tions where the probability of contact with the open circuit voltage may be greater.

Heavy duty AC welding machines (ratings usually over 500 amp for automatic machine welding) are also built with open circuit voltages of 75 to 80 volts with a special tap to provide 100 volts where necessary The tap may be needed to obtain rated output from the machine if the line voltage is low or if the voltage of the secondary circuit drops The tap should not be accessible to the welder for current adjustment but should be under the control of a responsible electrician or supervisor

Open circuit voltages should be as low as 50 volts on small AC welding machines used without expert supervision Since these machines are often used with low arc voltage electrodes and with leads not more than 20 ft long, the probability of a large voltage drop in the welding circuit is small

Cables

Welding cable is usually purchased in 50-ft lengths, and several lengths may be used in one circuit. Substantially insulated connectors, of a capacity at least equivalent to that of the cable, should be used to splice or connect cables Cable lugs used for connections should be securely fastened together by more than one bolt to give good electric contact The exposed metal parts of the lugs should be completely insulated

Welding cable is subjected to severe abuse if it is dragged over work under construction and across sharp corners, or run over by shop trucks Special cable with high quality insulation should be used. The fact that welding circuit voltages are low may lead to laxity in keeping the welding cable in good repair Operators and maintenance men should be instructed to see that defective cable is immediately replaced or repaired

On large jobs, there is likely to be much loose cable lying around Welders should keep this cable orderly and out of the way, preferably strung overhead to permit the passage of persons and vehicles Welding cables should not lie in water or oil, in ditches or bottoms of tanks Rooms in which arc welding is to be done regularly should be permanently wired with enough outlets so that extension cables will not have to be strewn about

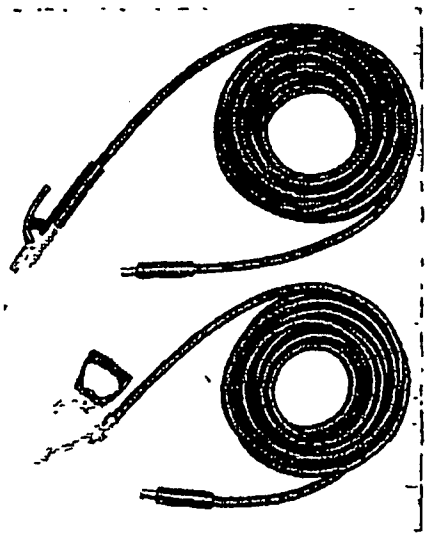

Fig 29-7. Fully insulated electrode holder on the electrode lead and the ground clamp on the work lead have insulated locking-type plugs for connection to receptacles on the welding machine.

Courtesy Westinghouse Electric Corp

Electrodes and holders

Arc welding is done with either a metallic or a carbon electrode The carbon electrode is usually a solid carbon or a graphite pencil, ¼ in in diam or larger, depending upon the amount of current used

For gas-shielded metal arc welding, the electrode is a solid or cored bare wire For shielded metal arc welding, the electrode is a covered wire.

Electrode holders are used to connect the electrode to the welding cable supplying secondary current Fully insulated holders (Fig 29-7) are preferred because there is less likelihood of accidentally striking an arc with such holders, particularly in close quarters

Electrode holders will become hot during welding operations if holders designed for light work are used on heavy welding, if connections between the cable and the hold-