

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

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AT&T Co Standard

PRECAUTIONS
GROUNDING PORTABLE ELECTRIC TOOLS

Contents	Page
1. General	1
2. Precautions	2
3. Provisions for Grounding	2
4. Methods of Grounding	6

1. GENERAL

1.01 This section contains information on grounding of portable electric tools. It is reissued to include information on the D extension cord and to make other minor changes.

1.02 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 hazardous voltage on the frame of the tool.

Note: Tools operated from ungrounded portable electric generators (circuit isolated from ground) do not require grounding. However, some Bell System generators (1250 watt ac or 1350 watt dc) are equipped with a 3-wire grounding type receptacle with the ground connected to the frame of the generator. The 3-wire type receptacle has been provided to simplify the connection of various portable tools to the generator.

1.03 Lamps (including C warning flashers) and soldering irons do not require grounding. **All other portable electric power tools such as drills, hammers, saws, solder pots, etc, shall be grounded when operated from commercial power.**

1.04 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.

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

2. PRECAUTIONS

2.01 Care should be taken to ensure that the cordage between the electrical outlet and power tool and any grounding wires are placed where they will not interfere with the movement of the public or workmen.

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

2.03 Electric power tools shall not be operated while the user is standing in water.

2.04 Never use electric tools having damaged or worn cords.

2.05 Replacement cords shall have equal or larger gauge wire than the original cord.

2.06 All cords assembled or repaired locally shall be tested for continuity of the grounding conductor between the grounding blade of the plug and the housing or frame of the tool before connecting the tool to a power supply. Periodic testing of the grounding conductor should be followed in accordance with local procedures.

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

3. PROVISIONS FOR GROUNDING

3.01 All electric power tools requiring grounding as covered in Paragraph 1.03 should be equipped with a 3-conductor cord which terminates in a standard 3-blade plug (see Fig. 1).

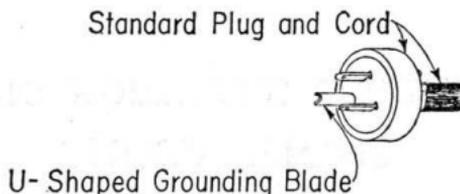


Fig. 1

3.02 The standard 3-blade plug supersedes two other types of plugs; 3-blade crowfoot (see Fig. 2) and 2-blade parallel with externally attached pigtail grounding wire. The superseded plugs may continue to be used until replacement is necessary, then replace with the standard plug.

Crowfoot Plug and Cord

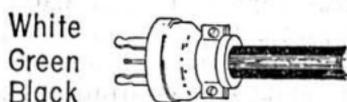


Fig. 2

3.03 Adapters shown in Fig. 3 permit electrical connections when the outlet receptacle is not the same type as the plug.

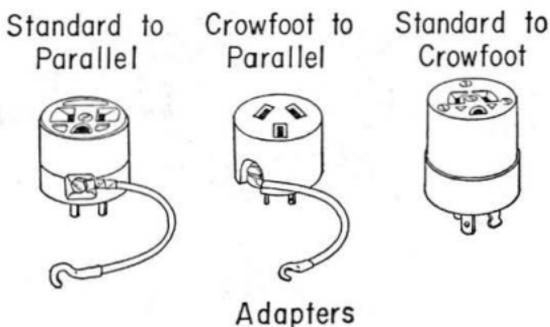
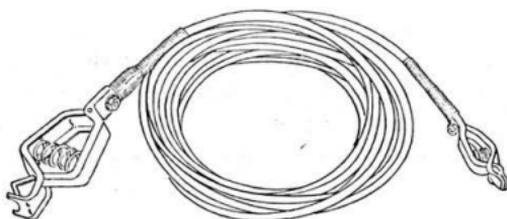


Fig. 3

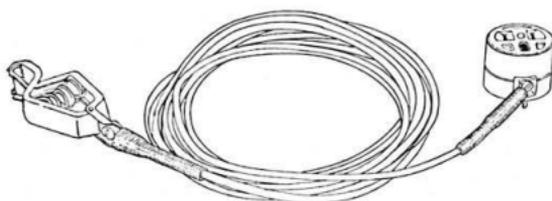
3.04 Connection of the "pigtail" grounding wire on adapters or attachment plugs to a suitable ground requires the use of an approved grounding cord. If a grounding cord is not available, a length of ground wire (14-gauge) may be used.

3.05 The B and C grounding cords, illustrated below in Figs. 4 and 5, are used to ground power tools at 2-wire receptacles. Each has a 15-foot, 18-gauge single conductor cord.



