

FOR less than the price of a soldering iron you can build this low-cost arc welder in an evening. The result is not a toy but a genuine arc welder which also can be used for brazing, cutting and heat-treating. Naturally it won't compete with large commercial models with outputs of several hundred amps, but it does a creditable job around the home and shop on metals up to a quarter-inch thick.

When brazing and cutting, the welding rod is replaced by a carbon rod. Two such rods are used to strike an arc with an intense flame, producing temperatures in excess of 10,000°F. This is more than enough heat for brazing and cutting most materials.

The welder is a resistance type unit—that is, resistance coils are wired in series on both sides of the line. This serves to drop the output to about 30 volts. When an arc is struck, the circuit is closed and the coils become red hot. Because intense heat is produced by the coils, the housing must be well

ventilated and carefully constructed.

The construction is simple and the chances are you have some of the necessary materials on hand. Start by cutting the chassis from a piece of 1/8-in. asbestos shingle. The shingles measure 12x24-in. so you'll have more than enough material from a single shingle. The asbestos is tough and cannot be cut with ordinary woodworking tools. A hack saw with a hardened blade or a saber saw fitted with a metal-cutting blade is recommended.

Cut both the chassis and coil support, then save the left-over piece and use it as a heat-resistant pad when working on small jobs. After cutting, file the edges smooth and drill the necessary holes as indicated.

The sides are formed from a single piece of perforated steel. Cut the strip to the exact length and width indicated with a pair of shears. Then use a marking pen to indicate the bend lines. Notch the flaps at the bend lines and use a block of wood as a form to fold the flaps.

FOUR-BUCK WELDER

By John Capotosto

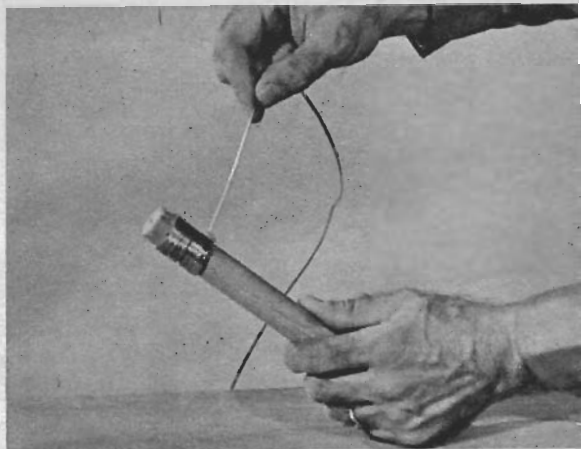
A few raps with a hammer may be necessary to produce a clean bend.

The top panel is cut from a piece of thin steel. Locate the centers for the rivet holes in the top panel, then attach it to the sides with tape. Use the forming block to support the flaps, then drill.

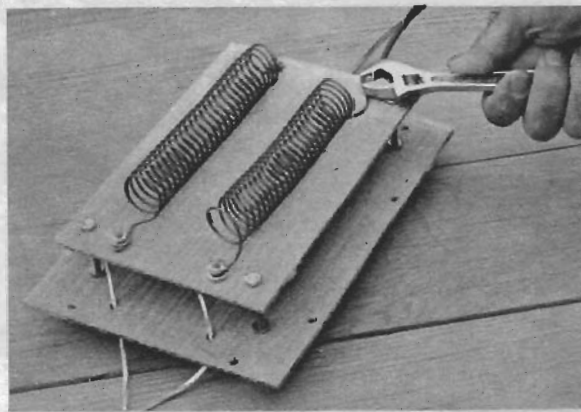
The resistance coils are prepared next. These are wound from No. 14 Nichrome wire. This is similar to the wire used in heater elements except it's much heavier. Use a short length of dowel or broomstick with a diameter of $\frac{7}{8}$ -in. Drill a starting hole at one end of the dowel, insert the wire, then carefully wind the wire 28 turns. Keep them tight and close to each other. Snip the captive end of the coil to release it from the form, then twist the ends into small loops to fit around the terminal screws.

