GROUNDING PORTABLE ELECTRIC POWER TOOLS

1. INTRODUCTION

This section describes the proper grounding of portable electric power tools and methods of obtaining effective grounds.

2. GENERAL

2.01 The grounding of portable electric tools protects the operator from electric shock caused by insulation breakdown on current-carrying parts within the tool housing. Grounding prevents the appearance of voltage on the frame of the tool.

> **Note:** Tools operated from ungrounded portable electric generators (circuit isolated from ground) and ALL-INSULATED tools do not require grounding. ALL-INSULATED tools are completely enclosed in a tough insulating plastic housing and do not require any grounding. Since there are many partially insulated tools on the market it is important for your safety to use only ALL-INSULATED tools which have been approved for use in Bell Canada.

2.02 Grounding, as described in this section, is accomplished by a third conductor used to connect the tool housing to the local power grounding system or to other equivalent grounds such as a cold water pipe. (See Figs. 1 and 2)

2.03 Permission should be obtained from the property owner or an authorized person before connecting power tool to outlet receptacles on a customer's premises.

3. CAUTIONS

3.01 Use only electric tools provided by the telephone company.

3.02 Electric power tools should always be grounded except as noted in Para. 2.01. Take special care to ensure that this grounding is adequate (See Parts 4 and 5).

3.03 Before connecting a tool to a power supply, check the apparatus plate on the tool to be certain that the proper voltage and type of current (ac or dc) is available.

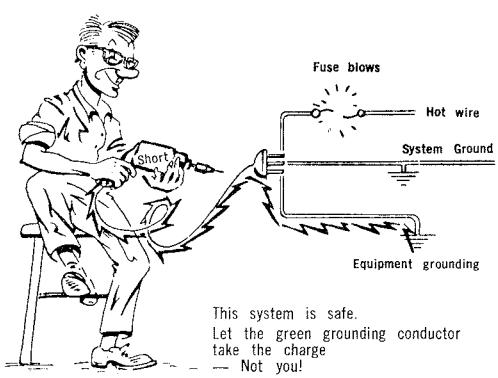


Fig. 1

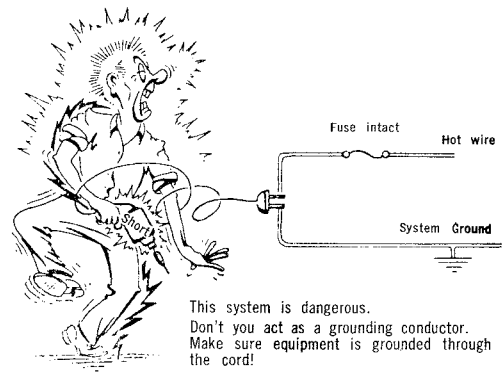


Fig. 2

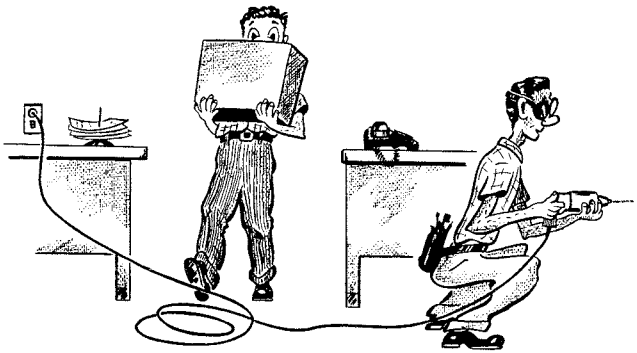


Fig. 3

3.04 Replacement cords should have equal or larger gauge wire than the original cord.

3.05 All cords assembled or repaired locally should be tested for continuity of the grounding conductor before connecting the tool to a power supply. Periodic testing of the grounding conductor should be followed in accordance with local procedures.

3.06 Make certain that the grounding connections do not become disengaged during the operation of the tool.

3.07 A power tool, even when grounded, must not be used while the operator is standing in water.

4. PROVISIONS FOR GROUNDING

4.01 All electric power tools except lamps, soldering coppers and ALL-INSULATED tools, must be equipped with a 3-Conductor cord which terminates in a U-Ground plug. (See Fig. 4).

4.02 Except for the tools mentioned in Para. 4.01, the U-Ground plug is currently furnished as standard equipment with all Bell Canada tools. If commercial power receptacles of the 2-Conductor parallel or crowfoot types are encountered on the customer's premises, one of the appropriate adapters shall be used. (See Fig. 5)

4.03 3-Conductor extension cords are required for connecting power tools to outlet receptacles remotely located from the work area. These are 25 ft. cords with 3-Conductors (#16 AWG) having standard plugs (U-Ground) at one end and U-Ground receptacles at the other.

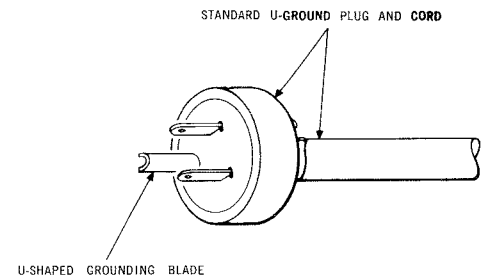


Fig. 4 — Standard U-Ground Plug

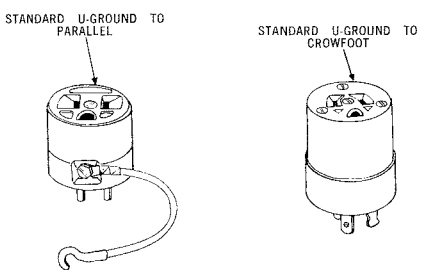


Fig. 5 — Adapters

5. METHOD OF GROUNDING

3-Conductor Grounding-Type Receptacles

5.01 The most satisfactory method of providing an effective ground is through the connection of a U-Ground plug to a comparable U-Ground receptacle (See Fig. 6). If outlet has a crowfoot or 2-Conductor parallel receptacle, use appropriate adapter. (See Fig. 5).

