TECH TIP - JOHN GROSH'S & WAYNE TORMAN'S ARTICLES ON RE-KEYING OR REPAIRING THE OPEL GT GAS CAP

First Wayne's Article - (John's article adds to and clarifies some of Wayne's, while there is a little repeat, its best if both are printed unedited)

Here's what I've figured out, and if anyone knows any better suggestions PLEASE share them!

1. Go shopping. You will need a plastic (or fiber) ring with a 3/4" internal diameter and 1" external diameter, about 1/8" thick. This *sounds* like it would be an easy part to get, but believe me, I had to search high and low for them, and I am still not completely satisfied with what I found, although it does seem to work ok. I ended up with fiber rings that are just a little bit too thin, which allows a very slight bit of play... but as I implied, it works well enough! My main concern is that fiber may not work if I need to do this again - especially Step 4, below, as you'll see. Also, I know it seems weird that I used American measurements, but for some reason, these ARE the right diameters and they didn't seem to fit well against any metric measurement as well as they did against 3/4" and 1".... what can I tell ya?

2. Place the gas cap upside down on your workbench. Remove the retaining clip at the top of the center shaft. This can be done most easily with "snap ring pliers" which can be had for as little as $6. Or you can use two pairs of needle-nose pliers. Insert the tip of one pair into the space in the snap ring, spread the pliers open to expand the snap ring, and then use the other pair of pliers to sort of "peel" the ring away from the groove that it fits into. (Just because getting it off was easy, don't think you can get away without the snap ring pliers... it's MUCH harder to put the ring back on! :-))

3. Once the ring is off, the outer sleeve on the center shaft, the spring, the spring "cup", and the fuel neck gasket will all come right off.... in fact, the outer sleeve and spring will probably come off at a pretty good speed as soon as you remove the retaining ring!

4. Now the hard part, which requires "the trick", where I'd guess just about everyone who has ever tried this has gotten "stuck". (I know it stumped me for about a year.) In order to get the "inner sleeve" out, the way I do it is to use a propane torch, and heat up all the way around the base of the inner sleeve, right where it bends 90 degrees to the flat circle of metal that is under where the gasket was. Use a large pair of pliers to (gently) hold this "inner sleeve" just under where the snap ring was. After a minute or so of heating with the propane torch, smoke will start pouring out from under the flat metal circle (don't worry, it doesn't burn, melt or discolor the metal in the time it takes for the plastic ring inside to melt... and it seems to melt quite "politely", without liquefying and gumming everything up). By lifting up on the inner sleeve so that the gas cap is about a quarter-inch off your workbench, as soon as the plastic ring has melted enough, the inner sleeve will pull away nicely from the outer chromed shell of the cap, and the outer shell will drop away onto the workbench. Note that there is a small wavy metal ring down inside the inner sleeve, that fits between the inner sleeve and the outer shell. DO NOT LOSE THIS RING! Now, clean up the plastic crap (well... there will be some.... it can't be helped!) from where it melted, and then go on to the next step.

5. Now that you have exposed the inner shaft, you are pretty much home free in terms of "trickery", except that you WILL need some patience later on when you are replacing lock wafers. There is a tiny set screw on the side of the inner shaft, near the tip. Once you loosen the screw, the lock mechanism will slide freely out of the outer shell (as long as you swing the cover open! ;-)). At that point, you can either swap in the mechanism from another cap (Bill), OR you can replace the lock wafers in the mechanism with ones that are proper to work with your key. Here is the deal on lock wafers... all keys are cut using a very specific instruction set, the "key code". Each notch on the key is cut to a certain depth as described by the numbers in that code. Opel used 5 different depths, so each digit in the key code is between 1 and 5. Each side of the key has its own code, hence you'll get a key code like 33512 24321 or whatever. (NOTE: You can still easily accomplish this change without having the actual key code, I'm just explaining this so you'll have an easier time of understanding what's going on!) Unfortunately, it seems that wafers for Opels have become scarce (although I haven't really asked any of the dealers about this specifically, because I scavenged several from beat-up door handles and crappy gas caps). fortunately, whether or not you have other locks that you can scavenge from, you'll still be ok, but just a little bit *less* safe... you'll see what I mean in a minute....