Assemble the chassis and coil support with screws as shown. Use No. 10 wire for the input and output leads, connecting the coils in series on each side of the line. Tighten all connections, then assemble the case with rivets.

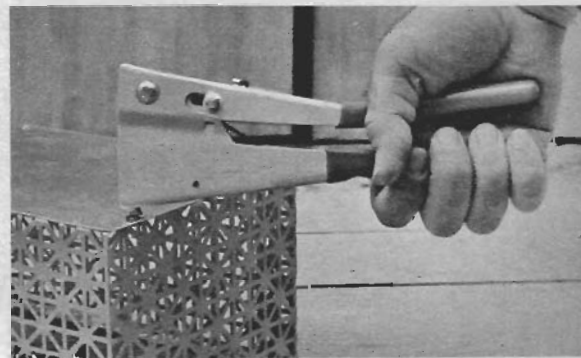
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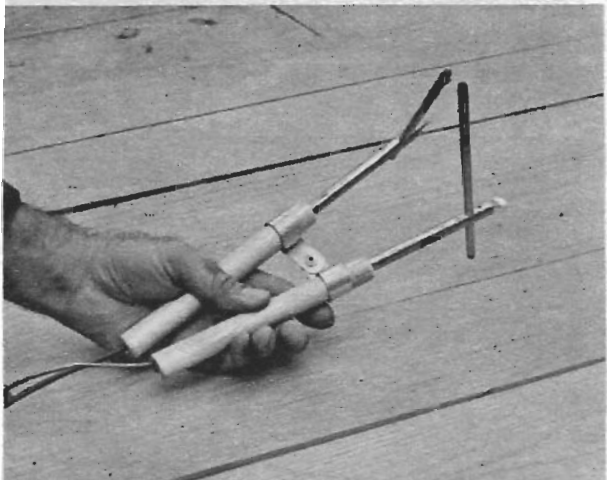
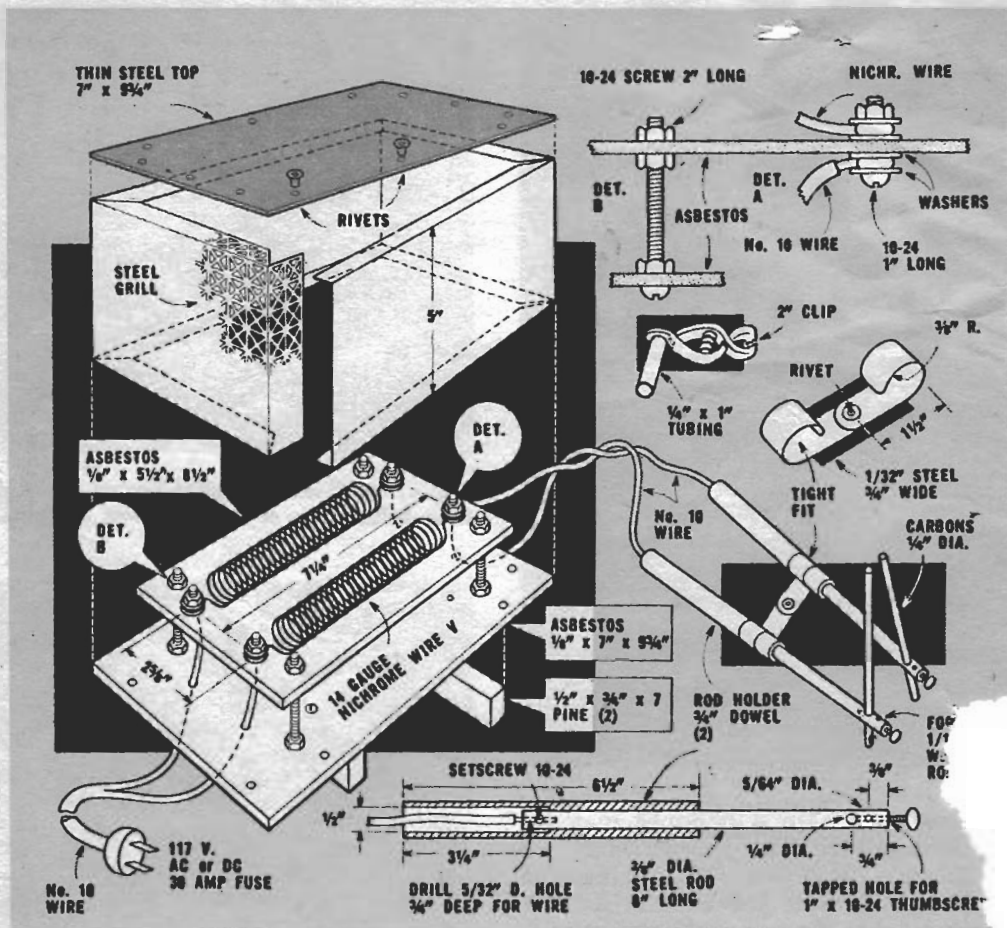
RESISTANCE wire is wound around dowel to form coils. Each of the coils has 28 turns.



