Boiler gets first test. Gauge is put on, shell filled completely with water, and small force pump connected. At 200 lb., pinhole leak was revealed. Quick work with torch sealed it.

After second test, in which boiler held 300 lb. pressure for an hour, fittings were taken off and holes drilled for steam gauge and try cocks. Next, washing in hot water removed flux.

Expert know-how enables Bohaboy to bend sheet-iron casing in a jiffy. Here he forms bottom on a homemade brake. Casing is asbestos-lined. Bead holds stack above top; tabs, below.

Shell slips into casing ends, and body over all. Horizontal tube is part of superheater, a 3' loop of 3/16" copper tubing running from throttle and carrying steam through fire.

ing them for 28 years. A PS photographer and writer peered over his shoulder in his tool-crammed workshop as he built one. Starting with raw material cut to size, he wound up a few hours later with 75 lb. on the gauge and a twin-cylinder engine humming briskly alongside. The photos on these pages show how the job was done.

This boiler really steams. Showing pressure in about four minutes from a cold start, it'll run a 3/8"-bore, double-action engine about 25 minutes on less than a quart of water. Ten water tubes, a superheater coil, and an effective burner, all jacketed in an asbestos-lined case, turn the trick.

The joints are simple—they're butted and silver-soldered. But don't, Bohaboy warns, try to imitate this type of construction with soft solder. The boiler would be as dangerous as a live rattlesnake. Only low-pressure boilers can be built with soft solder, and then only if all parts are screwed or riveted for strength before any soldering is done. Silver solder, on the other hand, makes a joint almost as strong as the parts themselves. You need a gas torch for the work.

Safety valves, try cocks, and throttle are so cheap as to be scarcely worth making. Bohaboy prefers try cocks to a water gauge. Smaller steam gauges can be bought if one wants to stick close to scale size in details.

No boiler should be fired up until it has been given a hydrostatic test. One method is to fill it completely with water (plugging all openings) and with a gauge connected, lay it on a gas flame. Pressure will rise rapidly, but any rupture will harmlessly release the water. A better method is to attach a powerful water pump and build up pressure with this. Either way, no harm is done if the boiler can't "take it." Boilers are commonly tested to three times working pressure. END
How an Expert Builds a Model Boiler

By Harry Walton
PS Photos by W. W. Morris

You can run a model steam engine on an air line, which is about as exciting as plugging in an electric motor. But when you use fire to boil water and let steam push the piston, you not only have a prime mover, but also a thrill that only the smell and spit of live steam can give. And cutting loose from the air hose gives you a nice portable power package for driving a model.

But even a small boiler, if badly made, can be dangerous. Water in a confined space stores heat as latent energy. Any sudden release of pressure, such as the rupture of a seam, lets it all flash into steam instantly, producing an explosion.

To find out how an expert builds safe model boilers, PS went to see Anton Bohaboy, of Rahway, N. J., who has been build-

Here are parts for the boiler. A 1/8” stainless-steel stay is threaded 3/8”-20 at both ends. Water tubes are common copper tubing. Dome is built up of 1/16”-wall tubing and 5/32” disk.

The heat’s on, applied with a small gas-oxygen torch that affords close control of the heating area. As the metal turns bright cherry red, silver solder in wire form is fed in.

To insure dry steam, dome goes over four holes drilled in boiler shell. Shell ends must be square and without burr so end disks will fit well. Holes for water tubes are staggered.

With all tubes in, the stay is threaded into one end disk and pushed through a plain hole in the other. Disks have outside chamfer for solder fillet and are push fit in shell.
Pieces of copper tubing are bent to an open O shape on a jig. Correctly made, they have to be sprung into holes, which are cocked to suit by inserting rod, bending to position.

Nut is screwed on each end of stay. Then disk is silver-soldered to shell all around. Both nuts are sealed with silver solder all around and on top to prevent leakage.

Silver-soldering flux is applied with brush. Anton Bohaboy uses commercial flux instead of borax. Note how upper ends of tubes protrude into shell. Lower ends are more nearly flush.

Dome, shaped saddle fashion to fit shell, is brazed over four holes. Filler nipple goes over large hole nearby. Silver solder used flows at 1,200°, and has ample strength.
Safety valve is screwed into top of dome. The throttle has a big fiber wheel to protect fingers from heat. Gauge requires water loop shown to keep hot steam from internal parts.

Alcohol is poured on asbestos in brazed-up sheet-iron fire pan. With water above try cock, Bohaboy fires boiler. Safety valve pops at 70 lb., but boiler held steam safely at 100.