

Knowledge Domain: Motors
Unit: Brush Substitution
Skill: Spring Repair

Tools and Parts Required:

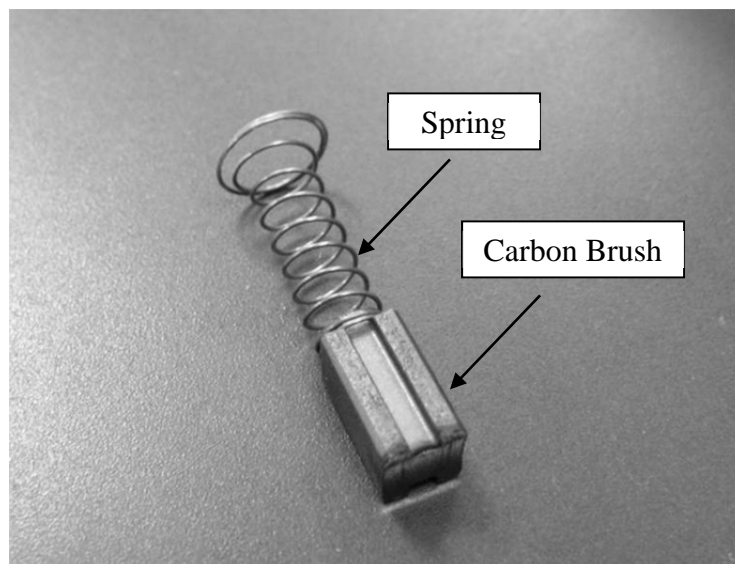
- 1) **Motor with Carbon Brushes**
- 2) **Flathead Screwdriver**
- 3) **Pliers**
- 4) **Replacement Springs**
- 5) **Safety Goggles**

Introduction

Carbon brushes transfer electric current from the motor housing to the commutator on the motor shaft. Carbon brushes are attached to coil springs. The spring applies a force to the back of the brush to keep it in contact with the commutator. As the brush wears down, the spring steadily pushes the brush back toward the commutator. Sometimes the spring fails. Failed springs may be burnt, rusty, melted, or rigid. Failed springs may be deformed, broken, or detached from the carbon brush. Failed springs cannot push the carbon brushes into contact with the commutator. Carbon brushes that do not contact the commutator cannot transfer electric current. Failed springs cause motors to turn slowly or not at all. Check for failed springs if a motor does not start. Failed springs must be replaced.

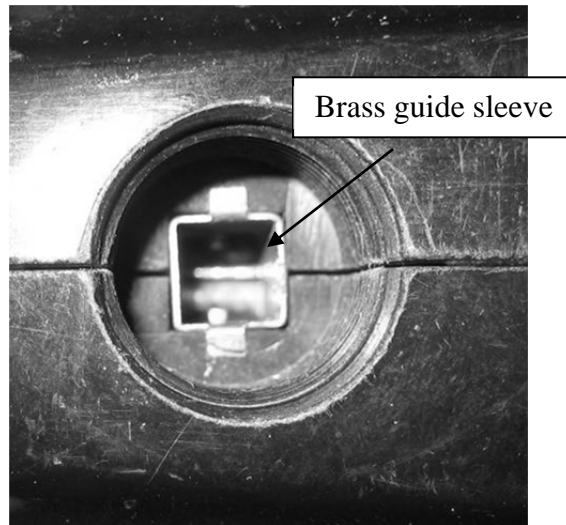
Example

Below is a picture of a coil spring attached to a carbon brush.

