

How to Rebuild a Distributor

Problems with a distributor can take three forms: mechanical, electrical and mechano-electrical. To briefly review what a distributor is and does, it is little more than a switch, making and breaking a spurt of electricity which is directed to a specific cylinder. A rotating center shaft, with a cam fitted to the upper end, opens and closes the ignition points while rotating a rotor that provides a path of electricity from the distributor cap's center terminal to the side terminals, each connected to a cylinder sparkplug by a wire designed to carry very high amperage. The distributor is connected, mechanically, to the complete timed system so that a spark is discharged to the correct sparkplug at the exact moment required for ignition. At first glance it seems to be a fairly simple, straight-forward system, but there are so many places that problems can occur, and so many types of problems, that the rebuilding can be a challenging job.

PART I

Let's start at the top and work our way down. First the distributor cap. Examine the cap for cracks, breaks, chips, or carbon tracking marks on the inside or outside. Tracking marks indicate an invisible crack. If any of these signs are found, replace the cap.

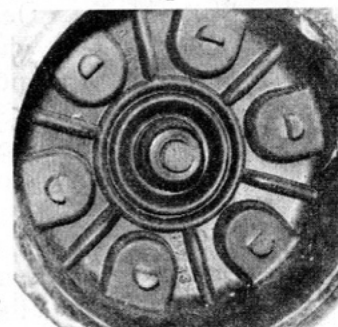
In most cases the sparkplug wires fit into recesses or holes. These holes are either lined with a connective metal sleeve or have a conductive metal spike. The sparkplug wires make contact with these inside the hole. Inside the distributor cap the conductive metal terminates in a small block of metal around the inside circumference of the distributor cap. There is an additional hole in the very center of the distributor cap. The wire from the coil fits into this hole, and like the surrounding holes it, too, has an electrical contact for the coil wire. The electrical contact inside the cap fits into a small hole or socket. A brass or copper spring carries the current from the terminal to a small carbon button which fits into the socket. Start checking the distributor with an ohm meter or multimeter. Using the continuity or ohm setting on the meter, check for continuity between each

inside metal contact and the sparkplug end of the wire. If the sparkplug wires are metal-cored (hopefully copper-cored), you should have virtually zero resistance. If you have carbon-cored sparkplug wires, there will be resistance (approximately 1,000 ohms per inch) but still there should be continuity. See the sidebar below for an explanation as to why copper-cored wires are superior for an older car.

If you do not have continuity, or if, when you wiggle the wires, there is a fluctuation in the continuity, remove the wire and check it for continuity or internal breaks. If the wire tests out well, check continuity from the terminal inside the cap to the contact on the outside of the cap. If you do not get zero resistance, check for corrosion. If that's not the problem, replace the cap. Check the continuity between the coil wire hole on the outside of the cap and the carbon button on the inside. Again, near zero resistance.

Next check the rotor. Clean the corrosion and check the continuity between the center of the metal conductor and the tip of the conductor. Zero resistance. Carefully examine the tip of the metal

conductor. If it shows any wear or damage, go back and recheck the distributor cap. The rotor should NOT touch the terminals around the inside circumference. The spark should actually jump the tiny gap. If there is wear on one side of the distributor cap, it is an indication that the center shaft is



The six terminals around the circumference are for the sparkplug wires. The carbon button in the center is the contact from the coil.

'whipping,' that's spinning in an eccentric rather than a smooth circular motion. We will get to that problem later. Check that the rotor is not leaking and allowing the center terminal to short out.

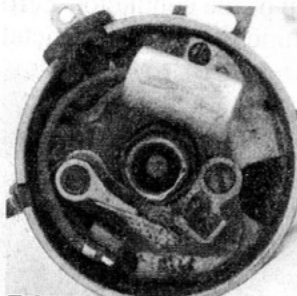
It's time to remove and get started cleaning and rebuilding the body of the distributor. Note the position of the number one sparkplug wire. Remove the distributor cap – it is not necessary to remove the wires – and set it aside. Note the position of the rotor, and make a note of which sparkplug terminal it points to. Note, or even bet-

ter, mark the position of the distributor in the engine. The distributor is generally held in position by a collar or a bolt through a hold-down plate. Loosening or removing the collar or the bolt in the hold-down plate will allow you to lift the distributor straight up. From this point on, do not turn the engine over; it will change the alignment of the distributor which you noted by the rotor position.

Look at the bottom of the shaft. Does it have a gear, an offset raised tab or an offset notch? The first indicates that the distributor engages with the crankshaft and the second two indicate that it is driven by the oil pump. (Sometimes a separate shaft fits between the distributor bottom and the oil pump. The shaft will have a tab or a notch on both ends which engages the oil pump and distributor shaft.)

