Servicing the Throttle Capstan

Edward F. Sowell
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Background

The throttle capstan, Figure 1,operates the two throttles in synchronization in response to the throttle cable. When the pressure is released from the accelerator the capstan, under action of a coil spring within it, is supposed to snap immediately back to the idle stop position. . Over time the lubricant on the capstan shaft hardens so the capstan no longer rotates freely. When this happens you may notice the engine not always returning to its proper idle speed; sometimes it will return to 750 RPM, other times 800 or 850. The solution is to remove and disassemble the capstan so it can be cleaned and lubricated. It's an easy job, taking about two hours at most. But while you have it off the engine it's a good time to also test and adjust the throttle switch (or pot), since it is mounted under the capstan. That will take a bit longer. That's covered in a separate document since the procedure is different on models that use throttle pots instead of switches, i.e., the HE cars.

Figure 1 Throttle capstan

Removal

Removal begins by disconnecting the throttle rods and cable from the capstan. The rods ride on knobs on top of the capstan and can be popped off by slipping the sleeve back and lifting. If you also disconnect them at the bellcranks be sure to mark them so you can return them to their proper sides during reassembly.

To disconnect the cable, rotate the capstan about a quarter turn clockwise so you can lift the lead button on the cable end out of its slot in the capstan. Then disconnect the kickdown switch wires and remove the inboard nut that fastens the cable sheath to the capstan frame, Figure 2. Try to not disturb the outboard nut so the cable adjustment is not changed when you reassemble.

You also have to disconnect the wiring harness from the throttle switch. You can see it just to the right of the kickdown switch in Figure 2. Some gentle rocking will be required, but be very careful because these connectors are hard (impossible?) to find.

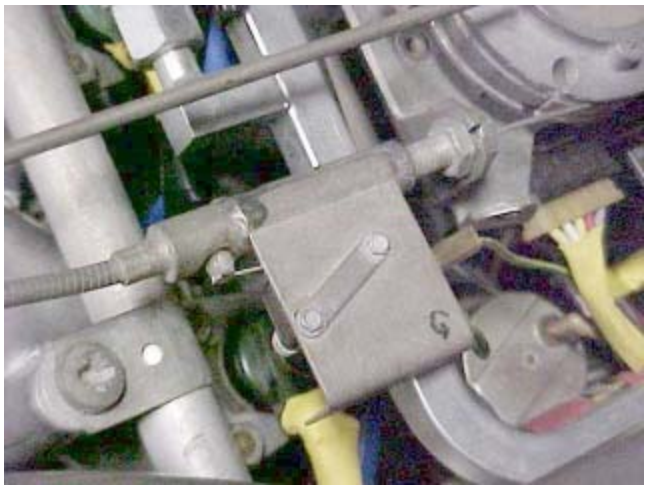

Figure 2 Kick down switch

The capstan assembly can now be freed from the pedestal by removing four nuts and lock washers. Be careful not to drop them or you will be spending the next 20 minutes looking for them down in the vee!

Disassembly

You should study the assembly before taking it apart so you know how to put it back together. Figure 3 shows a top view with the assembly positioned, as you would see it on the engine, standing on the left side of the car. To get your orientation, note the full-throttle stop screw at the left and the throttle switch connector at the right (blue arrow). Then, notice the small hole with the end of a wire peeking out to the *right* of the center disk (red arrow). This is the end of the spring inside the capstan. If you don't get it back the same angular position you're in trouble. The spring won't be wound up enough, and the angle of the shaft will be wrong for the correct position of the throttle switch.
Finally, you should put a mark from the center disk to the pulley so you can get the disk, and the shaft it attaches to, back the way it belongs. There is a black line in the photo showing this, but since you will be cleaning things don't use a marking pen. A small scratch would be better.

