

The New Burtz Model A Engine (Part 3)

This is the third and final chapter of what is involved in assembling one of the new Burtz Model A engines. Last month, we left off with the basic Short Block finished. Now that the crank, pistons, rods, cam and the rest of the valve train are installed, it is time to finish installing the cylinder head, pan, flywheel and the front and side covers.



Degreeding the cam

Before proceeding with the final assembly, the front pulley was marked for TDC (Top Dead Center) of #1 piston and the cam was "degreed" to confirm that the valves were opening and closing at the proper relationship to the position of the pistons. Cam manufacturers provide specifications for "degreeding" the cam. Opening the valves too early or too late will detract from the performance of the engine. For this operation, a degree wheel is used to indicate the position of the crankshaft and a dial indicator measures the amount of valve opening. We found that the opening and closing of the valves was within $\frac{1}{2}$ degree of specification which is well within tolerance.

We are now ready to complete the engine assembly. First, a new 6.0:1 head was installed using hardened studs and a "Best" gasket. To insure a good seal, Copper Coat spray was used as a sealer for the head gasket. Water inlets and outlets were also installed at this time. Next to be installed were the cam gear covers and the side valve chamber cover. A one piece front crank seal was used along with a new one piece crank pulley.

The engine was then turned up-side down for the installation of the oil pan. But first, the oil pump must be installed. For this engine, we used a Model A oil pump that was modified for an engine with full pressure oiling and an external full flow oil filter. A retainer was used to insure the pump was held tightly up against the block. The retainer bolt was drilled for a safety wire as an extra measure to ensure the pump retainer would always stay tight. The pan, with the dipper tray in place, was then installed. The new one piece rear main seal was next, using a special tool to seat the seal in place. A "Viton" version of the seal was used which should give longer service life than the basic seal material. It was found that a little extra chamfer on the bore would have helped with guiding the seal into place. In the future, the chamfer of the seal bore will be increased during the block de-burring process.

Installation of an external full flow oil filter assembly came next. A custom fabricated bracket for the filter mount was added using the front three side cover bolts. Three-eighths inch thin wall steel tubing was used to plumb the output port on the side of the block to the inlet of the filter and the outlet of the filter to the special return fitting which replaces the standard lower bolt of the cam gear side cover. The internal passages of all the fittings were increased to a minimum of 5/16 inches for adequate oil flow. Because of interference, the original oil return pipe was not used. Caps were made to cover the openings in the side cover and block. This return pipe is not needed because any oil accumulation in the valve chamber will drain into the pan thru the large holes in the floor of the valve chamber.

Next came installation of the flywheel housing and gasket. No. 2 Permatex was used to provide a good seal around rear cam bore area. Do not forget the shims that go between the housing and block at the upper 2 bolt holes. After the starter ring gear was fitted to the flywheel, the flywheel was then installed using extra long flywheel bolts. Now, the engine is ready to be transferred to the engine test stand for start up and run-in.

It is very important to prep a new or newly rebuilt engine for initial start up. First of all, check to confirm that



Completed engine, ready for the test stand

all the fuel connections and radiator hose clamps are tight. Fill the radiator with plain water and check for leaks and correct as necessary. Fill the engine with oil. For this engine, we used 10-30 petroleum based oil. I do not recommend using a full synthetic oil for initial break-in because it may increase the time necessary for the rings to fully seat. An oil supplement was added to insure no scuffing of the cam would take place during initial start-up.

To minimize the amount of cranking when first establishing oil pressure, fill the oil filter itself with oil before it is installed. With the spark plugs removed, crank the engine with the starter until oil pressure reads on the gauge. The engine should crank easily and at a steady speed. It should only take 15-30 seconds of cranking to establish oil pressure. While cranking the engine, listen for unusual noises. Crank the engine for about another 10-15 seconds to be sure all the oil galleries are full and oil has reached all the bearings. Check the ignition timing and install the spark plugs.

Now for start up. Turn on the fuel and be sure there is fuel in the carburetor. Have a screwdriver available to adjust



Engine on Test Stand

the carburetor for idle speed and mixture. Set the throttle to about ¼ open. Turn on the ignition, pull the choke full out and crank the engine a few seconds. Push the choke and continued to crank for a few more seconds and the engine should start, but it didn't.

Repeated the process a second time and the engine fired right up. The engine was run between 1000 and 1200 RPM for about 15 minutes to brake in the cam.

During the initial run in do not let the engine idle but keep the RPM's up to allow the cam and other moving parts to get plenty of lubrication. The engine was very smooth and quiet and felt strong. The oil pressure was good and there were no leaks.

Several members of the Santa Anita A's were present during initial start up. Everyone remarked about smooth the engine was and we all felt that the new Burtz Model A Engine components were definitely a great improvement over what we had been working with. Chuck Davies, the owner of the engine, went right home and started to remove the old engine out of his 1930 Coupe and get ready to install the new Burtz engine.

At a later date, I will report on Chuck's experience with the new engine after he has had time to put a few miles on it. My initial impression is that he will be very pleased.

So we took off, in a 4-cylindered blast, while neighbors shook their heads and grandparents waited breathlessly at the end of the line. The VW sped along with the evenness of an electric commuter train. Inside we were secure and warm. We busied ourselves computing mileage (multiply by 5 and divide by 8; it takes intelligence to drive one of these things).

When bottles needed warming, we transferred them from the "trunk" to the round heater vents, and family life went on. Baby Sue lay snug in her bed. Two-year-old Carol bounced gleefully in her car seat, exclaiming about the "big cars." Her prospective is slightly warped!

In farm towns we caused a major sensation on every Main Street. "What's that there frisky thing?" a weathered man inquired. Gas station attendants overflowed the tank as they peeked and probed. One proud fellow refused to speak another word after poking the hose into the rear of the car. At service stations, restaurants, motels (even in driving rain), Tom not-so-patiently explained his little oddity, permitting examination of the engine. Had we charged admission the trip could easily have paid for itself.

What could possible go wrong now?

Read the finale of "The Fiend Goes Foreign" story in next month's Spoken Wheels.

OTHER HAPPENINGS

Ladies Brunch

Monday, March 14

by Nancy Stancil

A fun time was had by the Ladies getting to know each other better at their recent brunch. We invite other Ladies will join us once a month at Annia's, San Gabriel Airport.



Attending were Sheri Johnson, Nancy Stancil, Bea Frutcher, Sue Rogers, Elaine Perry, Patty Lutz, Carol Emanuelli.