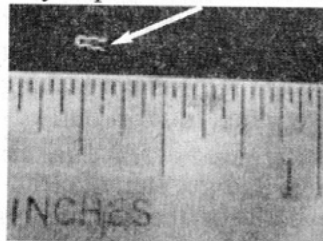


I highly recommend that the very first thing that you do is to photograph the top plate of the distributor. It will help you later when you reassemble. It will show the position of the points, condenser, wires, screws, etc. As you proceed with disassembly, keep photographing.



Take adequate, clear photographs prior to any work.

If the car has a vacuum advance, disconnect the vacuum line. Then remove the two screws holding the vacuum advance to the distributor body. The arm of the vacuum advance connects the distributor with a tiny clip. Use a tweezer to remove it. Don't lose it.



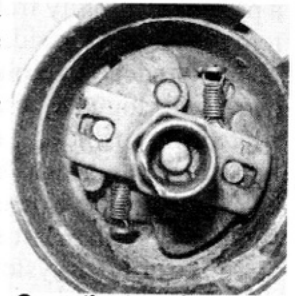
Remove the bolt down plate and the oil cup on the side of the body. Sometimes the oil cup will unscrew. Other times it is a press fit. Be sure to clean this part. The old oil sometimes hardens and plugs the oil passage.

Next, start removing the screws on the top plate. One holds the wires to the points, another

holds the points to the top plate, one or more are adjusting screws for the points (generally not removable) and another couple hold the top plate to the distributor body. Try to keep the screws and washers together.

Separate all of the parts from the top plate. Lift the top plate straight up; it should come right off. (In the example pictured the top plate is bolted to the housing with the two screws that hold the top clips on.)

When the top plate is removed, the centrifugal weights and springs are visible. The cam assembly has two 'wings' which fit over studs on the weights. The cam assembly can be removed after you remove the small clip inside the top of the center shaft.



(This clip may be hidden under a felt pad. Remove the felt pad with a tweezer, and the clip will be accessible.)

Once the top plate is removed, the weights and springs are visible.

Editor's note: We have recommended that you ask your dentist to donate his old picks to your tool kit. These are a great asset in working on the distributor: removing clips, removing springs, etc.

When the clip is removed, you may lift the cam assembly straight up and off the center shaft.

Remove the springs (we suggest that you remove the spring from the weight end first, and then the anchor end). The weights will lift off the pivot pins. Don't miss the washer or spacer on the center shaft below the cam assembly. All that remains in the body of the distributor is the anchor plate which is fastened to the center shaft.



Under the top plate there is a (clockwise) cam assembly, spacer, retaining clip, two springs and two weights.

Hold the bottom of the shaft in one hand and the body of the distributor in the other. Wiggle the shaft. If you feel any sideways play in the shaft, or if you had seen wear on the rotor or distributor terminals as noted above, the bushing has to be replaced. If there is no side play, it is not necessary to disassemble the mechanism any further. Clean the shaft and body with a good degreaser and even an aerosol brake cleaner. Do not bead blast the shaft/body assembly. If any abrasive gets into the shaft housing, the shaft will have to be removed to clean it out.

Wash all of the parts thoroughly to remove all grease and dirt. Use a wire brush if necessary to get the stubborn stuff off. If the distributor had a vacuum advance on it, you will find that the points-mounting plate swivels on the top plate. Make sure that you clean in between the two plates.

Check the vacuum advance. Perhaps the easiest way to do this is to suck on the open end of the vacuum advance, and immediately put your tongue over the opening. If the vacuum holds, and then releases when you remove your tongue, chances are the unit is good.



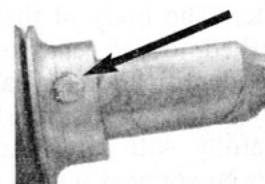
Cars with a vacuum advance have a swivel assembly attached to the top plate.

Reassemble in reverse order. Either replace the points or dress the point faces. Perhaps you want to replace the condenser as well. (Contact John Brillman of the Brillman Company for points and condensers.) If any of the wires are frayed or broken, replace them, too. Put a drop of oil on each of the weight pivot points before you replace the weights. Don't use too much oil anywhere in the distributor. It could work its way to the points and short out the system. Use a tiny bit of distributor cam lube on the cam where it passes under the fiber block of the point set. Before reinstalling the distributor in the car, set the points. It is relatively easy to set the fiber block on the high point of the cam and

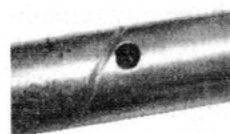
adjust the point gap in the shop. Tighten down all screws. Fill the oil cup and rotate the shaft to distribute the oil along the shaft.

