

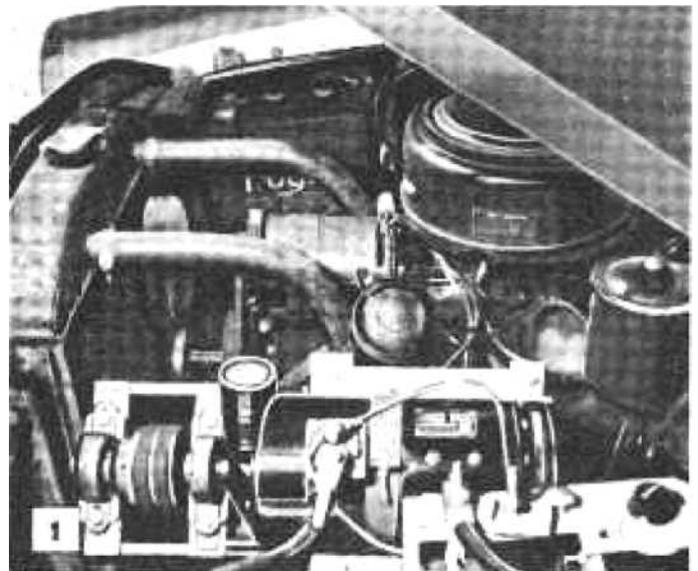


AUTO-POWERED ARC WELDER

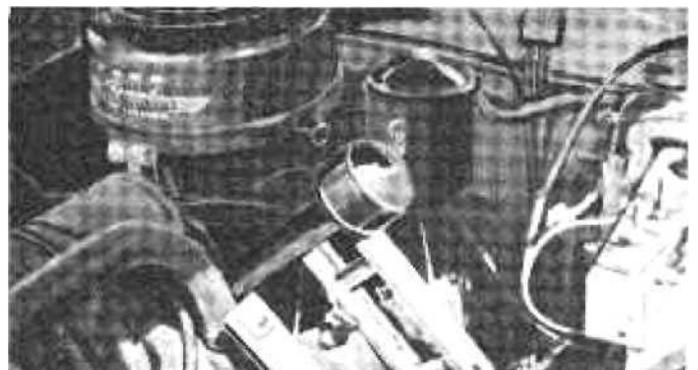
By Norman E. Schuttz

S'MALL ENOUGH to be hidden beneath the hood of a passenger car, yet powerful enough to handle electrodes up to 3/16-in. dia., this 200-amp. welder is powered by the engine of the car in which it is installed, and can be taken anywhere that an automobile can be driven.

The main component of the welder is a war-surplus Delco Remy P-1 aircraft generator that is rated at 24 v. and 200 amp. at 2500 to 4000 r.p.m. Since this generator has a counterclockwise rotation, it must be turned end for end and driven from the commutator end when rotated by a car engine. This requires that the floating shaft, which drives the free-turning armature, be removed from the generator and modified. First, cut this shaft about 1 1/2 in. from the driving spline. Next, center-drill the end of a 7-in. length of 3/4-in. steel shafting to provide a press fit for the cutoff shaft. Force the 1 1/2-in. length into the hole in the new shaft and braze or weld it in place. Mill a 3/16 x 3/16-in. keyway 4 in. long in the end of the shaft to hold the pulleys and bore a clearance hole for the shaft in the end housing of the generator opposite the original location. The shaft now will project from the end of the



Above, welder connected and ready to run. Below, support frames bolted to head, ready for welder



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generator, One flange of the 1/8 x 1 1/2 x 1 1/2 in. channel is cut back to 1/2 in. as indicated. When assembling the frame, first mount the two self-aligning, pillow-block bearings on the shaft; then adjust the various frame members to keep the shaft aligned properly while they are welded together. Front and rear supports for the generator frame are shown in Fig. 5. These supports were designed to hold the frame above the spark plugs when they are bolted to the head of a 1953 or 1954 "flathead" V8 engine, Fig. 2. Supports for bolting the generator frame to in-line-type engines and overhead-valve V8 engines will have to be modified or redesigned to suit a particular engine. Steel angles, spaced by lengths of 3/4-in. pipe, were used on the original supports. Holes in the bottom angles are 1/2-in. dia. to fit over the head bolts while holes in the upper angles are 3/8-in. dia., and are matched by holes in the generator-support frame. When considered necessary for more rigid mounting, a center support also can be used.