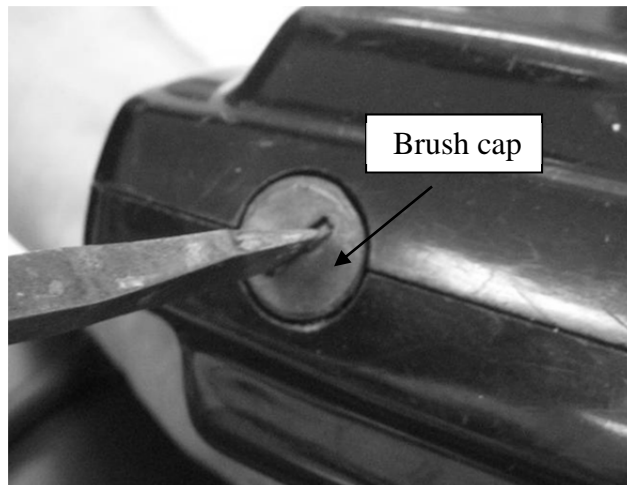


Identification and Diagnosis

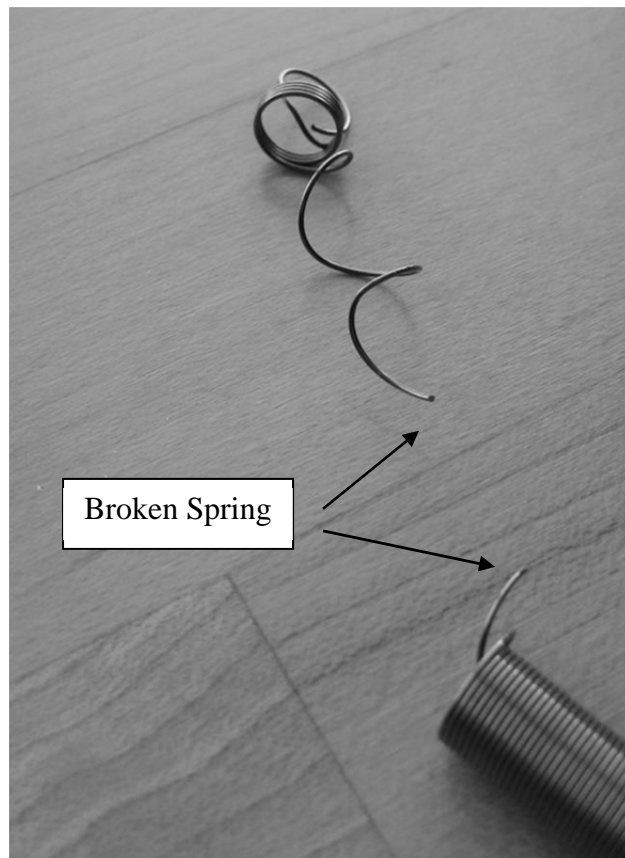
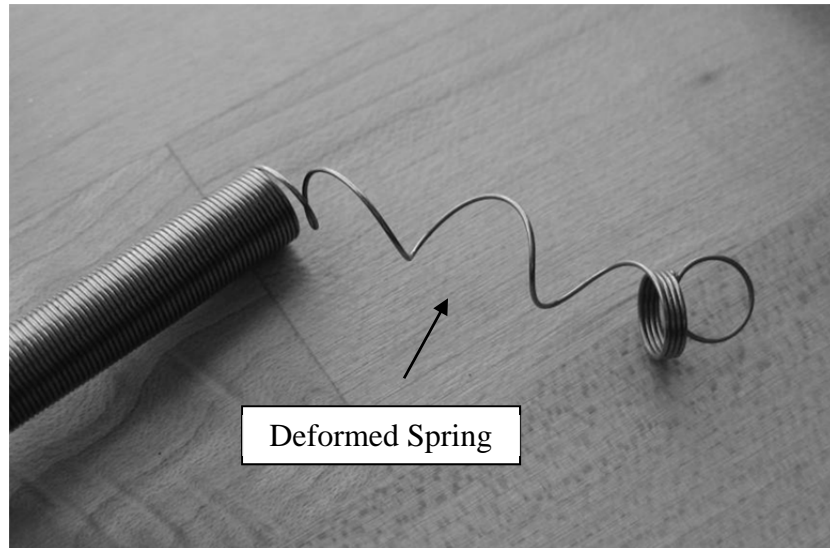
Carbon brushes slide into brass guide sleeves on opposite sides of the commutator. The brass guide sleeves align the carbon brushes with the motor.



Carbon brushes are found under brush caps.



Carbon brushes are attached to coil springs. Check the springs if the motor is turning slowly or not at all. Springs that prevent the carbon brushes from making full contact with the commutator must be replaced. Springs that are burnt, rusty, melted, or rigid must be replaced. Springs that are deformed or broken must be replaced.

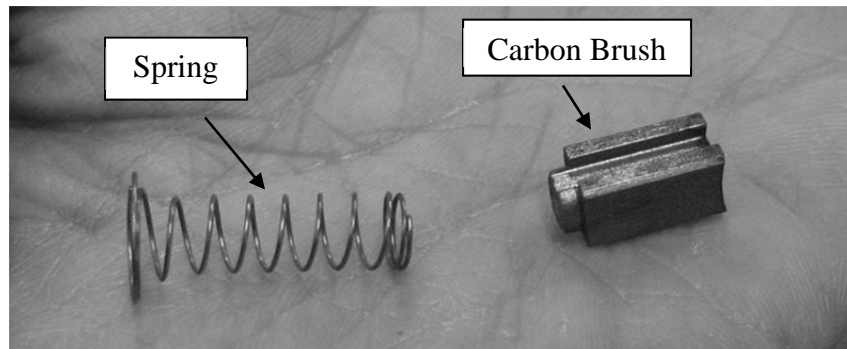


Springs that are detached from the carbon brush must be reattached.

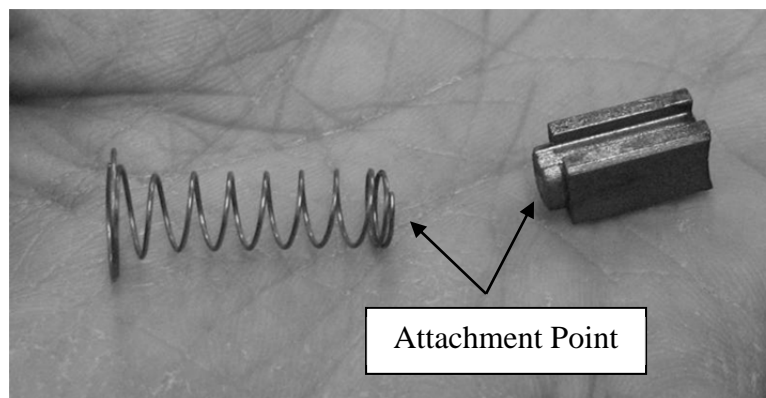
Procedure

Follow the procedure in *Motors-BrushSubstitution-Filing* to remove the carbon brushes from the motor.

Detach the coil springs from the carbon brushes.



Examine the springs. Determine whether or not any of the springs need to be replaced. Purchase a replacement spring if any of the springs are burnt, rusty, melted, or rigid. Purchase a replacement spring if any of the springs are deformed or broken. Try to purchase a spring with similar dimensions and similar elasticity to the original spring. Attach the new spring to the carbon brush. The diameter of the spring should ideally be slightly smaller than the attachment point on the brush.



Follow the procedure in *Motors-BrushSubstitution-Filing* to replace the carbon brushes and test the motor.

Exercise

Your instructor will provide you with a motor. Insure that your motor is disconnected from the power supply before working on it. Locate the carbon brushes, determine whether or not the coil springs need to be replaced, and test the motor.

Your instructor must verify your work before you continue.

Preventative Maintenance and Calibration

Always calibrate every medical device before returning it to use.