6. Here's the deal on re-keying to your key... once you have the lock cylinder out of the cap, notice that several of the wafers stick out past the edge of the cylinder when there is no key in there. Those are what prevent the lock from turning without a key, because they hang up in the grooves on the inner sleeve. Now, slide your ignition key into it. You'll see that some that stuck out before no longer do, but others now stick out. The idea of this whole exercise is to make it so that several stick out when no key is in, but when YOUR key is in, they ALL stay within the cylinder. (By the way, for these steps you'll need a large tweezer to pull out and put in wafers.) Once you've checked out the general operation of the cylinder, soak it with WD40 or something and get it cleaned up. Next, pull out one of the wafers... one that obviously DOESN'T fit correctly! Notice that the wafer has a thin edge on top (above the rectangular hole), and a thicker edge below the hole. (The top is also where you'll notice little sort of serrated edges or ridges on the corner of the wafer.) The thicker edge is what must correspond to the depth of the notch in your key that you are currently working on. In other words, the five wafers that all come out the same side of the cylinder must correspond to one side of the key , and the wafers that come out in the other direction must correspond to the other side of the key. Now that you understand what's going on with the cylinder and the wafers, it's time to carefully and patiently remove and replace wafers to match YOUR key. Begin by securing the cylinder horizontally, with a row of wafer slots pointing up. Notice that only HALF (five) of the wafers can be removed from each side, so you will only be working on those five for now. Remember, only work on one side of the cylinder at a time, and preferably only one wafer at a time. This is where it's *really* handy to have lots of wafers... for example, you can observe exactly how wafer "A" fits with the key in place, and then try a couple of other different wafers from your stash, until you find one that sticks out without the key, but is perfectly flush above and below when the key is in.

TECH TIP - RE-KEYING OR REPAIRING THE OPEL GT GAS CAP (CONT.)

If you are only working with the set of wafers from your one gas cap, unfortunately, you must remove ALL of the ones that don't fit before you reinstall ANY of them. That way, you'll have a pool of wafers to choose from as you try to re-fit each slot with the correct wafer. While this will eventually get you to (almost – see paragraph after next) the same end result, you won't have each wafer to compare to as you go along, because you will probably have already used it in a different slot.

Here's how to replace each wafer: With the key in place, if the one you are working on is, say, 2 millimeters *above* the edge of the cylinder, then you need to select a wafer with a bottom edge that is 2 millimeters *taller* than the one that was in there. That way, it will push the wafer DOWN. If the top of the wafer is 3 millimeters *below* the edge of the cylinder (and therefore sticking out the other side), then you need to replace it with a wafer whose bottom part is 3 millimeters *shorter*, so the key doesn't push it down as much! (Did you get all that? Whew!) Obviously, you'll have to remove and reinsert the key between each wafer change. I'd strongly recommend that once you do have a slot filled with the correct wafer, you use a "Sharpie" pen to mark that that one has been done... believe me, after a while you will be cross-eyed from looking at these slots and trying to determine which one you are currently working on, so it will certainly only help. Remember, concentrate only on the wafers on one side of the cylinder at a time, or you'll go crazy!

So here's the part about why it sucks (but will still work) to only have the wafers from your one gas cap... It is NOT required that all 10 wafers be in place for the lock to work. Once you've removed all the wafers that started off being wrong, you'll see that probably only a few are still left in the cylinder, because they just happened to be the right size to begin with. When you take the ones you removed from the cylinder and put them back in wherever they can now fit, you'll undoubtedly have a few wafers left over, and a few empty slots, because your remaining wafers likely won't be the right ones to fill the open spots. Again, you don't need all 10, so that's ok, but you really DO need to have some sticking out from both sides (with the key OUT) when you are done, or else it won't have the same security. Basically, the fewer wafers you do use, the less safe the lock is, but hell, you do what you have to in a pinch!

7. Now that you *finally* have as many wafers in the right alignment as you can manage, you are ready to reassemble everything. Put the key into the lock cylinder (so that all the wafers are retracted and the edges of the cylinder are nice and smooth. Next, push and hold in the little lock catch bar on the side of the inner shaft. Drop the lock cylinder all the way down into its hole, lining up the round rod on the end of the cylinder into the opening created in the bottom of the hole when you hold in the catch. Once the lock cylinder is all the way in, you can release the catch. Now, hold the cylinder down in the hole by putting your thumb or a piece of tape over the key entrance, and tighten the set screw in the side of the inner shaft to hold the cylinder in place.

8. Take the plastic or fiber ring that you purchased in Step 1, and cut about a 1/4" piece out of it. While flexing the ring, insert it into the groove just inside the opening in the inner sleeve, where the original plastic ring was. Drop the small wavy metal ring that you put aside in Step 4 all the way down into the inner sleeve. Now, push the shaft (of the outer shell - where the key cylinder is) down into the inner sleeve, and jiggle it around until the ring locks it into place. This might take a couple of tries, but it will eventually 'click'.

9. Put the gas cap upside down on your workbench again, preferably with a piece of cardboard under it to prevent scratching of the top of the gas cap! Place the spring cup down over the inner sleeve, with the ears on the spring cup pointed UP, then place the spring onto it. Finally, push the outer sleeve down hard over the spring and return the snap ring to its original location. (This is where the snap ring pliers are *really* helpful!) Voila!

Another tip: Craft stores sell a kind of fine tip pen that actually has paint in it. Buy a black one (and a white one - which I'll explain in a minute), and some "Goo Gone" or other harmless kind of gunk remover. Use it to "refresh" the black paint in the Opel logo. It works very nicely! Use the white paint pen to refresh the lettering and pictures in your instrument panel switches... but BE SURE to use the "Goo Gone" IMMEDIATELY on the plastic to wipe away excess paint, because it *really* sticks if you leave it on even for more than a few seconds. It is FAR better to paint and wipe six times, leaving a little more in the grooves each time, than it is to try to go really slowly and carefully and repaint them in one try. If you go that slowly, the paint will have dried where you started, and you will have a mess. Do a quick fill and an immediate wipe, and you'll be MUCH happier!

