



Facing page: *Craig Prucha's 25 HP Swan out in the sun at the Coolspring Power Museum where it's on long-term display.*

Left: *Fitting the new head in February 1999. Note the fixing bolts, two of six 38-inch-long tie rods that bolt the cylinder assembly together and to the bedplate.*

Heads Up

With a materials list in hand, I made another trip over to my friend Dave Johnson's shop and got the necessary stock to fabricate a new head and cylinder sleeve mounting plate. The engine was also missing the brass bearing halves for the connecting rod big end and the strap that holds the big end and bearings together on the crankshaft. Using a bearing half of similar size from another engine, I fabricated a pattern for two bronze castings, one for each bearing. I fabricated the strap for the connecting rod, and after getting the bearings back from the foundry, I machined them up.

I first squared up the bearing halves on a shaper and clamped them in a four-jaw chuck on my lathe. I put a piece of 0.060-inch nylon shim stock between the two bearing halves and machined the bore to size. I faced each side of the bearing assembly, and machined a chamfer into the inside diameter of the face to make clearance for the radius of the crankshaft. Finally, I drilled an oil hole and cut oil grooves in the bearing surface. I assembled the bearing halves together with the strap and the connecting rod.

Next, I turned to pouring the crosshead babbitt. Before I could pour the babbitt, however, I had to finish the cylinder sleeve mounting plate and mount the cylinder sleeve. And that meant I had to finish fabri-



Center: *Machining the cylinder-locating plate.*

Right: *Machining the shoulder on the new piston-connecting rod.*

cating the new piston connecting rod – all of which play a critical role in aligning the crosshead.

The cylinder sleeve and piston came back from the shop, and the connecting rod turned out nice and fit the piston well. I temporarily rigged the sleeve to the bedplate, installed the piston and piston connecting rod in the sleeve, connected the rod to the crosshead and spent a lot of time lining everything up to make sure the crosshead ran true with the piston. Once this was done, it was time to pour the babbitt. The pour went great, and I poured extra babbitt on the top side of the crosshead so I could machine the final height of the crosshead bearing surface. This also insured that the top of the crosshead would be parallel with the bottom: A final inspection showed the crosshead was properly located. The Swan was starting to look like an engine again.

Cylinder Mounting

I fabricated six new 38-inch-long, 1-1/4-inch-thick tie rods (the rods that bolt the head and cylinder assemblies together and also to the bedplate). I also had to finish turning the outside diameter of the new head and drill the six mounting holes for the tie rods. This wasn't without its challenges, as I discovered the six holes for mounting the head were not

evenly spaced. I wound up having to transfer the position of the holes from the existing head and labeling the new head's orientation. Also, the original head had a boss or protrusion that went 3-1/2 inches into the combustion chamber. That's an awful lot of mate-

