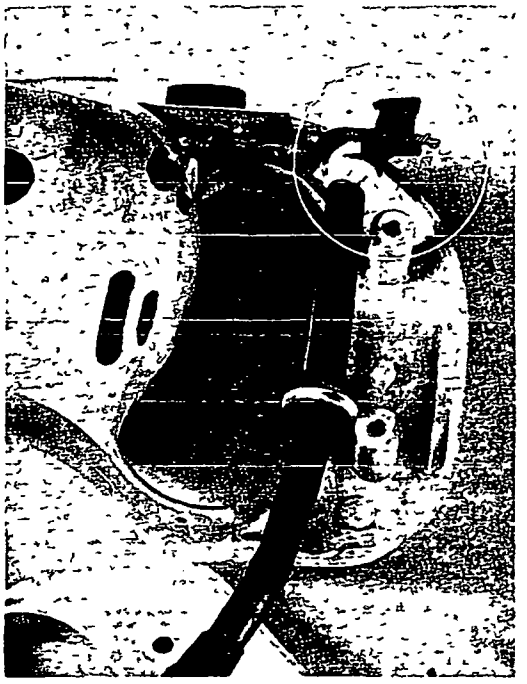

FIG 41–13.—In the circle is an exposed electrical connection inside the handle of a portable electric tool, creating a serious shock hazard. This sort of defect should be remedied only by an experienced electrician.

Motors, circuit breakers, moving parts of switches, and similar current-carrying devices wear out, break down, and need readjustments. Repairs on electrical circuits and electrical apparatus should be made only by experienced electricians (Fig. 41–13).

Only high-grade electrical equipment listed as standard by Underwriters Laboratories Inc., or other qualified authority, should be used in maintenance work. Inferior, unapproved equipment may become hazardous because of defective material or design or poor workmanship.

If practicable, conductors should be deenergized when maintenance work on them is necessary. Before they begin work, maintenance men should make certain that the line is dead by testing it with the voltage testing devices provided. *It is not safe to test a circuit with the fingers or with makeshift devices.*

The men should be instructed in the use of electrical testing equipment and meters: how to tap into the circuit, how to locate testing points from schematic diagrams, how to use insulated meter leads, clips, and probes, and how to fuse test circuits. Pliers, screw drivers, testing lights, and other tools used in electrical repair work should be insulated.

When maintenance or repair work must be done on energized conductors, it is advisable to have two or more employees work together. The supervisor should give detailed procedures to be followed. He should also see that maintenance crews are supplied with and use the right protective equipment.

The kind of protective equipment needed will be determined by the type of circuit, the nature of the job, and the conditions under which the work must be done. Rubber gloves, sleeves, mats, line hose, insulating platforms, safety headgear, safety glasses, safety belts, fuse tongs, and insulated switch sticks are among the more common items of equipment usually available.

Safety equipment should be inspected before use and retested at frequent intervals.

Because of the location of electrical equipment and circuits, the methods of maintaining them, and the insulated tools required, the maintenance man must be constantly on guard to prevent accidental grounding. Such grounding may result if an energized loose wire comes in contact with water pipe, conduit, metal fixtures, another wire, or anything metallic that is connected with the earth.

Lockouts

Unexpected operation of electrical equipment that can be started by automatic or manual remote control may cause injuries to persons who happen to be near enough to be struck. Unexpected starting of motors may injure men working on them as well as the men operating machines controlled by the motors.

For that reason, when men are to repair motors or other electrical equipment, the circuit should be opened at the switch box, and the switch should be padlocked in the "off" position and tagged with a description of the work being done, the name of the man, and the department involved. Warning signs or tagging alone does not provide the positive