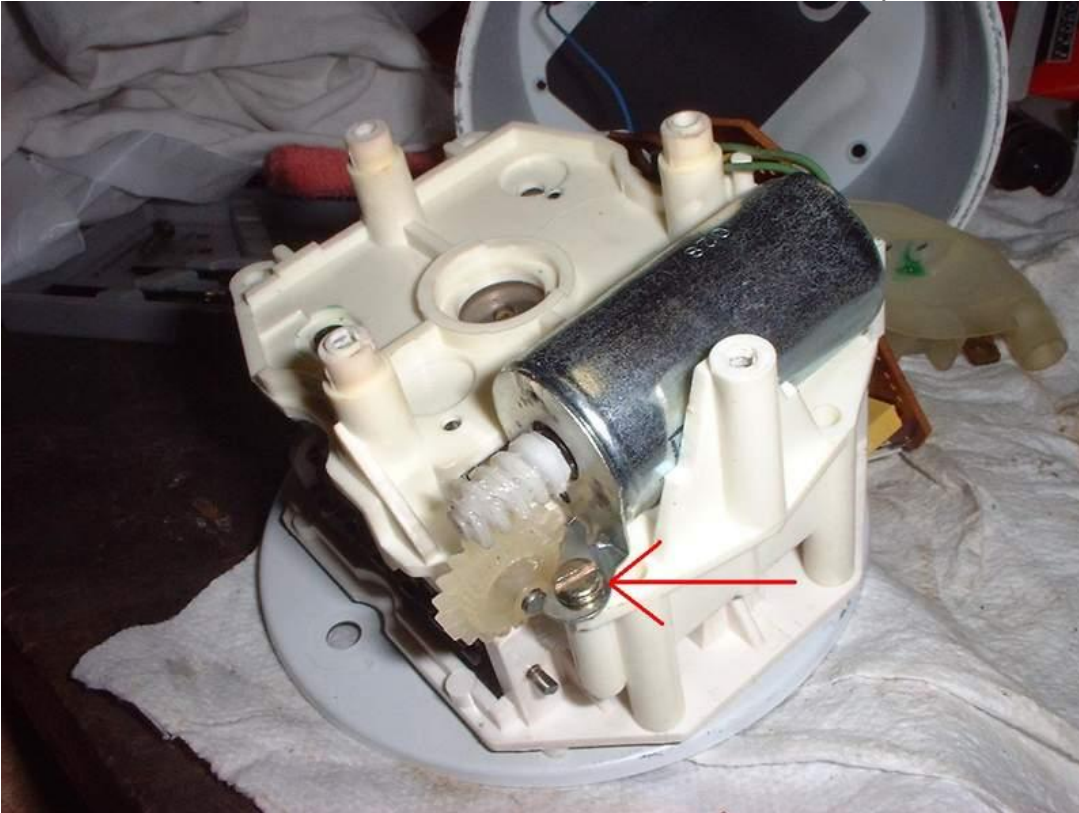
Re-install the small circlips on the intermediate gear and the first gear.



And check again for smooth operation. It was at this point I noticed that there was significant gap between my odo tumblers and if two tumblers were pushed apart, the gap was sufficient to "lock up" the odometer and prevent it from moving. The total gap between my tumblers appeared to be just less than 1mm. Therefore, I would guess that if the total gap is more than 0.5mm, it is probably enough to cause the odometer to lock up under the right conditions. We'll look at removing the "gap" in the next set of steps. If you have followed the highlighted jump to step 11 to complete the repair.