B Grounding Cord

Fig. 4

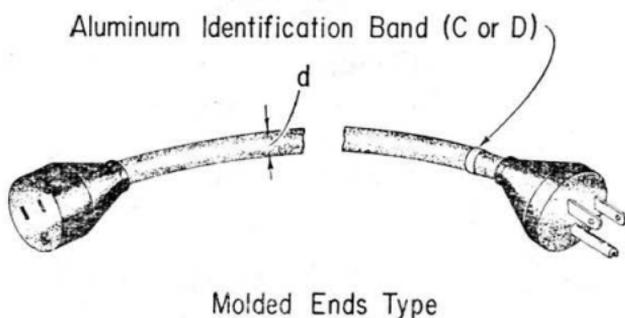
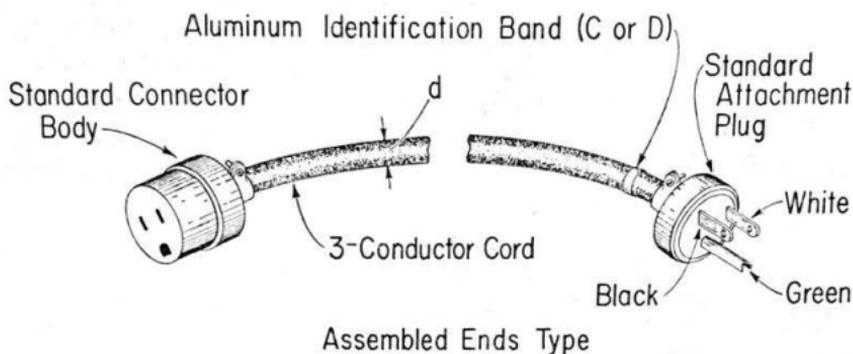


C Grounding Cord

Fig. 5

3.06 Extension cords (3-conductor only) such as the C or D extension cord, shown in Fig. 6, are required for connecting power tools to outlet receptacles remotely located from the work area. These cords consist of 30 feet of cordage having a standard plug at one end and a standard connector body at the other. The C cord uses 18-gauge conductors while the D

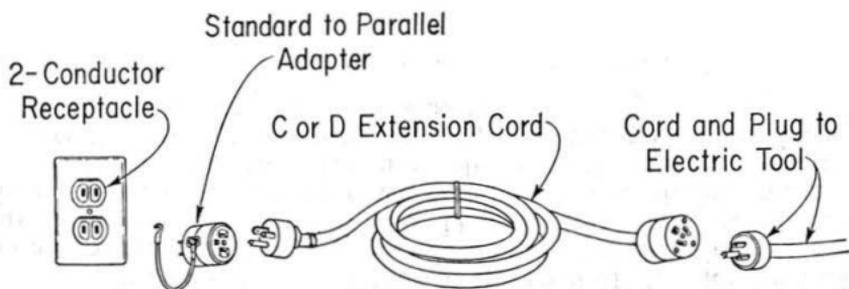
cord uses 14-gauge conductors. The D cord is considerably larger as indicated in Fig. 6 and has an aluminum identification band. This identification is also being placed on the C extension cord.



C Extension Cord, $d = .35$ inches (Approx. $\frac{1}{3}$ inch.)
 D Extension Cord, $d = .48$ inches (Approx. $\frac{1}{2}$ inch.)

Fig. 6

3.07 The conductor size of extension cords should be as large or larger than that of the cord of the electric tool. As an example, the cord of the 20-pound electric soldering pot has 16-gauge conductors. The D extension cord would be chosen if an extension cord were required. For similar reasons the 1/2-inch electric drill and the electric hammer would require the D extension cord. Fig. 7 gives a typical cord make-up using an extension cord and adapter.

