

## Metal Casting Skills Lead To Profit, Fun

When Roger Erickson set out to build his own helicopter from scratch (Vol. 28, No. 6), he had to learn how to cast his own metal parts. What he didn't expect was that it would become a new source of profit, and fun.

"I have been doing foundry work now for about 10 years, but I didn't get proficient at it until the last five years," says Erickson, who makes everything from cylinder heads to gears, pistons, and more. "In the last two years, I have also gotten into artwork. I enjoy super heavy detail work, like taking fingerprints off a mold of a finger."

Erickson credits an 85-year old friend, Wayne Thompson, for teaching him much of what he knows about casting metal. Thompson, he says, didn't start doing foundry work until he was 65, suggesting that it is never too late to start.

Although Erickson's walls are adorned with a number of pieces of cast artwork from large eagles to a 50-lb., full-size, brass Sheltie dog, it isn't art that pays the bills. He has casts of everything from gears and gear cases to heads for a WDAllis Chalmers and 4-cylinder Wisconsin engines.

"The Wisconsin cylinder heads tend to crack, and the spark plugs blow out," says Erickson. "I cast new heads and update them by thickening them up where the spark plug goes so it doesn't strip. The original ones also used to warp and lose the head gasket,

so I thickened them up slightly, and that's no longer a problem."

Erickson also casts furnace pots for his corn fed furnaces and boilers, as well as parts for converting car engines for airplane use.

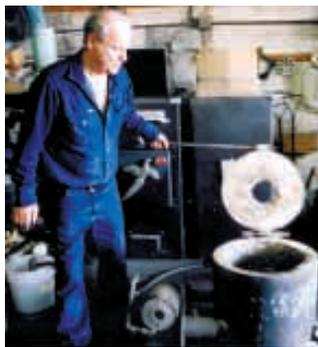
"I started out making kits for converting V-8's for use in light planes," explains Erickson. "I made the gears and everything for \$6,000 to 8,000 each."

He has built several metal-casting furnaces, including an outside one with a tilter that holds 150 lbs. of molten metal. He can melt steel in them, but does most of his work in brass or aluminum.

"I build the metal furnaces myself out of steel, refractory cement, air blowers, and LP gas fittings," says Erickson. "I can't buy anything that works as well as the ones I build. I can go from a cold start to liquid metal in 15 minutes."

One gear case Erickson cast for his helicopter weighed 72 lbs. It took two people to pour. The lifesize Sheltie dog was another massive pour. Not only was it super detailed, but it was also hollow, which required a sand core.

Erickson makes a pattern of the piece he wants to reproduce. In the case of his artwork, he may use ceramic or whatever is available to create a mold of the original art. Wood or metal pieces may serve as the pattern. Packing sand around the pattern cre-



Roger Erickson makes everything from cylinder heads to gears, pistons, and more. He even does cast artwork, including this 50-lb., full-size, brass Sheltie dog (right).



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## Dog-Powered Scooter

A Bend, Oregon man has come up with a fun new way to take a dog out for a run. His Dog Powered Scooter is also a practical form of transportation, says Mark Schuette.

He modified an adult-sized scooter by adding curved rear outriggers made from bicycle tubing, to which dogs can be harnessed. A swiveled dog harness attaches to the dogs at shoulder height. The harness is flexible enough to sit or lie down once the scooter stops.

Because the dog is in back rather than up front pulling, you control the steering and braking.

Schuette says the invention works great in situations where rules prevent you from letting your dog off its leash to run freely. It's also just a fun way to spend time with your pet, he says.

"With the scooter's low center of gravity, there's no downward pressure on the animal, but his momentum lets you have a free ride when you need to," he says. "It takes only about 10 or 15 minutes to get your dog accustomed to being harnessed beneath the outrigger and virtually anyone can ride this, including 10-year old kids and older folks."

Schuette sells the single dog rigs for \$500 each (this includes the scooter, outrigger assembly, pulling harness, and shock absorbing clips, as well as shipping in the U.S. lower 48 states).

Accessory packages are available to outfit a second or even a third dog for between \$150 and \$200 extra.



Adult-sized scooter has curved rear outrigger made from bicycle tubing, to which dog can be harnessed. A second or third outrigger can be added.

Custom-fit outrigger systems for other types of scooters are also available.

He says other animals such as miniature horses would also be suited to the system because it is vertically adjustable for a wide range of sizes. A "tall" outrigger is also available for the giant breeds.

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## Make Your Own Pistons

When he couldn't find replacement pistons for an old car engine, Steve Chastain decided to make his own. Using a pop can for a mold, he cast his first pistons, melting aluminum over a charcoal fire.

"Never let a lack of materials keep you from doing what you want to do," says Chastain, author of three books on metal casting, including his latest on making your own pistons.

Readers of his first two books, *Metal Casting: A Sand Casting Manual for the Small Foundry, Vol. 1 & 2*, know that building a foundry Chastain's way is easy. All you need is a five-gal. bucket lined with sand and refractory clay. A piece of 4-in. diameter steel pipe with a bottom welded on it makes a pot. Fill the lined bucket with charcoal and the pot with aluminum and light the charcoal.

"It takes about 20 minutes to melt a pot of aluminum with charcoal," says Chastain. "And it only costs about \$20 to make the bucket furnace."

Not only will the simple foundry work once, but Chastain estimates it can probably be refired 50 times before it would have to be relined.

In his new book, *Making Pistons*, he puts his foundry knowledge to use to replace hard-to-find pistons. This book is designed for the serious automotive enthusiast with experience in foundry work. Foundry terms such as sprue, gates and venting are used without explanation. He describes in detail the desired cooling of the molten metal to attain the optimum strength.

He walks the reader through a technical explanation of determining head thickness and design for heat flow. Special attention is paid to the role of the rings and designing proper ring lands for high loads and temperature.

Once the design has been completed, Chastain takes the reader through the process of making a pattern for the blank, a core box for molding a sand core, and creating the mold itself.

The key here is in accurately reproducing the original piston. Although his early attempts relied on table saw and dowels, he recommends using a lathe to get the shape as exact as possible.

The final step before casting the piston is making and then placing the core. "I use a mixture of wheat flour, molasses and sand for the core and then bake it like a cookie,"



Chastain casts his pistons in a homemade firepot.



Once the piston has been cast, Chastain completes the finishing work.

he says. "It sets up hard like a brick, but after melted metal has been poured around it, the molasses burns out. When you take the piston blank out, the core pours out like dry sand."

Once the pour has been made, Chastain walks the project through to completion, milling out the piston, cutting grooves and using the lathe.

Chastain has come a long way from making pistons with pop cans for pattern blanks and using 5-gal. pails for a furnace. The basic reason for doing what he does has remained the same.

"One outfit was selling a set of pistons for a 1930 Dodge for \$1,500, and it would take six months before I could get them," he explains. "It took me 7 to 10 days and about \$10 to make my own, and a complete set of rings for them cost me \$80."

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