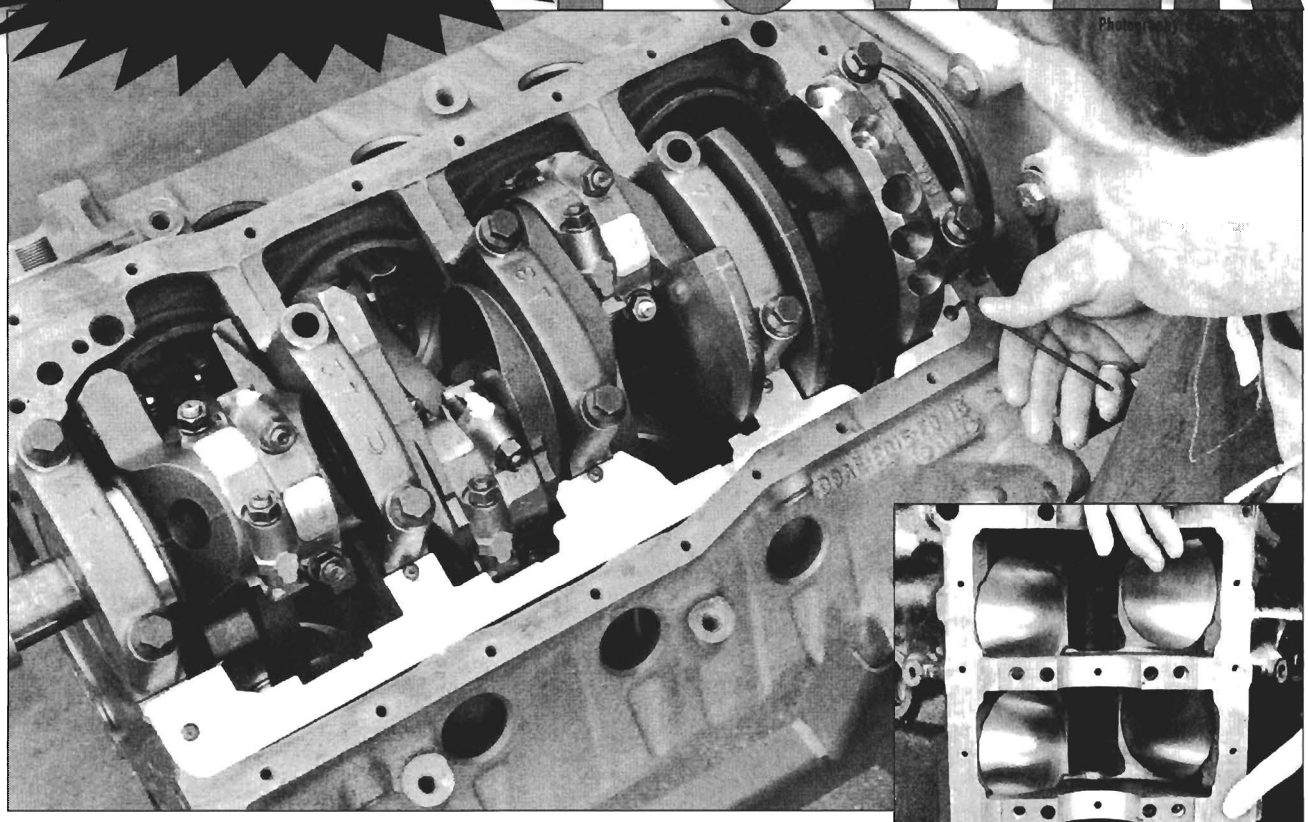
FREE POWER



The homemade crank scraper, as installed on this small-block Ford, cost just 50 cents in materials and will add horsepower to any street engine.

Make a 50-Cent Crank Scraper and Find 10-20 HP!