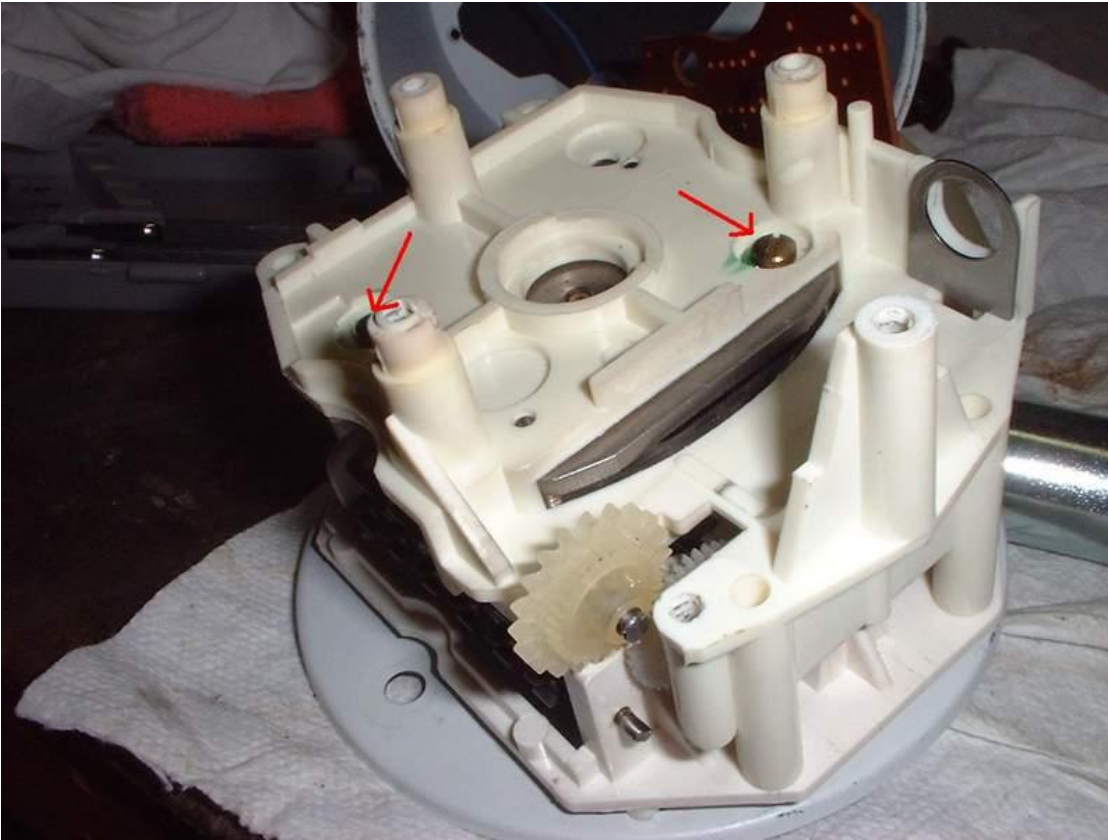


7. You'll also need to remove the drive motor's one screw and pull that out of your way.

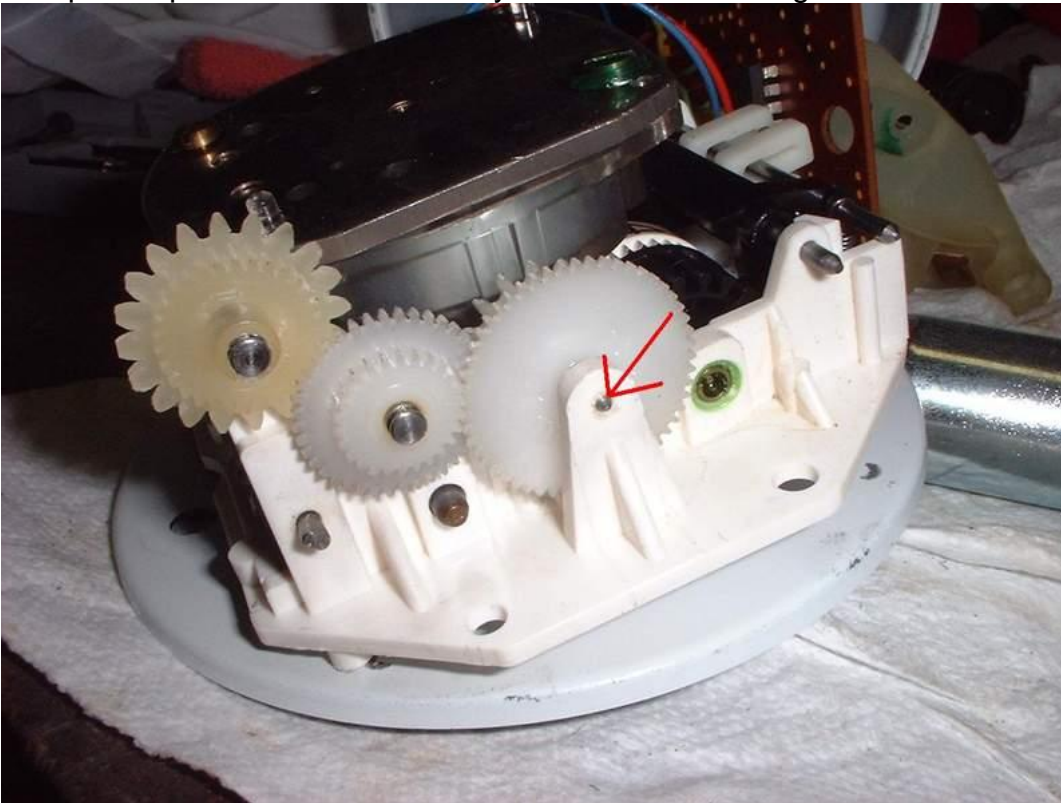


If you're watching closely, you'll see my new gear