

Knowledge Domain: Power Supply
Unit: Plug/Cable
Skill: Fabricating Power Cords

Tools and Parts Required:

- 1) Digital multimeter (DMM)
- 2) Wire stripper
- 3) Screwdriver set
- 4) Outlet housing
- 5) Outlet cover
- 6) Electrical outlet
- 7) Electrical plug, male
- 8) Two-wire cable*

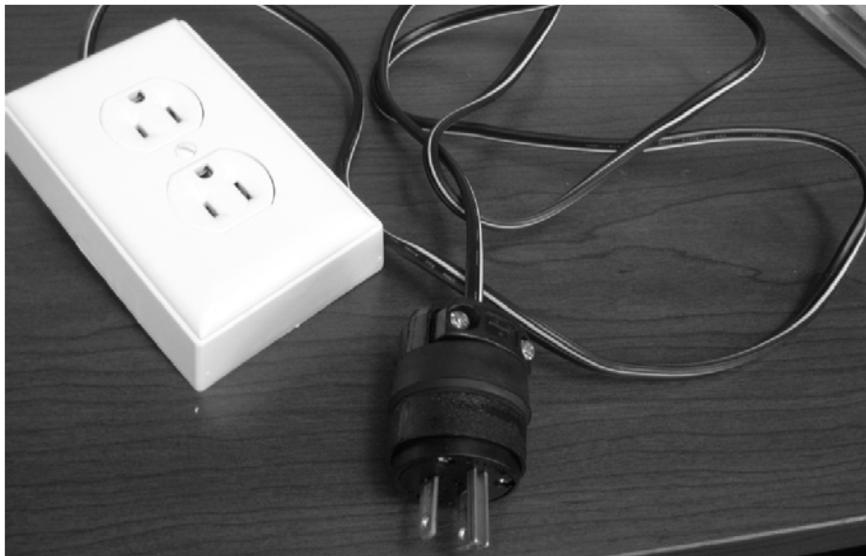
*Some countries and some devices require grounded connections. In these situations, use a three-wire cable. Connect the cable to hot, neutral, and ground.

Introduction

Power plugs and cables are used to connect electrical devices to AC power. Incorrectly wired plugs prevent a machine from working properly. Plugs with loose connections or faulty contacts prevent a machine from working properly. Frayed power cables can cause electric shock and prevent a machine from working properly.

Example

This is an example of a fabricated extension cord for U.S. plugs. The cord includes male and female connections. Plug and socket shapes vary from country to country. A different type of plug may be seen more commonly near you.



Identification and Diagnosis

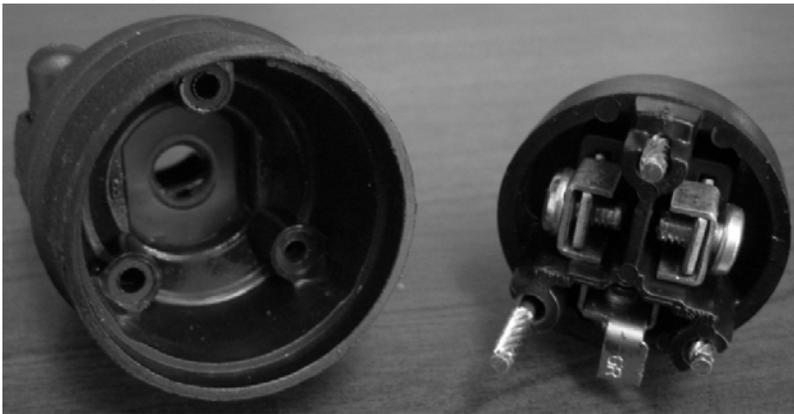
If a device is not functioning, inspect the power cable. Inspect the plugs. Use a DMM to check connectivity. Locate faulty connections in the power cable. Locate faulty connections in the plugs. Replace the cable if a repair is impossible. Replace the plugs if a repair is impossible.

Procedure

This procedure demonstrates fabricating and attaching male and female connections to power cables. The attachment procedure for connectors to cables remains the same with only a change in structure of the connectors. The following procedure can be used to fabricate an extension cord. For medical equipment, you may not need to replace both ends. Refer to this procedure when replacing any component of a power cord.

Fabricate Extension Cord

1. Open the male electrical plug to expose the inside connections. Use a screwdriver to help open any screws. Keep the screws in a safe place for reassembly.



