

Salvaging Bosch Wipers

by Dan Berg

Most Bosch wiper motors installed in Fairmont motorcars have been exposed to weather extremes for years. Most failures are due to solidifying of the gear grease, moisture infiltrating the motor's arm shaft or over rotating the wipe blade arm. If the motor is mounted in a open motorcar, water usually penetrates the electric motor case, too, which begins corroding the electrical parts, especially the brush assembly.

The motor is divided into four assemblies: the case, direct current motor, gear train and shaft carrier. The case consists of its cover, the motor and gear frame, and frame gasket. The motor includes the field coil, rotating coil and commutator, brushes, and a retainer plate. This plate fastens the rotating coil and brushes to the frame. A flat steel spring screwed to the top of the plate provides the pivot and necessary tension to secure the rotating coil and commutator. The gear train contains three gears which transmit power and provide speed reduction to the shaft. A rack and pinion gear arrangement transforms the rotary motion to an eccentric (back/forth) movement. The shaft is composed of the shaft carrier, shaft, spur gear with roll pin and a felt washer for sealing and lubricating the shaft.

Five problem areas have been encountered that affect the performance of the American Bosch wiper motor. Starting with the shaft: damaged grooves that prevent the wiper blade mounting cup to engage the shaft, a rusted shaft, a broken shaft spur gear, a broken fiber drive spur gear tooth, or a corroded motor brush assembly.

To begin refurbishing the wiper motor, remove the shaft cover, withdraw the eccentric rack and gear assembly from the shaft, unscrew the gear retainer plate, and remove the spur gears. Scrub all of these parts with solvent to cleanse the hardened gear grease. Inspect all the components for the five problem areas. Keep track of the thin steel washers that are attached to the three gear shafts.

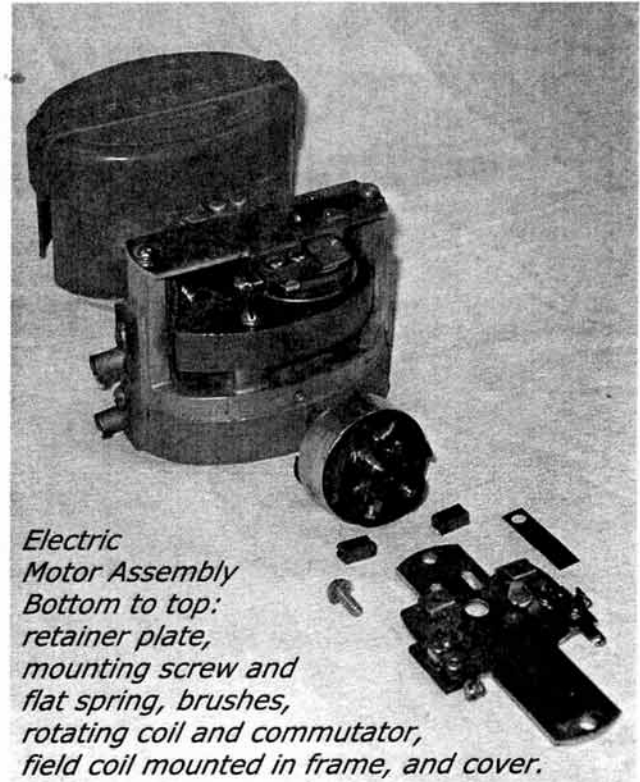
If a broken tooth is discovered on the fiber spur gear, the only fix is to cannibalize another undamaged gear from a spare wiper motor. Six-volt and 12-volt wiper motor gear train parts are interchangeable.

To service the DC electric motor, start by removing the retainer plate, withdraw the rotating coil and commutator. Remove the carbon brushes from their holder. A wire rotary brush mounted in a Dremel tool is very effective in removing built-up corrosion from the brush holder assembly. To further improve the performance of the DC electric motor, polish the commutator with the Dremel wire brush, and clean its grooves with electronic spray cleaner. Finally, run a tooth pick gently down the commutators slots.

If the shaft grooves are worn, the only fix for the stripped knurled shaft is to replace the shaft with

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This article first appeared in the April 2003 Lineup, published by Motorcar Operators West. Dan agreed to submit it for inclusion here, also.