already in place - I forgot to take pics of disassembly and these were taken during reassembly!

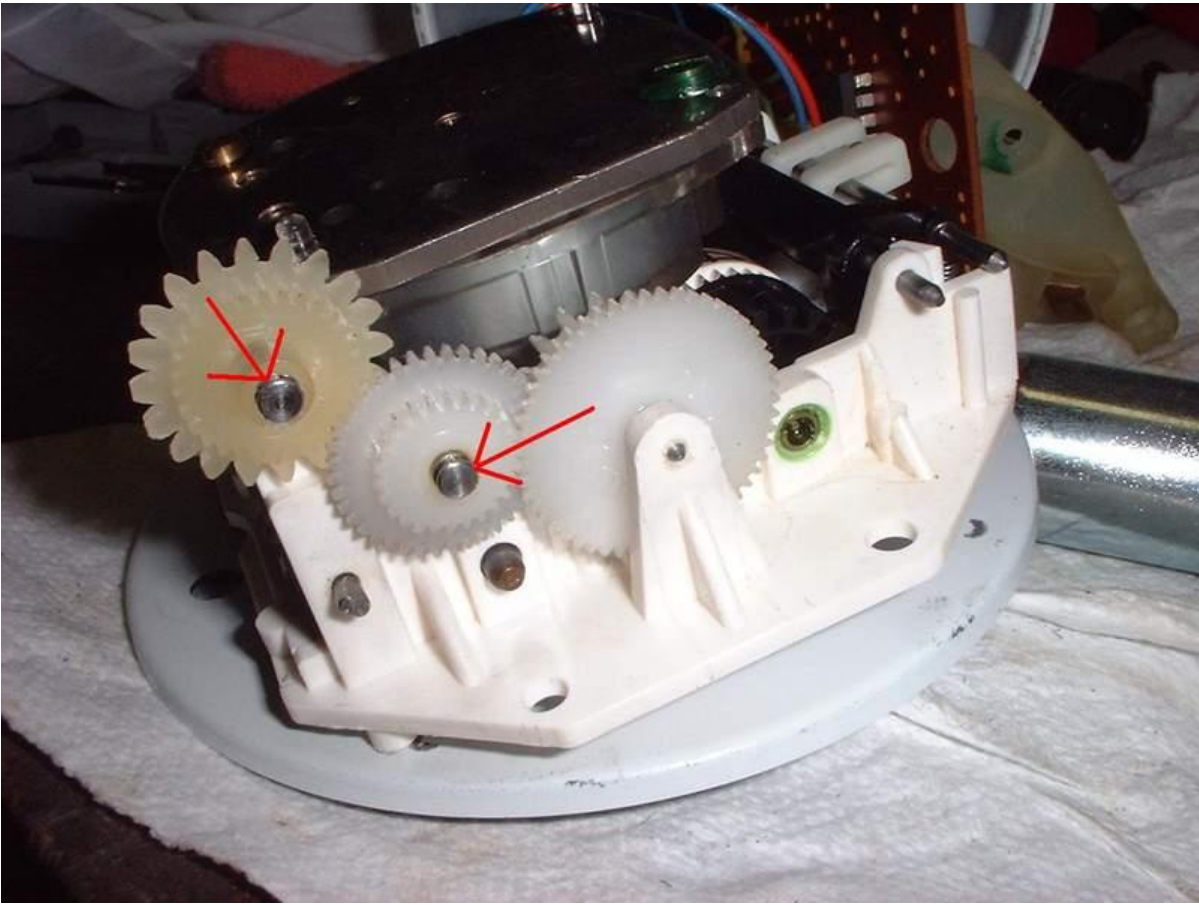
8. Two more screws hold the plastic housing piece, remove these and remove the housing piece.



