

# Arc welding gun

By PHILLIP M. WILSON

You can spot weld, tack weld and burn holes  
in metal with this welding gun you can make yourself

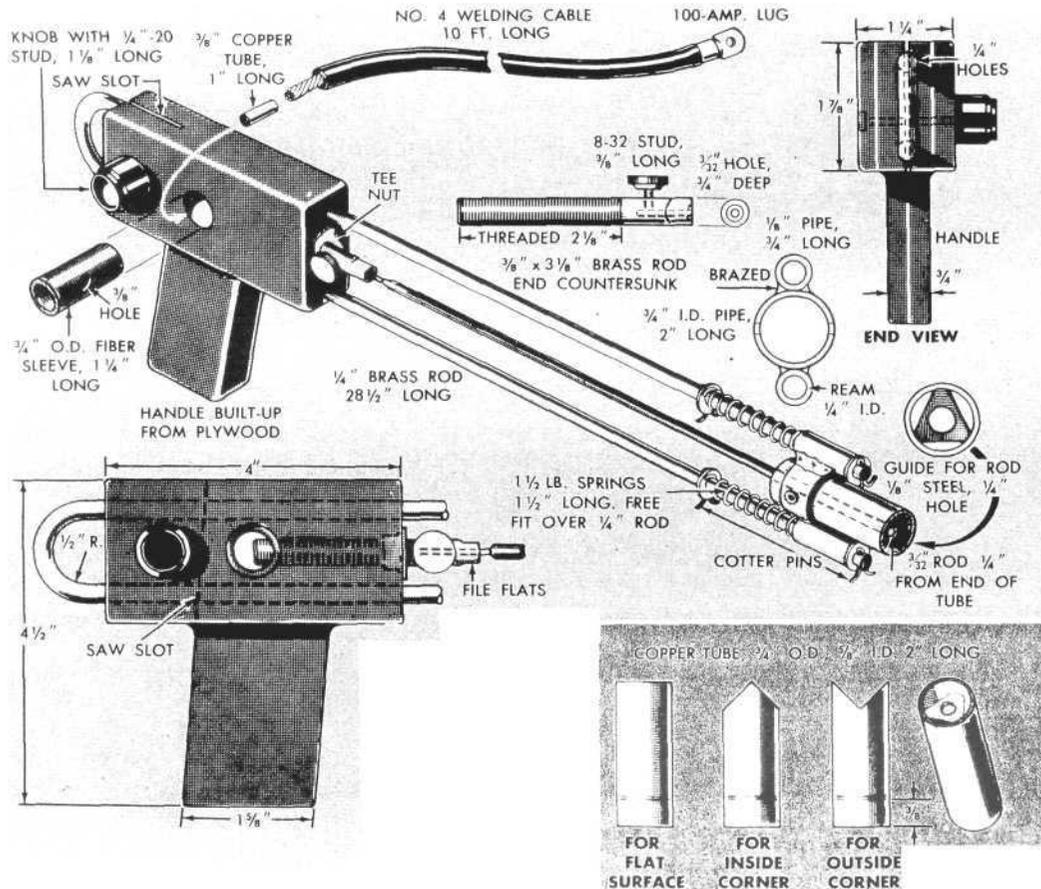
AFTER YOU BUILD this arc-spot welder, you'll find that you can spot weld sheet metal without a back up, also tack weld, and burn holes in sheet metal faster than you can drill them. And, as you use the gun, you'll discover many more jobs it will do faster, easier and better.

The "secret" of its operation is the copper nozzle that acts as a shield and heat sink for the arc. The tremendous heat is concentrated on a small area for a short length of time, and with the springs tending to push the gun back at the same time the rod is burning off, a spot, plug, or tack can be made in less than a second.

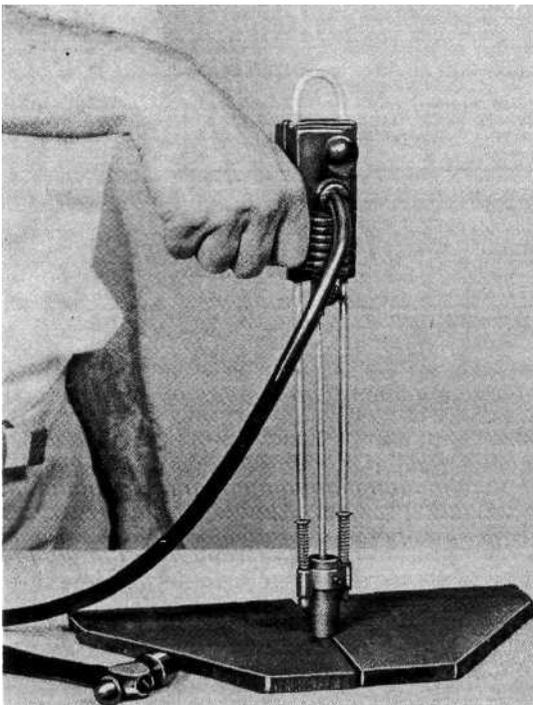
You have a lot of leeway when rounding up

the materials; in fact, your scrap box probably contains some parts that can be used. Just as an example, the handle on this welder was originally part of a toy machine gun. Incidentally, if you can manage to wangle your son's tommy gun, the handle will probably need some beefing up. The best bet is to fill it with epoxy after adding hardener. If you prefer, pieces of plywood can be sandwiched together with epoxy to form a handle like this prototype. When the cement has hardened, the block can be sawed to shape and sanded smooth.