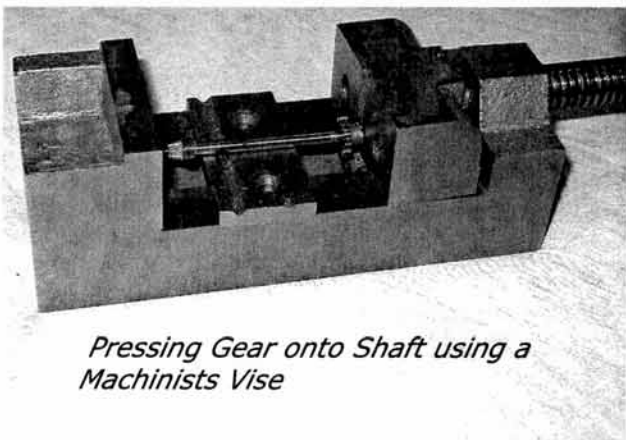
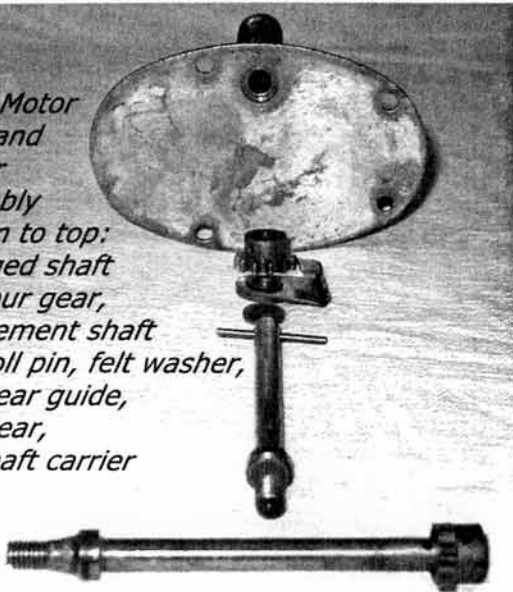
*Electric Motor Assembly
Bottom to top:
retainer plate,
mounting screw and
flat spring, brushes,
rotating coil and commutator,
field coil mounted in frame, and cover.*



*Wiper Motor Gear Case Assembly
Bottom to top: drive and rack gear,
rack gear guide,
gear retainer
plate, washers,
worm gear,
idle gear,
gear assembly
mounted in frame*

*Wiper Motor
Shaft and
Carrier
Assembly*

*Bottom to top:
damaged shaft
and spur gear,
replacement shaft
with roll pin, felt washer,
rack gear guide,
spur gear,
and shaft carrier*



*Pressing Gear onto Shaft using a
Machinists Vise*



*American Bosch
Wiper Motor
Mounted to MT14 motorcar*

another shaft with sufficient grooves to engage the pressed steel wiper blade mounting cup. To replace the shaft, removed it from the carrier. This is a simple task of cradling the shaft's spur gear shoulder in a machinist's vise and tapping out the spring roll pin with a 1/16" punch. Tap out the shaft from the spur gear with a 3/16" diameter flat punch. With the shaft out of the carrier, polish the shaft with a Dremel-mounted wire wheel. The most challenging task is aligning the shaft and spur gear roll pin holes. After examining a number of shafts, I have concluded that the roll pin hole was drilled after the gear was pressed onto the shaft. An effective approach is to paint the shaft end black, place a 1/16" diameter drill bit in the pin hole for a guide and scribe a line across the shaft end. Paint the spur gear end black and again using a 1/16" drill bit and a steel rule, scribe a line across the pin holes. Place the gear onto the shaft, lining up the scribed lines. Lightly tap the gear to the shaft. Place the shaft and gear into a machinist vice; tighten the vise's handle. Press on until the holes begin to line up. If the holes are misaligned, tap out the shaft from the gear. The holes must be exactly aligned to insert the roll pin. This operation may take a number of tries to accomplish. To test the alignment, insert the 1/16" punch or drill bit into the holes. If a replacement gear and the shaft holes should fail to align, drill the assembled gear and shaft with a #53 bit to provide clearance for the roll pin, or drill a new hole through the assembled shaft and gear. Remember to slip on the felt washer, eccentric gear guide, and lubricate the shaft before pressing on the spur gear. The roll pin can be reused if undamaged or replaced with a new 1/16" roll pin.

To reassemble the wiper motor, assemble the electric motor components and spray electronic tuner cleaner and lubricant onto the brushes and commutator. Use a good quality grease such as Lubriplate on the rotating coil bearing surface. Install all gears and corresponding washers. Apply Lubriplate grease on all gear tooth and friction surfaces. Attach the gear retainer plate. Take the shaft carrier, insert the rack gear into the shaft guide, slip on the case gasket, and manipulate the carrier and eccentric gear into the gear case. Make sure the parts are seated properly, check the alignment of the gasket and frame holes. Replace and tighten the carrier cover screws. Hook up wire leads to a 12-volt battery to test the action of the motor, gear train, and shaft movement. Slip on and attach the case cover. If the wiper motor performs satisfactorily, it should draw approximately 1 1/2 amperes. When returning the wiper motor to the motorcar, the sequence for mounting hardware is to first screw on the square 7/16" nut. Insert the carrier shaft through the motorcar's mounting hole, followed by the finishing washer, the internal teeth lock washer, and finally, tighten the motor with the 7/16" 20-hex nut.