Drive Pulleys

A 3-in.-dia. double V-pulley is fitted on the welding-generator shaft. A 6-in.-dia. double V-pulley is welded to the crankshaft pulley of the car engine. Care must be taken in the latter operation to make sure the double pulley is centered on the crankshaft pulley to prevent misalignment. The center of the double pulley is **cut out** to permit tightening the pulley **nut** on the crankshaft. Because the engine-fan will strike the modified pulleys, it is necessary to reposition it. Remove the blades from the fan hub, insert spacers and rivet the blades to the hub as shown in Fig. 8. On a different type of engine, more or less modi-

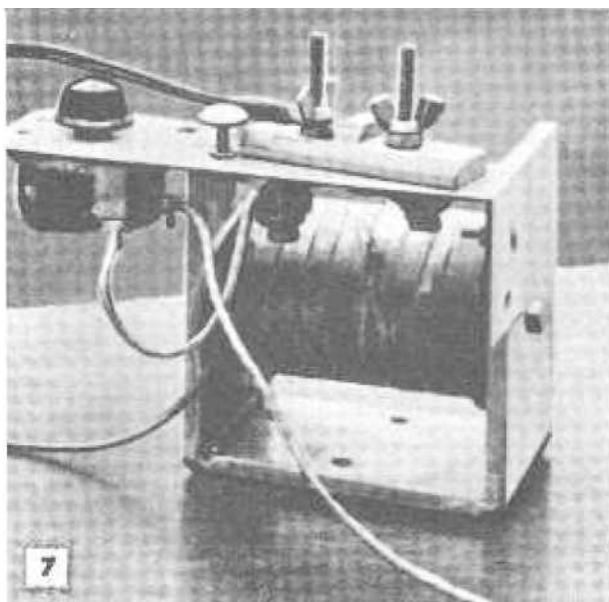
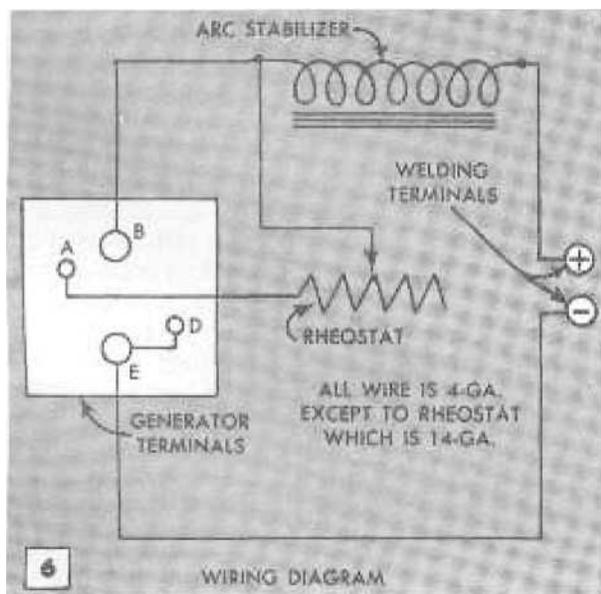
fication of the fan may be required. When the fan is moved forward it requires that the radiator be moved forward a similar distance to keep the fan blades clear of it. On the original car, four 5/8-in. hardwood blocks were used as spacers to relocate the radiator. Sheet-metal pans at the top and bottom of the radiator may require cutting or bending to allow the forward movement of the radiator.

Arc Stabilizer and Rheostat

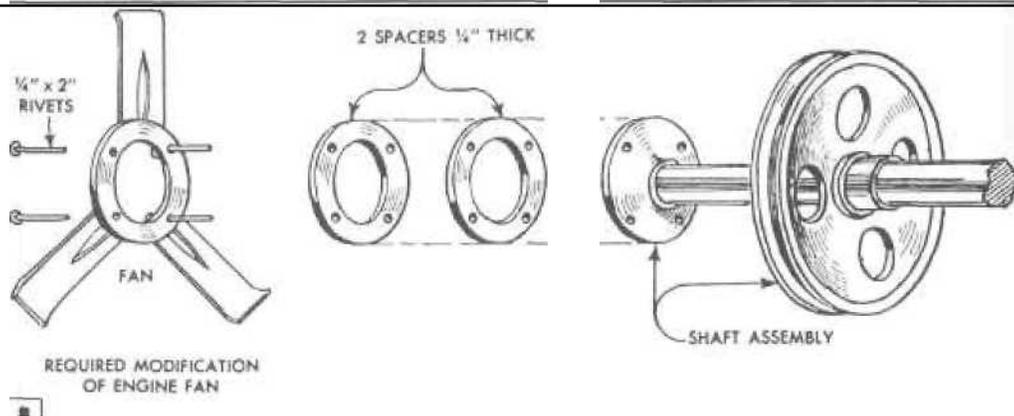
To assure that the welder produces a steady arc, an arc stabilizer must be wired into the welding circuit. The stabilizer, Figs. 3 and 7, consists of a core of 2-in.-dia. cold-rolled steel approximately 5 1/2 in. long. First, a layer of insulating cloth is wrapped on the core, then five layers of 4-ga. enamel-coated copper wire are wrapped on the core, each layer being separated by insulating cloth. Finally, the completed core is wrapped with tape and tied to make sure the wire stays wrapped tightly. The beginning and end leads are left about 9 in. long to permit attaching them to the terminals. Make sure the ends of the stabilizer core make good contact with the metal frame which is made of double 8-ga. sheet steel. Short flanges are bent along the edges, then mitered at the corners and welded to provide additional strength as shown in Fig. 7.