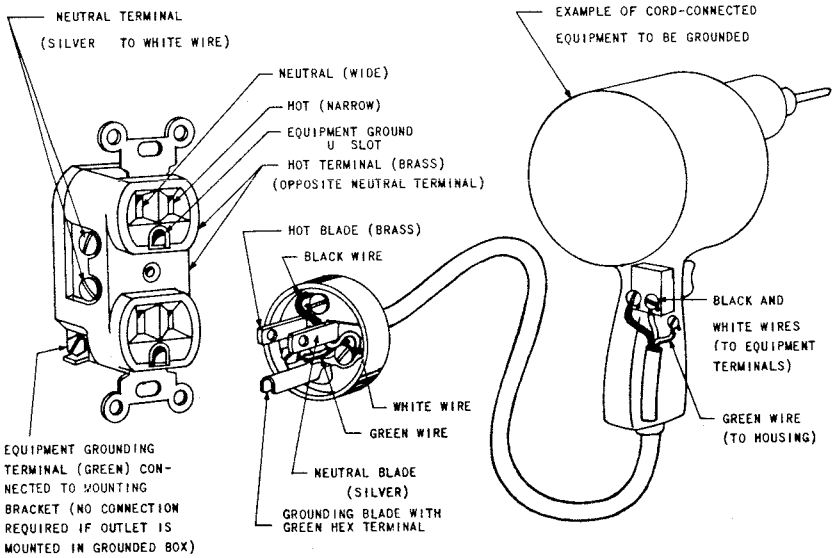


Fig. 6 — Typical Bell Canada Arrangement

2-Conductor Receptacles (Ungrounded Outlet Box)

5.02 Where electrical connections are to be made at 2-Conductor parallel ungrounded receptacles, the pigtail grounding wire or ground terminal must be connected to a suitable ground. This is accomplished as follows:

- Locate a nearby grounded object, such as a cold water pipe, to which the ground wire or grounding cord may be attached.
- Attach, between ground terminal on adapter and grounded object selected, a ground wire (See Fig. 7), making certain a good metallic connection at both ends is accomplished.

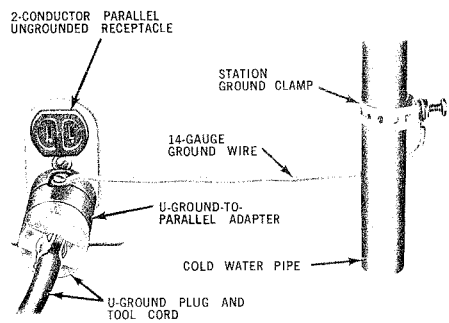


Fig. 7 — Ungrounded 2-Conductor Receptacle

- If grounded object selected is far away from power outlet use the B Grounding Cord to connect the object to the ground pigtail wire on the adapter (See Fig. 8).

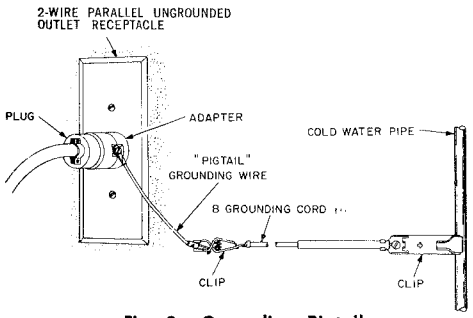


Fig. 8 — Grounding Pigtail

- The B Grounding Cord is a 15-foot, 18 AWG, Single conductor cord with clips at both ends (See Fig. 9).

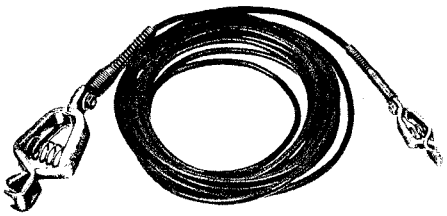


Fig. 9 — B Grounding Cord

2-Conductor Receptacles — (Grounded Outlet Box)

5.03 Where it is known that a building is wired with metallic conduit, armored cable, or nonmetallic sheath cable with a grounding conductor, the outlet boxes may be grounded. Under these conditions and only after it has been found that the boxes are grounded, the grounding pigtail terminal on the adapter or plug may be fastened under the coverplate screw of the receptacle. (See Fig. 10).

5.04 In grounding to a 2-Conductor receptacle (Fig. 10), connect pigtail to coverplate screw before inserting adapter into the receptacle.

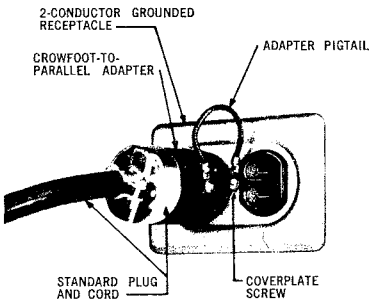
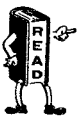


Fig. 10 — Grounded 2-Conductor Receptacle



If grounding cannot be accomplished as outlined in this section, the electric tool must not be operated. Nonelectric tools should be used to complete the job.