By Pete Saueracker

One of the best things a backyard engine builder can add to his next project is a crankshaft scraper. Simply put, the scraper rids the crankshaft of excess oil as it spins—in the process adding horsepower, improving overall lubrication, and increasing the powerplant's durability and smoothness. Sure, crank scrapers are available from the aftermarket, but you can make an even better one in your own garage. You just need a few hours and some pocket change, and the result will be shaped specifically to your engine. When you add it up, a homemade crank scraper can yield the cheapest performance improvement of any modification in the universe. Here's what it's all about.

Shear, Heat, and Friction

At any given moment, roughly half of the engine oil is suspended in the

Drill and tap the main bearing saddles to accommodate a 10-24 machine screw. Even on this Chevy four-bolt main block there is enough room to add a small tapped hole.

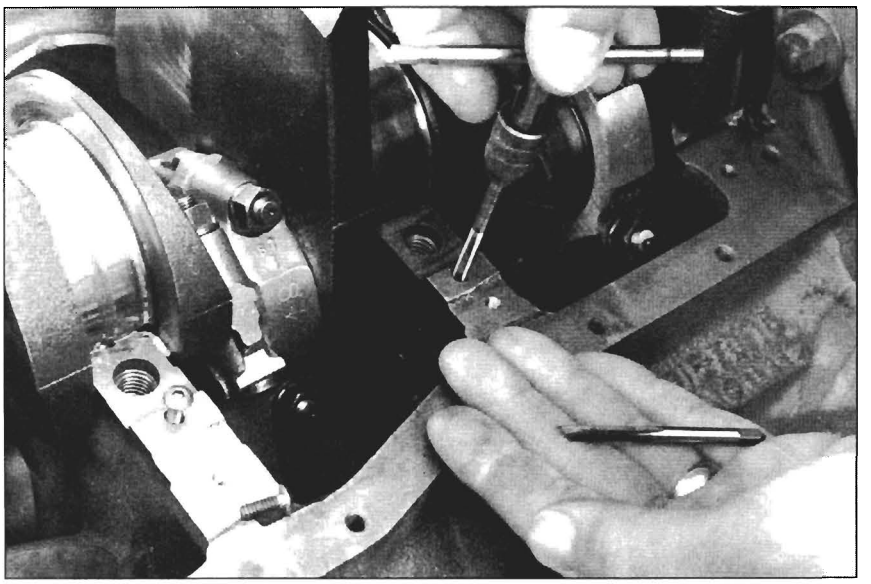
block and heads rather than in the oil pan. Imagine the interior of the engine as a hurricane of flying oil mist, all of it trying to return to the oil pan so it can be picked up by the oil pump and begin the process again. If everything works

just right, the oil will do its lubricating and cooling job, while consuming minimal horsepower. But if the oil isn't kept perfectly under control, it will eat horsepower, lose pressure, affect durability, and disrupt the smoothness of operation.

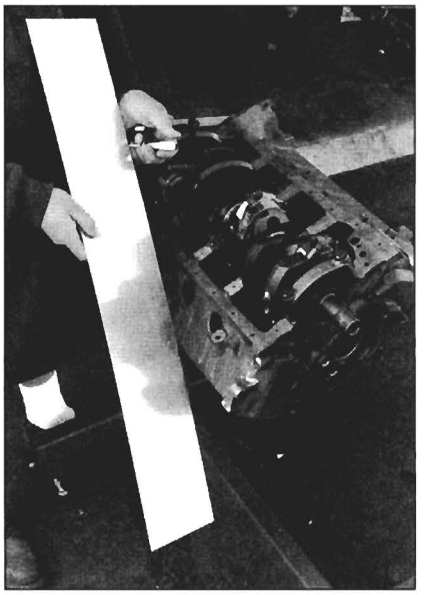
One characteristic that allows motor oil to do its job is its viscosity, or reluctance to shear. This property keeps the oil where you want it—between the journals and bearings, for example—to maintain lubrication. Once the oil has done its work, we would like it to return instantly to the oil pan. Unfortunately, it sticks to the crank and winds up moving around the crank as it rotates. This is called *roping*. When the oil ropes up around the crank, more power is required to turn the crank, robbing the rear wheels of grunt they could use to accelerate the car.