The frame for the stabilizer also is used to support the rheostat, terminal connections and throttle for controlling engine speed, Figs. 3 and 7. The rheostat is a heavy-duty type, rated at 6 ohms, 11.1 amp. Fig. 6 is a wiring diagram, showing the connections between the stabilizer, welder and rheostat. Note that all wires in this circuit are 4 ga., except the lines to the

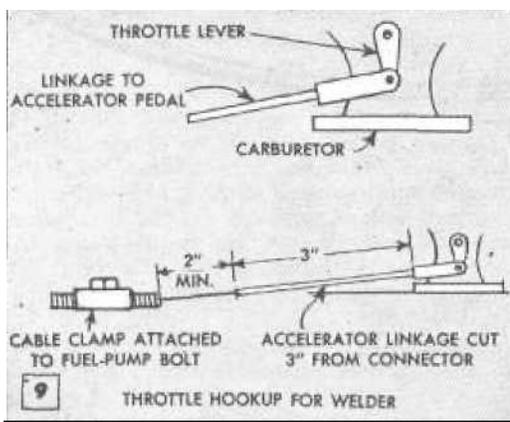
Arc-stabilizer-rheostat assembly. Note how flanges are bent on stabilizer frame for added rigidity



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Original engine fan was modified by removing blade from hub, adding spacers, then riveting blades



One method of controlling engine speed requires choke cable to which linkage is welded as shown

rheostat which are 14 ga. As shown in Figs, 1 and 2, the stabilizer-rheostat assembly is bolted to the inside of a fender. Large washers on the underside prevent the bolts from pulling through the sheet, metal of the fender.

Throttle Hookup

To control the speed of the car engine and thus the r.p.m. of the welding generator, it is necessary to add an auxiliary throttle control to the carburetor. As shown in Fig. 9, some cars are equipped with throttle linkage that has spring-loaded connectors that easily snap off without tools. An extra piece of the linkage is welded or brazed to the end of a choke cable that leads to the stabilizer frame where it is easy to reach when operating the welder. To change from control by foot throttle inside the car to hand control at the welder requires only unhooking one control and hooking on the other,

On engines with other types of linkage connectors it may be possible to locate the

choke cable so that it can be hooked onto the throttle lever without the necessity of removing the regular foot-control linkage, in some cases, the latter-type linkage is bolted together and requires the use of wrenches for disassembly. The less time required to connect the welder to the engine, the more time used profitably for welding, so it is important that any short-cut in making the hookup be considered,

Operating the Welder

Two heavy-duty V-belts are used to drive the welder from the crankshaft. Belts for the original installation were 54 in. long. Belts for other type installations are selected by measuring the distance around and between both sets of pulleys. To install the belts on the generator pulleys, the front pillow-block bearing is removed, both belts clipped over the pulleys, then the bearing is reinstalled. To fit the belts on the crankshaft pulleys, tip the forward end of the welder frame down, loop the belts over the crankshaft pulleys, then level the welder. Belt tension is adjusted by fitting thin washers or sheet-metal shims between the forward ends of the welder frame and the support frame.

When the welder is to be run continuously for some time on a big job, connect the air scoop of the welding generator, Fig. 5, to the air horn of the carburetor with flexible tubing. Carburetor vacuum will draw air through the generator housing, thus cooling the generator. An ammeter and voltmeter are not wired into the welder, and since each welder will differ in characteristics due to being custom-built, no precise calibration of the rheostat is suggested. After a few jobs with the welder, the operator will become familiar with the machine and can make his own calibrations, which can be marked on the frame under the rheostat dial, * * *

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