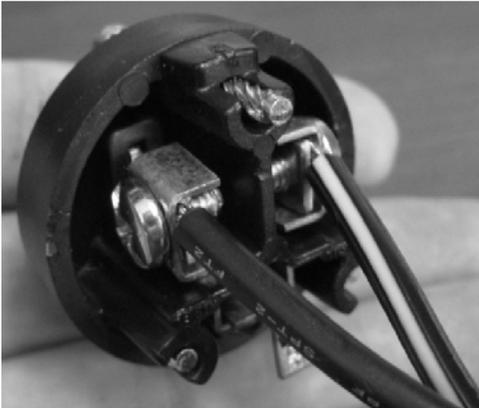
2. Slide the wires of the cord through the back end of the male electrical plug. Take care to slide the wires through in order of attachment to the plug connections.



3. Use the wire strippers to strip 1 cm of insulation from the wires threaded through the back of the plug at one end.



4. Connect the live and neutral wires to their plug connections. See the module on Outlets and Plugs for a list of proper wiring locations.



5. Secure the live and neutral wires with the securing screws. Insert the male electrical plug into the housing.



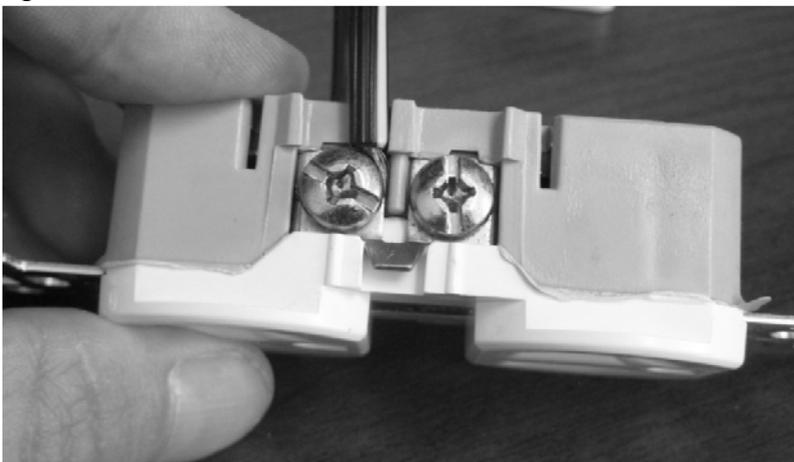
6. Pull the wires of the remaining end of the cord through the outlet housing. Only two wires are being used to fabricate the cable. So, the ground pin is not connected.



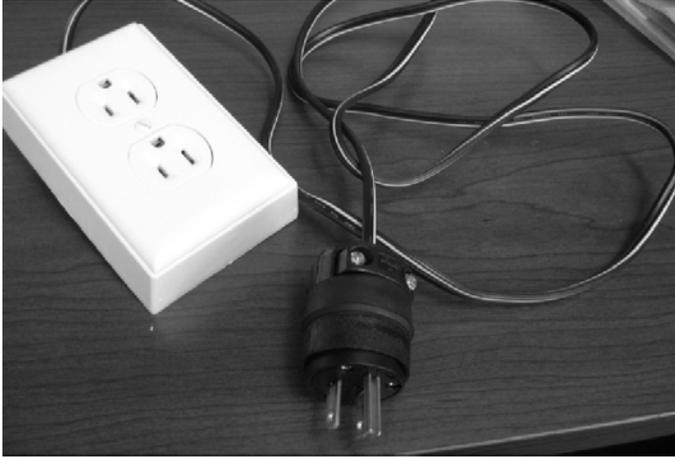
7. Use the wire strippers to strip 1 cm of insulation from both wires of the cord at the remaining end.



8. Connect the live and neutral wires to their respective locations on the electrical outlet. Wrap the wires around the securing screws in a clockwise direction. This ensures that tightening the securing screw will not loosen the wires as you tighten the screws.



9. Attach the outlet and outlet cover to the outlet housing.



Verify Power Cord

1. Set the DMM to measure ohms (Ω).



2. Place one probe of the DMM on the live pin (male end) and the other probe in the live slot (female end). Verify that the DMM reads $<1\Omega$ or Short.



3. Bend and pull the cable. Verify that the reading does not change. If readings change, check connections.



4. Repeat steps 2-3 for the neutral pin.

Exercise

Your instructor will now give you the materials required to fabricate your own extension cord. The connector may have 2 or 3 pins. Follow the procedure above. Your instructor must verify your work before you continue.

Preventative Maintenance and Calibration

Preserve plugs by inserting and removing wires with care. Place cables in locations where they will not be stepped on or crushed. Avoid sharp bends in cables. Check power cords on medical equipment for fraying.