

Knowledge Domain: Motors**Unit: Cleaning/Lubrication****Skill: Arcing grooves in commutator with a lathe****Tools and Parts Required:**

1. Lathe
2. Commutator to be arced
3. Three-cornered file
4. Hack saw blade modified for this task

Introduction

Friction between the copper segments of the commutator and the brushes eventually wears both surfaces. Older copper brushes can cause more wear to the commutator. The commutator surface may have deep grooves and notches that were caused by friction.

The commutator on small motors is not designed to be repaired. This module describes the skill of removing the rotor from the frame and arcing the grooves using a lathe. This skill requires a lathe. You may need to find a repair facility in your city if you do not have a lathe.

Identification and Diagnosis

Arcing at brushes is usually caused by mica protruding above the commutator segments. Mica protrudes because the commutator surface has worn down. The brushes cannot make good contact and arcing occurs. The commutator burns and blackens and becomes rough. This trouble is more common with generators.

A blackened and burned commutator is not always caused by high mica. Other causes are:

- having brushes of improper size or material
- an insufficient spring tension on the brushes
- an overload on the generator
- an open or short circuit in the generator windings
- two windings on one armature with two commutators
- a short-circuit between the motor and generator windings

Check for these effects before attempting to arc the grooves with a lathe.

Procedure

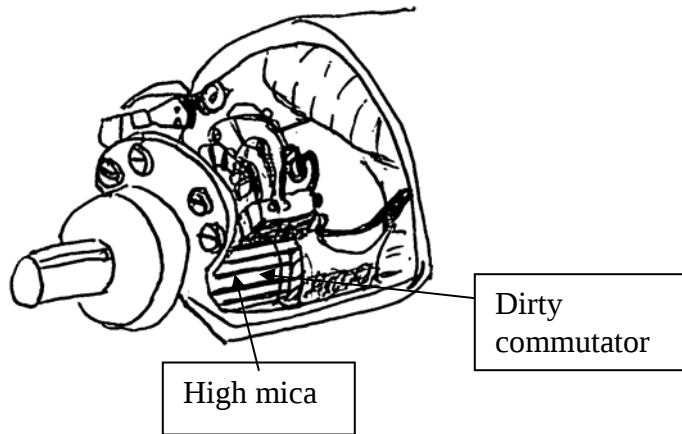


Figure 1. Copper is softer than mica and wears down more rapidly. If the copper is gone, the mica is above the commutator and the brushes cannot make good contact. When this occurs, the mica must be undercut.

1. Remove the armature and carefully mount it true on the lathe. If you do not have a lathe, take the armature to a shop where there is a lathe.
2. Cut out the mica between the bars with a hack saw blade. Insure that the hack saw blade will cut a groove only slightly wider than the mica insulation.
3. This will leave a rectangular groove free from mica; the depth should be about 0.794 mm.
4. Slightly bevel the edges of the slots using a three-cornered file (Figure 2B). This is done in order to prevent any burrs remaining, which would cause excessive brush wear.

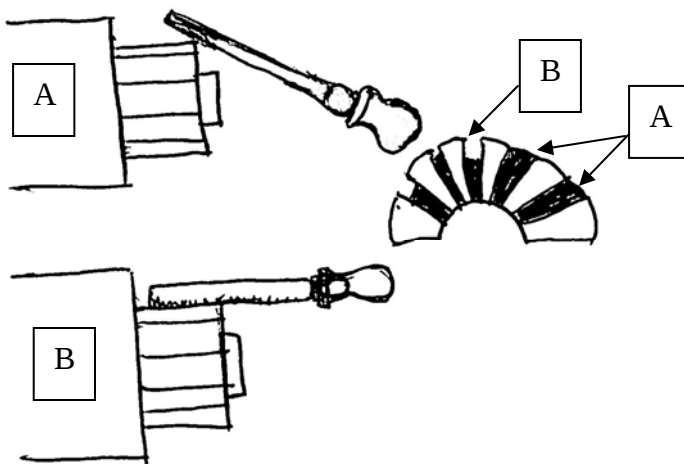


Figure 2A. Cut the mica between the bars with a hack saw blade. **2B.** Bevel the edges with a three-cornered file.

5. When properly finished, the commutator should look like the following (3B):

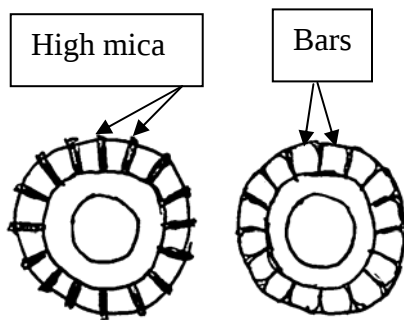


Figure 3A.Before cutting mica. **3B.** After cutting mica.

Exercise

Your instructor will provide you with a dirty commutator. Your task is to arc the grooves with the designated lathe and tools.

Preventative Maintenance and Calibration

Check the motor for noise every 6 months. Decide to use a lathe or emery paper appropriately.