COILS are stretched between binding posts and then secured to the four terminals.



METAL grill is used as considerable heat is produced. Rivets simplify construction.



HOLDERS are assembled with bracket when welder is used as cutting or brazing tool.

The rod holders are made from $\frac{3}{8}$ -in steel rod. Drill and tap both ends as indicated. Then connect the wire leads and insert the holder into wood handles. The rods should fit the handles snugly. If you find they are too loose, flatten the rods slightly with a hammer and force them into the handles.

The rod-holder bracket is made to disassemble quickly in order that the holders may be used singly or in pairs. The holders are used in pairs with twin carbons as a torch for soldering, brazing and cutting. The holders are separated and used singly when arc welding. In the latter case, one holder grasps the welding rod while the other is connected to the work with an alligator clamp.

The welder will operate on 117 volts AC or DC. The fuse must be 30 amps and the wire [Continued on page 119]

[Continued from page 86]

connecting must be no thinner than No. 10. The open circuit no-load is 117 volts so certain precautions must be taken when operating the welder. *Never grasp the electrodes when the unit is plugged in.* Never use the welder without gloves and never touch the cabinet as it gets quite hot (this is normal). *Do not work on grounded objects.* Do not stand on wet ground or a wet floor. *Always use the insulated asbestos as a pad on the work table.*

Because ultraviolet rays are produced by the arc, always use a special welder's face mask with tinted eyepiece. This is a must because looking directly at the arc can damage your eyes.

To use the welder, place a rod into the small hole in one of the holders and tighten up on the thumbscrew. Insert the alligator clamp into the other holder and clamp this to any part of the work. Plug in the welder, then strike an arc by drawing the rod lightly over the work piece. Tip the rod slightly and move it quickly. When it arcs, draw it away from the work for a distance of $\frac{1}{8}$ -in. Then begin welding.

Parts to be welded must be clean and the ground clamp must make good contact with the work. Draw the rod slowly along the seam in a zigzag motion to make a continuous weld. After a pass is completed, chip away the slag which forms on the weld. Then if necessary, lay on another bead to build up the deposit. This may be repeated as many times as necessary.

To use the torch for brazing or cutting, insert a carbon rod in each holder and assemble the holders by means of the bracket. Do not overtighten the set screws or the rods may break. Twist the holders so the rods form a V. Plug in the welder and, using the holders as you would a pair of pliers, bring the rods together. Let them touch, then slowly move them apart to strike an arc. Keep the tips approximately a quarter inch apart. As they wear, keep the gap adjusted accordingly. Play the flame back and forth over the work area, then feed the rod into the joint.

If you have difficulty locating the special resistance wire it can be purchased from the Armor Co., Box 290, Deer Park, N.Y. 11729. The price is \$2 postpaid. •