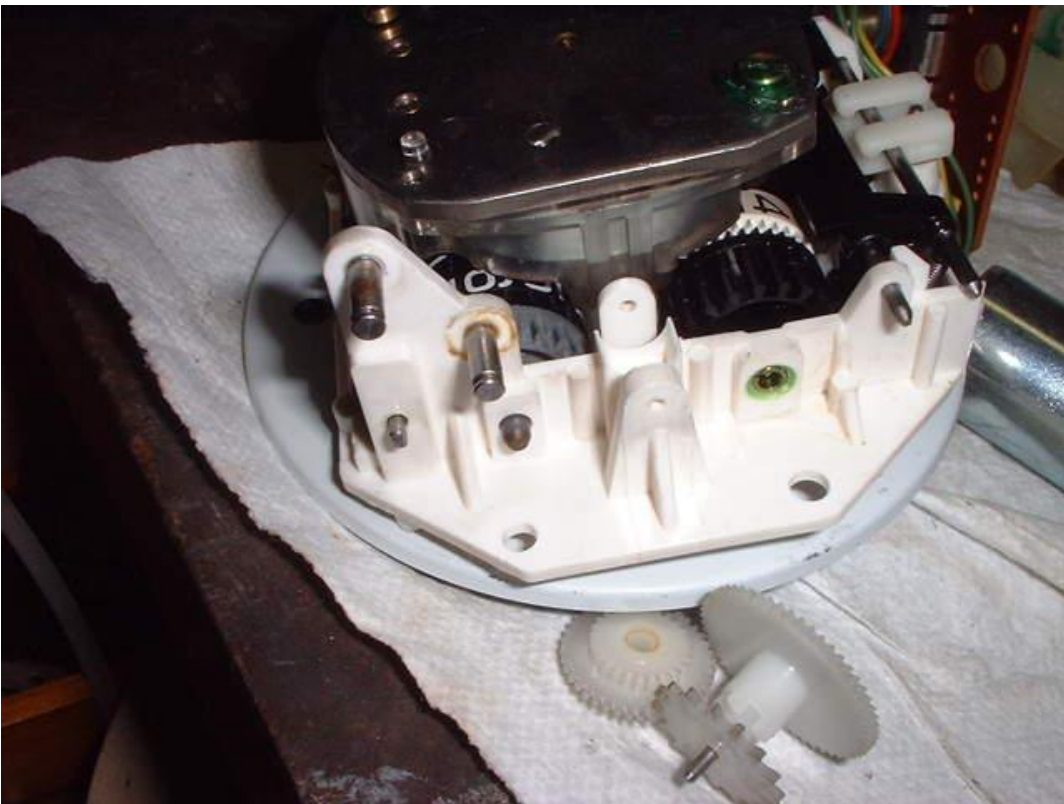
9. You now have access to the axle of the other gear that's in your way. Use a tiny drill bit, needle, or toothpick to push that axle out and you can remove that gear.



10. They're already removed in the pics, but you also need to remove the gear retainer circlips with a small screwdriver



10. Voila – you can now slip your new gear on!



11. Reassembly is somewhat the reverse of disassembly, with a couple of exceptions.

a. Getting those four screws back on under the face is a major *****. I wish you luck and patience. I was really worried about breaking the needle at this point, but mine was flexible and made it thru the ordeal. You may want to consider replacing the screws with shorter ones. I think it'll hold together just fine.

b. I took a punch to set the bezel ring onto the case and it seemed to work well. Again, work slowly and methodically. It's nearly as tight as factory and looks so; I think you deserve a beer now, for sure. For me, being patient is not natural, so I'm particularly proud of this accomplishment. Many people will say "ah, don't be cheap – send it to a pro" – fine, but they'll never know the pride you'll feel every time you look at that odometer spinning for the rest of the car's life.

When reinstalling the Speedo needle, make sure you gently push down evenly on the center hub of the needle. Once it is in firm enough, use the stop points at max speed and 0 mph/kph to realign the needle with 0.

It will faithfully serve as a reminder that you have achieved a higher consciousness to become one with the odometer gear, grasshopper.

Enjoy that beer.

Craig



www.OdometerGears.com