In addition, oil tends to trap air, making it bubbly. That reduces oil pressure, allowing the lubed parts to grow hotter and increasing frictional power losses. Roping and foaming of the oil is called *windage*. A meticulous engine builder takes windage seriously and does everything in his power to control it. The proper control can yield 10-20 additional horsepower in a wet-sump engine.

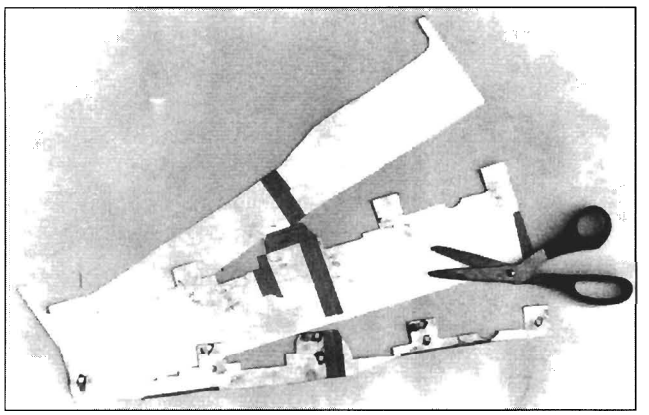
So what can the backyard engine builder do? We used to think the benefits from a crank scraper in a low-rpm street motor were not worth the effort. But then we discovered that reducing oil viscosity indeed produces more power, and that thinner-weight oils can overtax a stock oil system. The thinner the



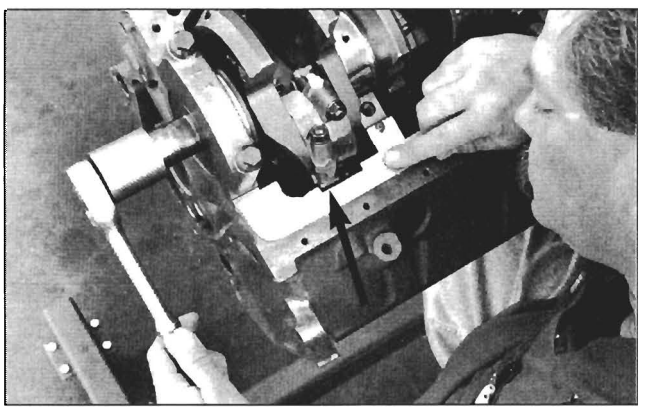
When threading the small holes, use a small T-handle on the tap to maintain fine control. The side loads that come with larger handles could break the small tap. The button-head 10-24 Allen machine screws cost 6 cents each.



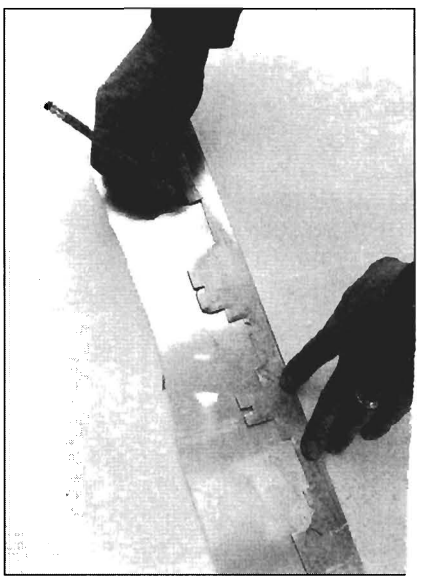
Buy some aluminum sheet scrap at a metal-remnants supplier. The sheet should be 0.040- to 0.060-inch thick. Ours measured 40x6x0.061 inches and cost $2.