PART II

If the shaft has to be removed, and the distributor re-bushed, you still have a bit of work ahead of you before you can consider re-assembly. The shaft is held in position by a collar with a steel pin going through the collar and shaft. Hand-file one end of the splayed pin and drive the pin out from the opposite side. Be sure that the collar/shaft is supported so that you do not bend the shaft when driving out the pin. When the collar

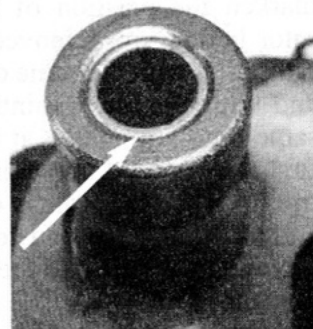


The distributor bottom shaft showing the retaining pin that has to be removed.



With the retainer pin removed, the collar slips off, and the shaft is removable through the body.

drops out of position you will have a better indication of what has to be done before the shaft can be removed. In some cases the fitting at the bottom of the shaft will slide up through the housing. If there is a gear at the bottom of the shaft, chances are that you will have to remove the gear in order to get the shaft through the housing. Be sure not to damage the gear when you drive out the pin holding it onto the shaft. Slide the shaft up through the distributor body and out. The bushing will now be visible through the bottom



Once the shaft and collar are removed, the bushing is visible and accessible. If worn, it has to be pressed out and replaced.

After you have installed a new retaining pin in the gear and/or shaft collar, be sure to splay the ends so that the pin does not work out as the shaft spins.

PART III

The cosmetics of the distributor are rather simple. Once the internal parts are cleaned, degreased and wire-brushed they will look 100% better. The body of the distributor can be wire-brushed, too, to remove any loose paint and rust. The identification tag can be covered with special easy-off painter's masking tape and trimmed carefully with an X-Acto knife. The body can then be sprayed with a good semi-gloss or satin black paint. When the paint is thoroughly cured the tape can be removed from the ID tag. Clean the Bakelite (plastic) parts - the distributor cap and rotor - with mild soap and water. Use an old toothbrush to get into those tight places. Rinse well, and use compressed air to blow any remaining water out of the spark-plug wire holes. Polish with a soft cloth. Use a small wire brush to clean the terminals inside the sparkplug wire holes. A piece of fine or extra fine sandpaper or a wire brush will clean the inside terminals. We recommend against using a wire brush in a drill. If the brush slips and contacts the Bakelite, it could remove the glazed finish and cause a short.

PART IV

After being rebuilt, new or refurbished components installed, points adjusted, etc. it is time to reinstall the distributor. Hopefully you marked the position of the distributor and the rotor before you removed it. If so, reinstall it with the same orientation and with the rotor pointing at the same plug-terminal as it was when first removed. At this point the distributor should be close enough to correct timing for you to start the car, and then time it in the traditional manner.

If you failed to mark the distributor or rotor direction, or if the engine was turned over while the distributor was out, you will have to

Not only does it look new, it works like new as well. Setting the points was done on the bench before installing the distributor to allow for a precise adjustment.



start from the beginning. Remove the number one sparkplug and crank the engine over until the piston on No. 1 is on top dead center (TDC) on the compression stroke. If you cover the sparkplug hole with your thumb, you will feel the pressure build up. You'll soon feel TDC by the compression. Turn the rotor to point directly to the #1 cylinder terminal on the distributor cap. Reinstall the distributor, and start the car. It should be close enough to run and allow you to time it in the traditional manner.

If the car doesn't start, there is a possibility that the distributor was installed 180° off. Remove and rotate the entire assembly half of a full turn.

While the distributor is apart, check the condition of the points, condenser, rotor, insulators, point rubbing block and spark advance. If in doubt - any doubt - install new parts. You will now know that the distributor is operating as it should.

WHY COPPER-CORE SPARKPLUG WIRES?*

A sparkplug wire consists of two main parts: the conductor and the insulator. The conductor carries the current from one end to the other, while the insulator prevents the current from leaking out or from being diverted from its destination. That's it! Everything else, the braided cotton covering, the terminals, the wire guides are all incidental to the primary job: transmitting current. Copper is one of the best conductors of electricity. Even over long distances, resistance is nominal. In our automobiles - especially in our antiques and classics, and most importantly with six-volt electrical systems - it is imperative that as much of the electrical charge get to the sparkplug from the distributor. That's the job of the sparkplug wires. The copper core will do the job, but if the insulation is bad, if it is cracked, porous, leaking or otherwise allowing electricity to escape from the wire, it is a liability. Change your sparkplug wires. And change to wires with a copper core. Why not carbon-core, resistor wires as used on new cars? Well, newer isn't always better. Carbon-core wires, by the nature of the core, have a built-in resistance. That resistance results in a loss of transmitted electricity. You are not getting the maximum current to the sparkplugs. The result? A less intense spark and poorer fuel combustion. For maximum electrical results use copper-core wires.

* from the Brillman Company

S.K.