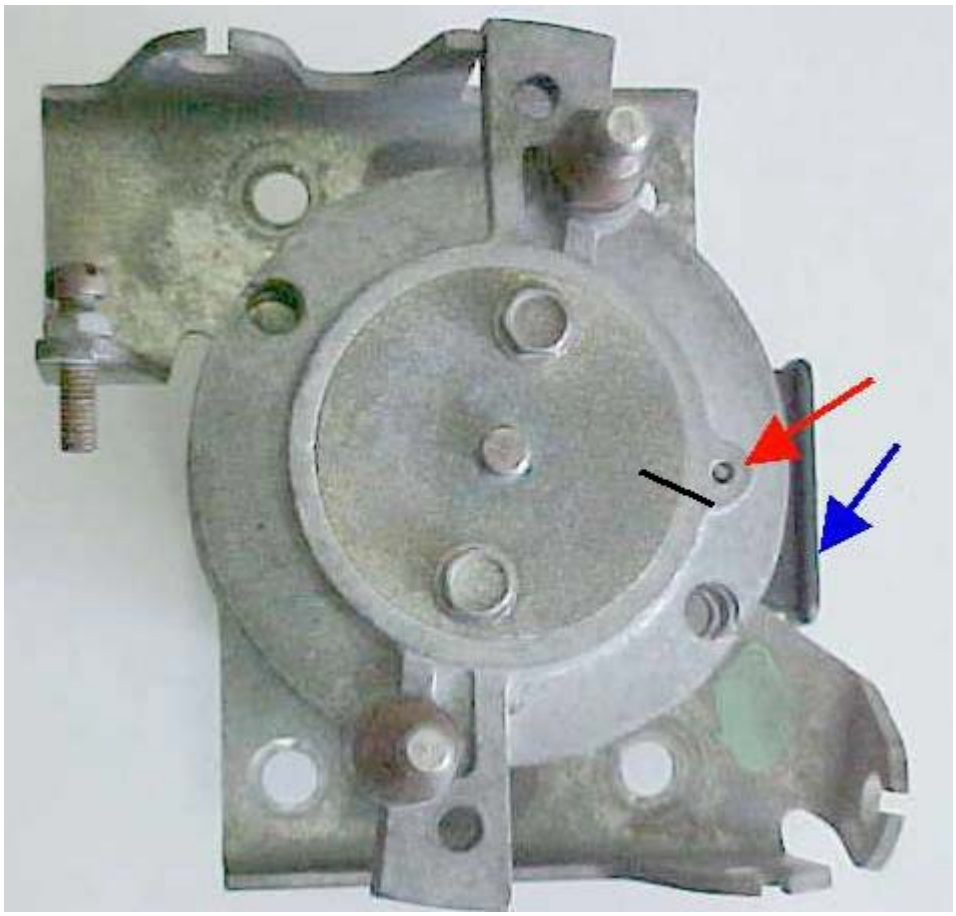

Figure 3 Top of capstan

Then turn it upside down to see the throttle switch (or pot) attached to the bottom of the frame, Figure 4. You will be pulling the switch off the shaft, so notice which way the connector points. In this photo the assembly has been flipped over from the top view in Figure 3, so the side that points toward the rear of the engine is at the left. That's where the connector belongs.

You're going to have to remove the switch, which raises the issue of getting it back in place properly adjusted. Although it's a good idea to plan on resetting the adjustment during reassembly, you might want to put a little scratch mark one the base near one of the graduations on the screw tabs just to get it back close to where it ought to be.

Figure 4 Bottom view

Now that you've studied it a bit you can begin the disassembly. Remove the screws holding the switch or pot on the frame. Then use a flat blade screwdriver or small pry bar to gently pry the switch away from the frame. What you are doing is pulling it free of the shaft. Once it is off, remove the two hex-head screws on the central plate on top, Figure 3. Since it is attached to the plate, the shaft can be driven out once those screws are out, Figure 5. A gentle tap with a soft hammer or block of wood should do it.