A saw slot cut in the rear of the handle allows the clutch knob to tighten the hairpin-shape slide rod. The knob should be tightened just enough so that the electrode can be fed with an easy downward push. An electronic supply house or radio repair shop can supply a knob of this type



Set the heat as you would for regular welding, push the nozzle down and then let up for a tack joint. Wear goggles when working with the arc-gun



or you can improvise one from a 1-in.-diameter plastic medicine-bottle cap, filled with epoxy. Before the cement hardens, embed a 1/4-20 bolt, head down, to serve as a stud. The knob on the conductor screw that holds the electrode can be made in the same way. Keep in mind that both the knob and the stud are part of the electrical circuit and therefore must be made of some insulating material.

A 3/8-in. hole drilled in the side of the handle accepts the fiber or plastic sleeve that provides insulation for the welding cable. Drill a 3/8-in. hole in the side of the sleeve to take the conductor screw, then drill and tap the front of the handle for the threaded brass rod that holds the electrode. Since no great pressure is required, it is all right to tap the wood, but you can use a Tee-nut instead. If you do, remember to check to see that it doesn't make contact with the slide rod and short it out.

The next step is to drill two holes in the handle

for the slide rod. The holes are 1/4 in. on 1-1/4 in. centers and must be drilled exactly parallel.

The cable used here is an extra-flexible no. 4 rubber-jacket type, but no. 6 superflex would have been easier to handle. Attach a 100-amp lug to one end of the cable and at the other end slip on a 1-in. length of 3/8-in. copper tubing to withstand the pressure of the conductor screw.

The nozzle holder is 3/4-in. black pipe, 1/2 in. long. The slide made from a 3/4-in. length of 1/8-in. pipe is reamed out to 1/4 in. i.d. After riling both slide pieces to the required 1-1/4 in. center measurement, clamp them to the nozzle holder and braze the joints. The nozzle is secured by two socket-head setscrews inserted in holes tapped in the nozzle holder.

A rod guide formed from 1/8-in. steel is press fitted to a depth of 3/8 in. inside each nozzle. This keeps the rod centered and prevents arcing against the side of the nozzle.

The slide rod is 1/4 in. o.d. and is made of brass, bronze, stainless steel or other noncorrosive metal.

After assembling all the parts, clip the cable lug onto your electrode holder. Use the ground of the welder in the usual way. Slip a match tip, self-starting arc-welding rod (available from mail-order stores) into the conductor tube and adjust the clutch knob for 1/8 to 1/4-in. space between rod end and nozzle tip. Then set the heat at 75 amps and press the nozzle down against two pieces of sheet metal that are to be tacked. There will be a slight hiss and a little smoke. Release the pressure to stop arcing and inspect the joint. If penetration is insufficient, increase the heat and the pressure time. For burning holes it's best to use high heat and a short pressure time.

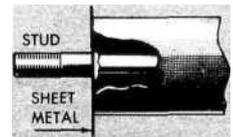
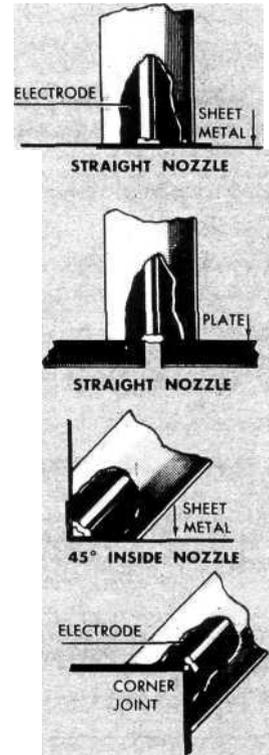
When welding together two pieces of sheet metal remember that timing of dwell determines the type of weld. Momentary contact will produce a spot weld, longer contact a plug weld on metal

Tacking two pieces of plate before making a conventional weld can be accomplished without the use of a welding mask because the nozzle acts as a guard. For safety wear flash goggles

Spot or plug welding an inside corner calls for the use of a special-purpose nozzle

This nozzle holds the welding electrode at a 45-deg. angle for tacking or spot welding of an outside corner

Welding a stud to a sheet or light plate stock is possible by completely penetrating through to the stud from the reverse side of the work



STRAIGHT NOZZLE

The welding gun, shown below with its four quick-changeable nozzles, can handle a multitude of jobs