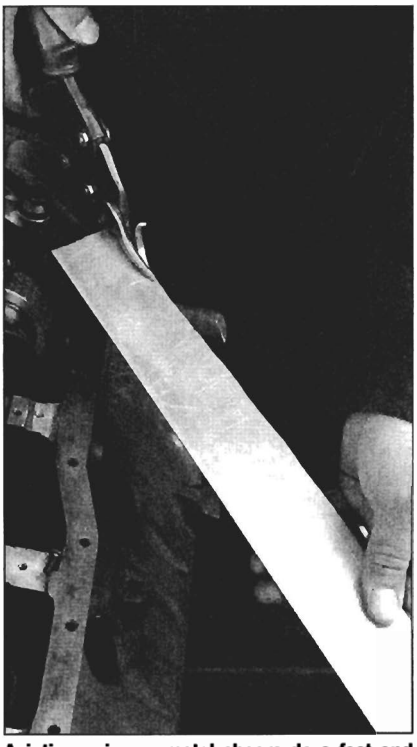
Tape some heavy paper together and screw it securely in place on the block. Then rotate the crank slowly and use scissors to cut the paper to match the shape of the crank profile. You may need several templates before you are satisfied.



As the crank rotates, the rod bolts and counterweights will come extremely close to the template. With a steel rod motor, leave 1/16-1/8 inch clearance (*arrow*) between the assembly and the scraper. Any closer is too close, and any farther away won't clean the crank.



Once you have finished the paper templat trace its shape on the aluminum. Use a met scriber (your best option), pencil, or a shar pointed marker.



Aviation snips or metal shears do a fast and easy job of rough-cutting the aluminum to the scraper outline, but don't try to get the shape exactly right. You'll fine-tune it later.

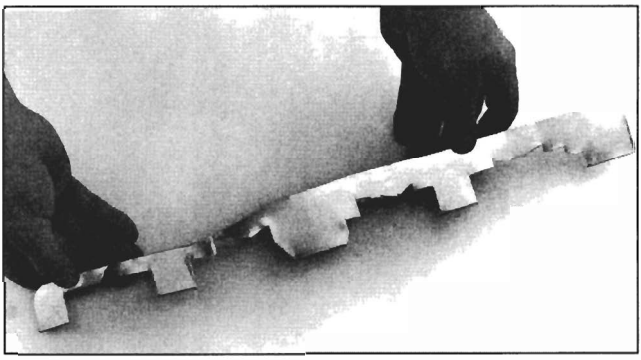
oil, the more likely it is to foam and rope around the crank. With 10W-30 or 10W-40 lube, most unmodified oiling systems on high-performance engines experience a loss in power, reduced oil pressure, increased friction, and a loss of durability. As our dyno testing revealed, the best way to alleviate this is to make a custom-fitted crank scraper.