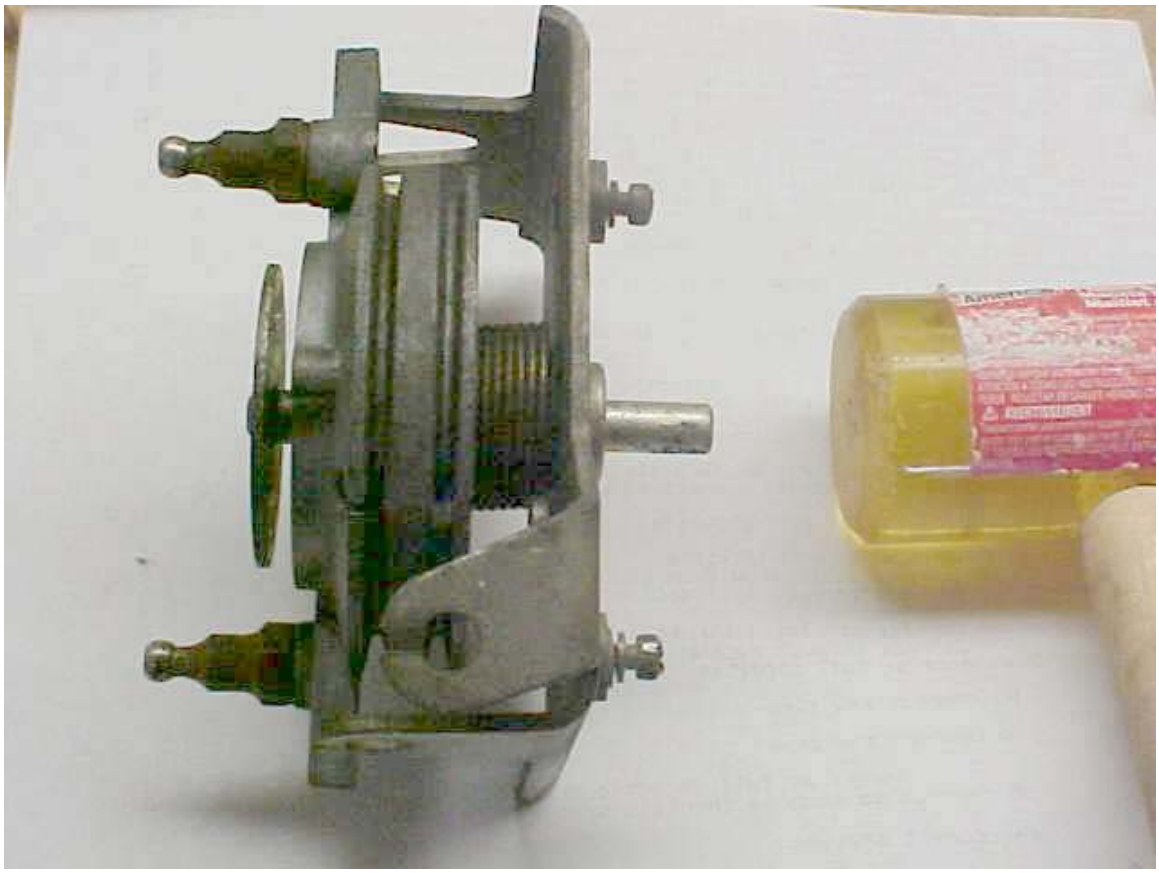

Figure 5 Removing the shaft

With the shaft and central disk off you can see that the pulley is held on a hollow shaft by a Circlip, Figure 6. Remove it with Circlip pliers.

