

ELECTRICAL HAZARDS

For emergency grounding of electric tools, such as may be used by contractors before regular facilities are available, a flexible ground wire may be fastened directly to the noncurrent-carrying metallic parts of the tools and then fastened to a spring clip that can be clipped onto a good ground (metallic building framework, water pipe, etc.)

Built-in grounding One method of equipment grounding uses a three-conductor cord (four-conductor for three-phase circuit) with a multicontact polarized plug-in receptacle. This method ensures use of the ground because one wire forms a continuous path from the equipment through the receptacle to the ground.

This method of grounding can be used only where polarized receptacles that admit the polarized plugs have been installed. Otherwise, it would be necessary to use adapters or to change plugs, with resultant loss of time and possible hazard from wrong connections.

If portable electric tools are not properly grounded, accidents such as the following may occur:

- 1 While standing on a wet terrazzo floor, a worker using an ungrounded portable drill was preparing to drill holes in the floor. Insulation within the drill failed and its frame became "hot." Since there was no ground to carry off the current safely, it passed through the workman's body, killing him.
- 2 A workman was drilling holes in a large exhaust hood in a building in which the wiring had polarized receptacles. However, his tool had only a two-wire cord and was not otherwise grounded. A defect developed in the tool, and its case became energized. The man had been perspiring freely and was standing on a conductive tile floor. He was electrocuted.
- 3 A worker was using a portable electric drill while standing on wet ground. His drill was of the three-wire polarized type, but the location did not have polarized receptacles. The workman neglected to attach the ground wire of his adapter and, when the tool case became charged, he was electrocuted.

Since an early lack of standardization in the design of plugs and receptacles and in

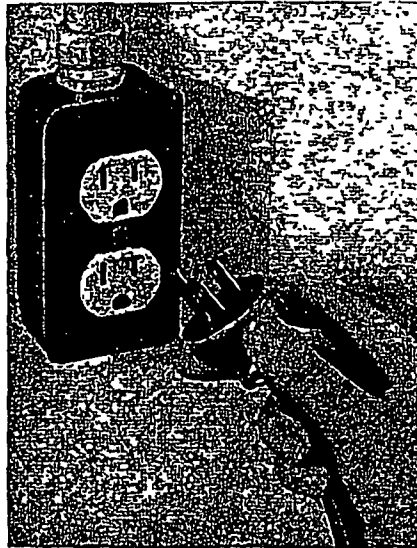


Fig. 31-5. This is the standard receptacle and plug recommended by the National Electrical Manufacturers Association. The receptacle is designed to receive a plug having three blades, a U-shaped or round grounding blade with two standard parallel polarizing blades. This type of fixture also permits use of the nonpolarized standard plug.

their application led to confusion, a standard^{*} was set up. This standard specifies that a receptacle similar in size and shape to the ordinary two-hole type be designed to receive a plug having three blades, a U-shaped or round grounding blade and two standard parallel polarizing blades (Fig. 31-5).

A receptacle of this type will permit use of the polarized or nonpolarized standard plug for such tools as soldering irons,

^{*}American Standards Association, 10 East 40th St., New York City. *Outlet Receptacles, Attachment Plug Caps, and Appliance Plugs*, with supplement C73.1 (Also NEMA WD 1-1961.)