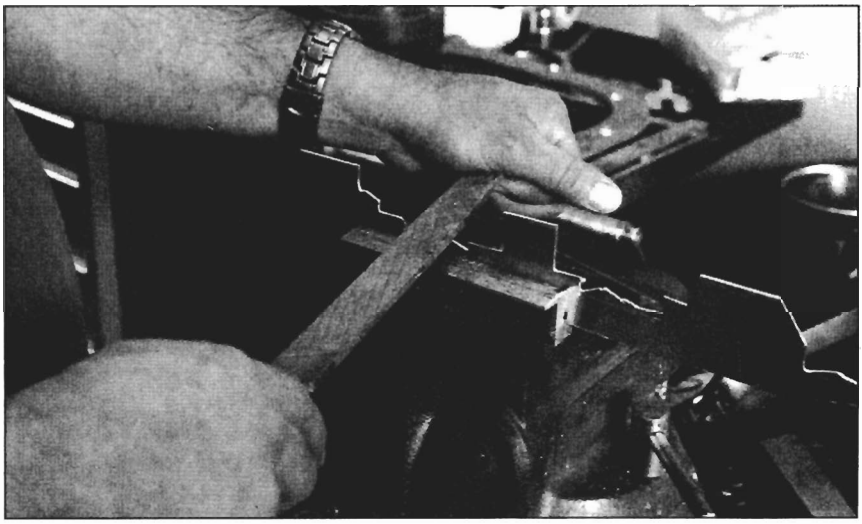
The Details

We like the idea of a home-built crank scraper because it is inexpensive and does the job like nothing else. Universal scrapers cost $10-20 and must be custom-fitted to a specific engine. Moreover, most aftermarket scrapers require another $50-100 for new main bearing bolts with special studs to accommodate the piece. The simple crankshaft scraper outlined here is nothing more than a basic, but refined, piece of sheet stock that mirrors the edges of the rotating crankshaft assembly.

You can mount your custom-made scraper to the main bearing saddles by drilling a few holes for some inexpensive button-head Allen screws. Since the holes are relatively small in diameter and depth, they will have no effect

This is your rough-cut aluminum scraper. It gets very thin in some places, so you might want to separate it into two or three pieces. That way, it won't break apart after installation and drop aluminum flecks into the oil pan, or lose its scraping ability.

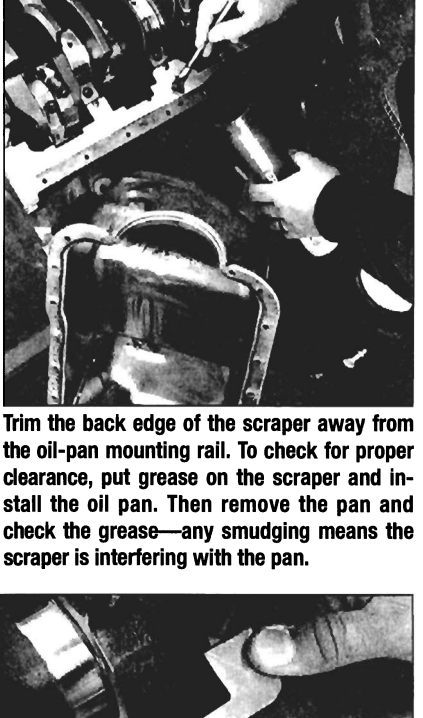




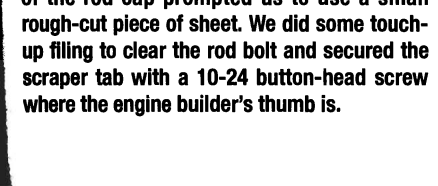
Use a coarse-cut hand file to get the scraper's shape as close as possible to your outline. Then mount the rough scraper to the block and slowly rotate the crankshaft assembly. Check for clearance, mark the places where additional filing is needed, and remove the scraper from the block. Keep filing and reinstalling until the fit is as good as it can be.

on the strength of the main bearing saddles, nor will they distort the main bearing bores. Depending on the raw materials you have on hand, the complete cost of the scraper could be as little as 50 cents.

First, determine the direction of the crankshaft's rotation. Viewed from the front, most American V-8s run clockwise. Place the scraper on the side of the crank where the scraped oil will fall downward and into the oil pan—the rotating crank should meet the scraper on upward rotation. Fit the scraper on the bearing saddles so that it abuts the main caps but does not interfere with the oil-pan rails on the block. Be sure to leave a small opening between the block and the scraper where the free oil can drain back into the oil pan. Then trim and fit the scraper until it matches the complete rotating crankshaft assembly. **HR**



Trim the back edge of the scraper away from the oil-pan mounting rail. To check for proper clearance, put grease on the scraper and install the oil pan. Then remove the pan and check the grease—any smudging means the scraper is interfering with the pan.



On this small-block Ford, the forward portion of the scraper is all one piece. The proximity of the rod cap prompted us to use a small rough-cut piece of sheet. We did some touch-up filing to clear the rod bolt and secured the scraper tab with a 10-24 button-head screw where the engine builder's thumb is.