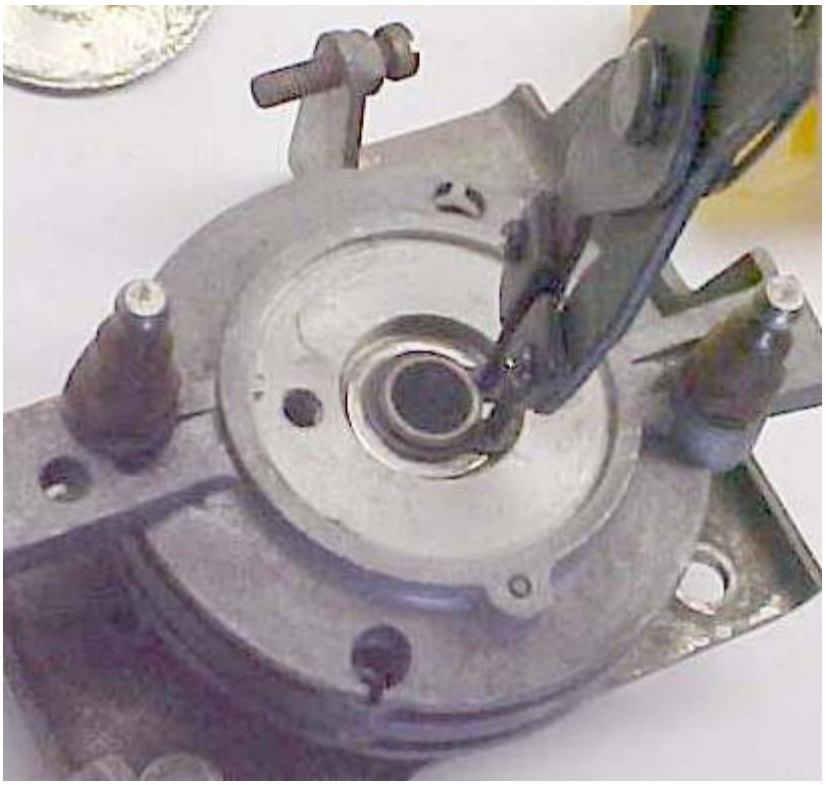

Figure 6 Removing Circlip

This allows you to lift the pulley off the frame, Figure 7. This one, off a car that had been setting in a junkyard for a while, is pretty grubby. The one on my car was in better shape.

I should mention that there are two bushings pressed into the pulley. These are in the parts catalog (C20955/3), but I do not know if they are still available. I felt no need to replace them in either of the two units worked with.