Well, I really hope that this info is useful to a lot of you, since it was a major pain to type it all up. And I did do this from memory, so I hope I haven't missed any key details (I don't think so, though...) If you have easier ways to do ANY of these steps, PLEASE share them with the rest of us - I *certainly* won't be offended by better ideas!

Repairing and Modifying GT Gas Caps

by John Grosh

If you are familiar with the Opel GT gas cap, you know that when the cap is locked, the upper chromed shell of the cap rotates independently of the lower bronze part of the cap, which attaches to the gas tank filler neck. In a properly working cap, inserting the correct key and turning it 180 degrees unlocks the cap by locking together the chromed shell and the bronze catching mechanism so that they turn together, thus allowing the cap to be rotated off the filler neck.

If you are like me, you have one or more caps that won't unlock; that is, even when the key is in the position that should couple the upper and lower parts of the cap, the two halves still rotate independently of each other. I recently took apart six GT gas caps and found a broken part that was responsible for this condition in five of the six. I've developed a slightly modified part that replaces one of the cap's internal pieces and solves this problem.

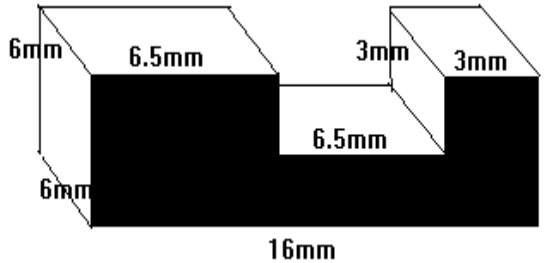
TECH TIP - RE-KEYING OR REPAIRING THE OPEL GT GAS CAP (CONT.)

Here's what you need to do if you have a cap with the same problem. First, locate a copy of Wayne Torman's article, "Tech Tip: How to Repair and Re-Key a Faulty GT Gas Cap," as originally published in the February, 1997 issue of the Blitz and reprinted in the March/April newsletter of the NAOGTC. (Wayne recently posted a copy of this article to the Opel email listservers.) Follow his instruction steps 1. through 5. (For his step 1., I had good success with a material called Gylon made by Garlock. I started with 1/8" thick material, punched out a 1" circle, then punched a 3/4" concentric ring out of the center.)

When you have the cap completely disassembled, you may discover, like I did with most of my caps, that the inner chromed shaft has corroded on the opposite side from where the locking tang protrudes (the locking tang is what Wayne calls the "lock catch bar" in his step 6; it is the piece of square bar that engages in the groove in the bronze sleeve to unlock the cap). If you remove the locking tang, you will find a spring behind it, unless the spring has also corroded away. This spring engages the tang with the groove in the bronze sleeve when the key is in the "unlock" position. However, when the cap is locked, the tang is held entirely within the chromed shaft, which permits the chromed shaft and the bronze sleeve to rotate independently. In this position, the spring exerts all of its force against the outside wall of the chromed shaft. With the passage of 25+ years during which freezing water and other contaminants enter the cap, the spring eventually breaks through the light-duty metal of the shaft. When this happens, the spring can no longer engage the tang and your cap is left permanently in the locked position.

My solution to this problem involves eliminating the spring and using a locking tang with slightly different dimensions. The idea is to employ the off-center lobe on the bottom of the key cylinder to forcibly engage the locking tang into the bronze sleeve groove, rather than merely allowing the spring to engage the tang. The disadvantage with the revised locking tang is that the key can be turned to the unlocked position (and thus engaging the tang in the groove) only when the groove is aligned with the tang. Happily, this alignment coincides with the two positions in which the locked cap "clicks" as the top and bottom parts rotate past each other.

In order to fabricate the revised locking tang, you will need to find some 6mm square bar stock (it should be available at a local machine shop) and cut it to the dimensions shown here. For reference, the 6.5mm dimension is almost exactly 1/4", in case your machinist happens to have only SAE tools. By the way, I don't recommend using square bar stock of any SAE dimension since it won't fit accurately into the original space in the chromed shaft.



As I mentioned earlier, the spring is not used with this tang. The revised tang is inserted into the space where the original was, with the left-most face in the above diagram facing outward. The key cylinder can then be inserted and rotated to check that the new tang withdraws completely inside the chromed shaft with the key in the locked position but protrudes from the shaft with the key in the unlocked position. You may now continue the reassembly as per Wayne's instructions. Note that if you make use of the Gylon material I suggested earlier, you won't need to cut a notch in it (Step 7) since the Gylon will flex sufficiently on its own to slide over the shaft but snap back to its original shape to engage the shaft and sleeve.

Feel free to contact me at jgrosh@juno.com if you have questions.