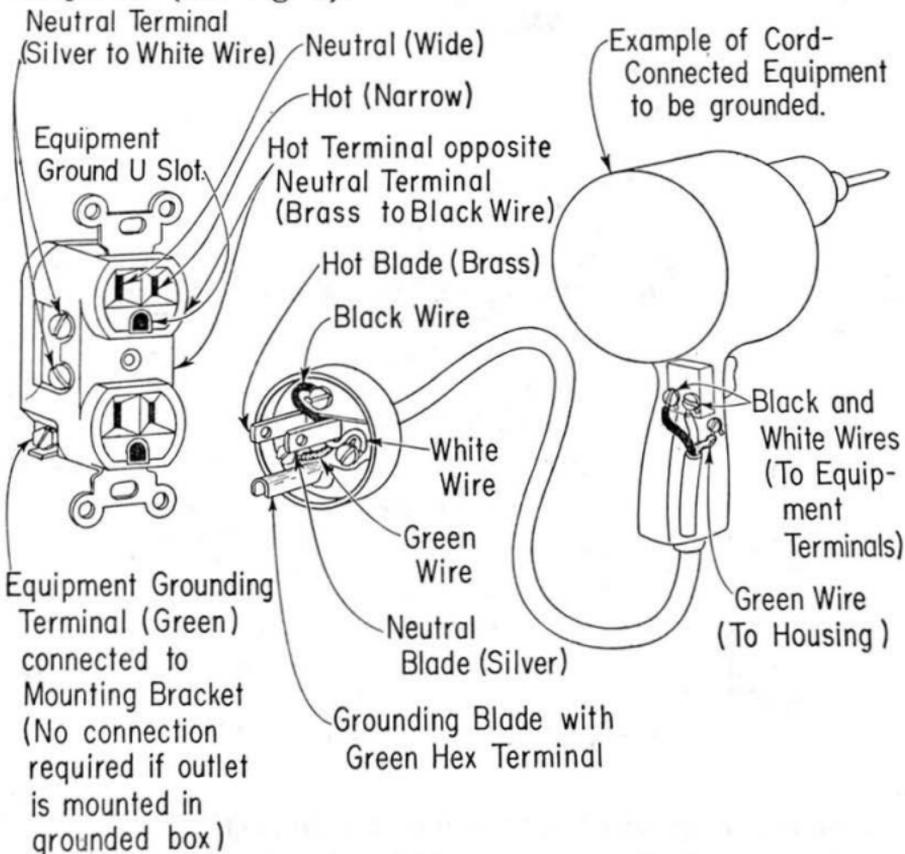


Typical Cord Make-Up

Fig. 7

4. METHODS OF GROUNDING

4.01 **Three-Wire Grounding Type Receptacles:** The most satisfactory method of providing an effective ground is through the connection of a 3-blade plug to a compatible 3-wire receptacle (see Fig. 8).



Wiring of 125-Volt Standard Plug and Receptacle

Fig. 8

4.02 If the receptacle is a crowfoot type, the standard-to-crowfoot adapter will be required (see Fig. 3).

4.03 **Two-Wire Receptacles:** Where electrical connections are to be made at 2-wire parallel receptacles, proceed as follows:

- (1) Locate a nearby grounded object to which a grounding cord may be attached. A cold waterpipe is preferred; however, other grounded objects such as cold water faucets, radiators, metallic power conduits, etc, may be used.
- (2) Attach the grounding cord to the "pigtail" terminal on plug or adapter and to the grounded object, making certain that a good solid metallic connection at both ends is accomplished (see Fig. 9).
- (3) Insert the adapter or plug into the outlet receptacle for operation of tool.

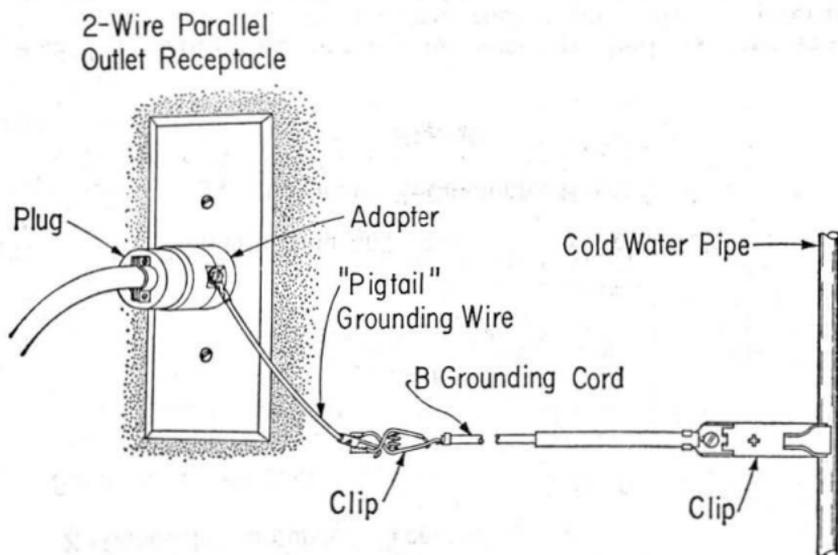


Fig. 9

Note: A length of 14-gauge ground wire and a station ground clamp may be used between the adapter and the pipe. (See Paragraph 3.04.)

4.04 **Two-Wire Receptacles—Grounded Outlet Box:** 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 reasonably be assumed to be grounded. Under these conditions and only after it is found that grounding cannot be accomplished as in Paragraph 4.02, the grounding "pigtail" terminal on the adapter or plug may be fastened under the coverplate screw of the receptacle. (See Fig. 10.)

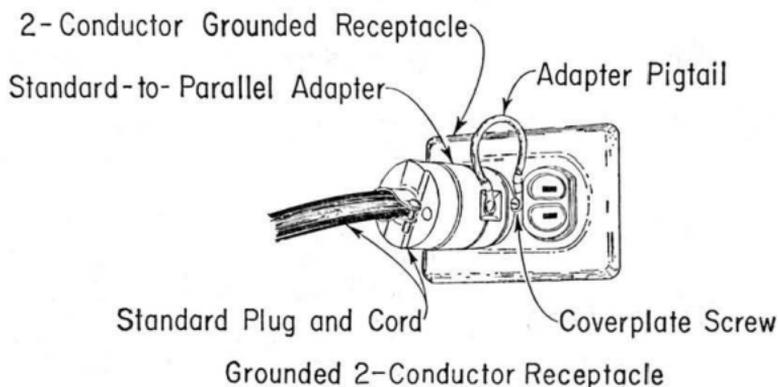


Fig. 10

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