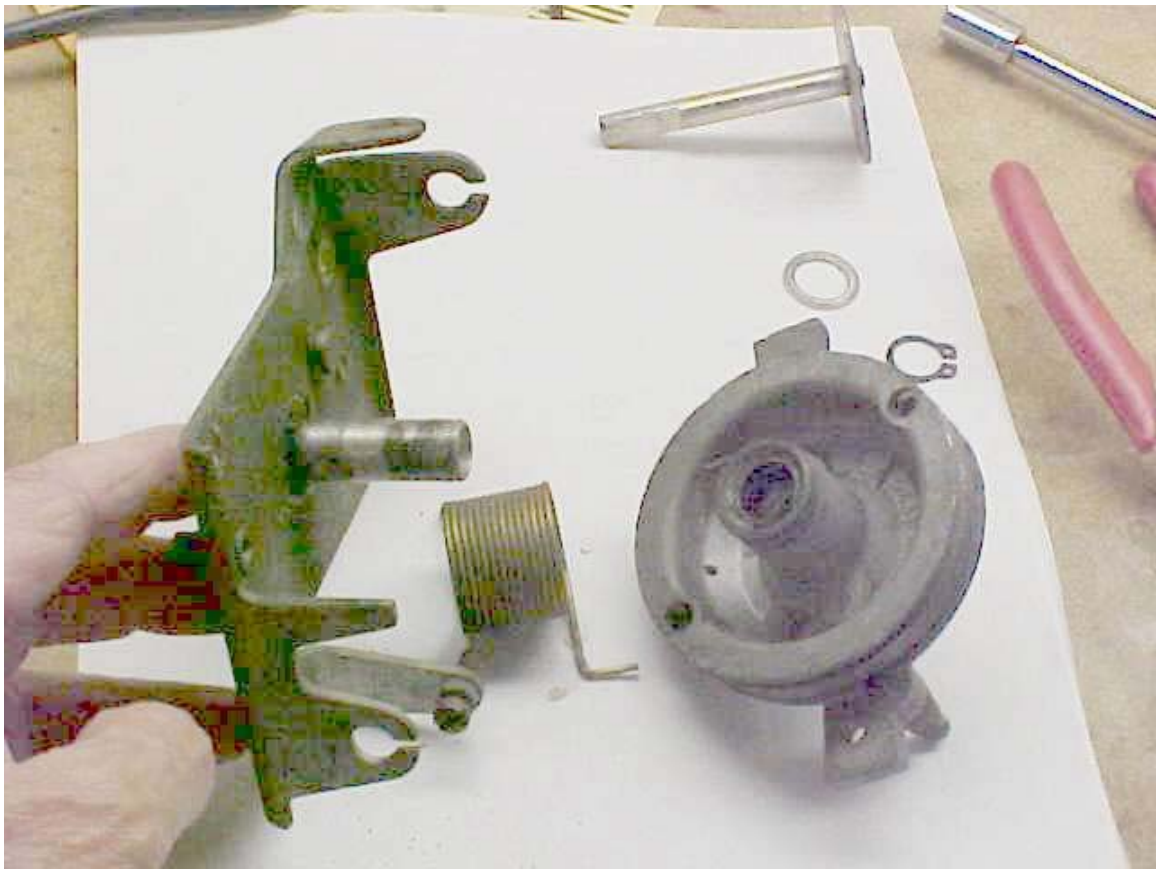

Figure 7 Disassembled capstan

Cleaning and Lubricating

The unit cleaned up nicely with Simple Green and some work with various brushes, Figure 8. I had to use some fine sandpaper on the hollow shaft (outside) as it had a bit of scale. I lubed it with Finish Line, an excellent light grease from the bicycle world that can easily withstand the engine compartment temperatures.

Figure 8 Cleaned and lubricated.

Reassembly

To reassemble first place the spring over the hollow shaft, hooking the bottom end over the post on the capstan base. Then slip the pulley over the hollow shaft with the small hole aligned with the top end of the spring.

Now, you have to rotate the pulley to properly preload the spring. First, be sure you're holding the part oriented as shown in Figure 3. The idea is to rotate it clockwise until the hole holding the spring end is at the right, as shown in the photo. As you rotate it, you may have to lift it back up a little to clear the stops on the base. Once it is in the right angular position push it firmly towards the base. The spring tends to lean to one side or the other as you push it down so you might have to twist the pulley back and forth a bit till it falls into place. Look at it from the side to see that the spring is still properly hooked over the post on the base, Figure 9.

Figure 9 Spring hooked over post.

Now put the washer and Circlip back on the hollow shaft to lock the pulley in place.

Now it's time to slip the shaft and center plate back in place. Be sure to align the marks you put on the plate and pulley. Otherwise, the flat on the shaft will not be properly positioned to fit into the switch. Replace the hex head screws that hold the plate in place.

All that remains is to reinstall the switch and adjust it. Hold the assembly as shown in Figure 4 and slip it back onto the shaft with the connector facing to the left. Check that the flat in the switch is aligned with the one on the shaft. It should be if you put the shaft and plate assembly back in the right way. It will take some gentle force to push it down to the base. Insert the screws and carry out the adjustment process, described in a separate document at my Web site.

Reinstall

Reinstallation is straightforward, reversing the steps you went through to take it apart. The only minor challenge is to be sure the throttle cable sheath is properly adjusted where it connects to the capstan base, Figure 2.

The adjustment should be such that the cable has as little slack as possible while offering no resistance at all to the free rotation of the pulley when pressure is removed from the accelerator. Start by tightening the inboard nut with the outboard one in its original place. Turn the pulley a little clockwise and let it go. If the pulley snaps back and rests firmly on the idle stop it's ok. Do it several times to be sure. If it tends to stay a little away from the stop, loosen the outboard nut and tighten the inboard one. This will put more slack in the cable, allowing the pulley to freely return to its stop. You don't want too much slack because it tends to introduce some dead space when pressing the accelerator. However, not enough slack will result in your idle speed staying high sometimes.