FROM THE BENCH CHRIS WICKCKERSHAM

The New Burtz Model A Engine (Part 2)

Part 1 of this report included comments on the efforts of Terry Burtz to design and manufacture an "improved" Model A engine block assembly. I also commented on the components in the "block kit" purchased by Chuck Davies, one of our Santa Anita A's members. He brought one of the new Burtz Engine kits to my shop and wanted me to "help" with the assembly. Since this was my first experience with the new Burtz Engine, I decided to document the process.

Last month was the first installment of what is involved in putting together the new Burtz Model A Engine. We left off with the block being de-burred and the necessary alternations made to adapt to a full flow oil filter.

An inspection of the critical dimensions had been performed and all measurements were well within tolerance with the exception of the valve seats. The width of the part of the seat closest to the center of the engine was noticeably wider (aprox. 0.030 inches) than the width of the opposite side of the seat. This was noted with all the intake and exhaust seats. The seats also appeared to be a little rough. This same inconsistency was found in 2 of the other Burtz blocks I had in my shop but a third block had seats which were very uniform and smooth. For this first engine, it was decided to re-grind the seats to insure good sealing and longevity.

After the valve seats were re-ground, the block was cleaned and prepared for paint. The cleaning process included several steps using solvent, Simple Green, high strength detergent, lots of hot water and finally a pressure flushing of all oil and water passages. Long brushes were used to clean all the oil passages to insure they were absolutely clean and free of chips and debris. After the final rinse with hot water, the block was immediately dried and the cylinder bores were protected with a light coat of oil. To help insure good adhesion of the paint, keep the outside of the block free of oil and be sure your hands are clean as well as any tools you are using. At this point, I use a big plastic bag to keep the block clean when not being worked on.

The head, block and front cover are temporarily installed for painting.

The block is now ready for paint. When painting a Model A engine, I have found the easiest way to keep paint off the surfaces you do not want to get painted is to set the block on a table and temporarily bolt on the head, side and front covers. I use only a few bolts, just enough to hold the parts in place. A little masking on the rear machined surfaces and some old spark plugs to keep paint out of the cylinders and you are ready to paint.

For this engine, it was decided to use the original Ford Engine Green however the color the engine is painted is strictly up to the individual. Years ago, we would paint the engines of our old Hot Rods red because a car with a red engine always seemed to go faster.

Now for the fun part, assembling the engine. The first item on the assembly process is to install all the oil galley plugs but there was a minor problem with one of the plugs. Terry Burtz designed the engine to use straight machine thread plugs for oil galley plugs.

The arrow points to an oil passage hole that must be plugged and sealed by a 7/16-14 "set screw".

There is one place where a 7/16-14 "set screw" is used to plug a short oil galley at the front of the engine. This set screw was intended to only be screwed in until it was flush with the outside machined surface of the casting but the threads were tapped so deep that the set screw could be screwed in so far in that it would block off an intersecting oil galley. If the engine was not being used with an external oil filter this would not be a problem but these passages are used to supply filtered oil to the main oil galley when using an oil filter.

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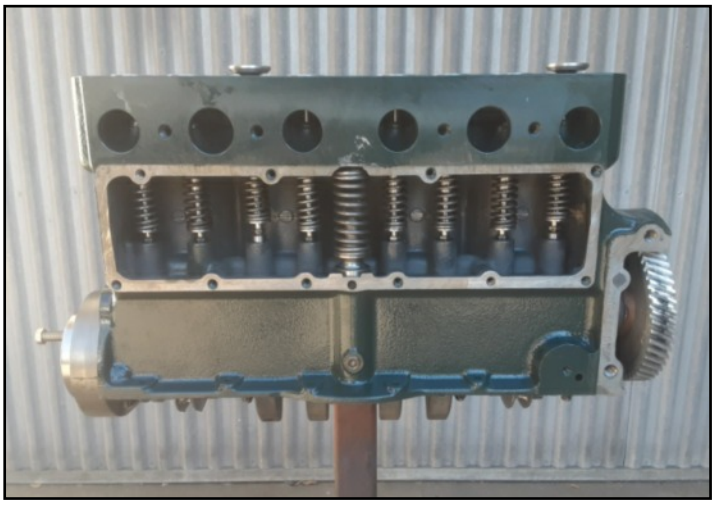
I sent an email to Terry Burtz and he very quickly responded and said this plug was intended to only be installed flush with the machined surface and not screwed all the way in. Terry proceeded to communicate my finding to his quality assurance team and also made an addition to the "Builders Guide" to point out this issue.

To insure this plug and all the other galley plugs would stay in place, all but one were installed using epoxy as a sealer. The exception was the plug for the main galley at the rear of the block. A half inch long, 1/2-13 socket head cap screw (Allen screw) with an aluminum sealing washer was substituted for the 1/2-13 "set screw" type plug supplied in the kit. I had heard from others that there were a few instances where an oil leak had developed when the "set screw" did not seal properly. Using a cap screw with a sealing washer will provide a positive seal.

The arrow shows where a 1/2 inch long, 1/2-13 socket head cap screw (Allen screw) with an aluminum sealing washer was installed.

The next step was to install the crankshaft. Following the directions in the "Builders Guide", the crankshaft was cleaned and inspected and the main bearing studs and bearing shells were installed. The crankshaft was placed in the block and bearing clearances were checked. While all the other bearings were well within specification, it was found the rear bearing had a clearance of 0.004 inches which is a little loose. To correct this, the rear bearing cap was lapped on the surface plate until the desired clearance of 0.0015 inches was achieved. When completed, the crank turned free and smooth. Before I continue, just a note about the nuts that were supplied for the main bearing studs. All of the nuts supplied in the kit were a little loose on the studs. The solution for this was to purchase new grade 8, 12 point jet nuts and new castle nuts which were found to fit much better.

Now, on to the valve train: The tappets were placed in the block. The crank and cam gears were installed and the cam was placed in the block. A liberal amount of assembly lube was used on the foot of each tappet and on each cam lobe and journal as well as the cam thrust surface at the front cam bearing. The valves, springs and keepers were then installed and the valve clearances adjusted. When adjusting the valves, I find it a lot easier to rotate the crank without having the pistons and rods in place.



Block assembled with crankshaft, pistons, rods, cam and valves.

The piston and rod assemblies were next. Each piston was installed on a rod and the rings installed on the piston. These assemblies were then installed in the block. Bearing clearances were checked and all found to be within spec.

One issue that did come up was one rod cap bolt on each rod protruded slightly thru the rod just where the rod comes closest to the cam. I was not able to determine exactly how much clearance there was between the cam and the tip of the rod bolt but I did know the cam comes very close to the rod at this point. To insure there was no interference, the corner of the end of the each bolt was removed back flush with the rod.

Arrow indicates where rod cap bolt protruded slightly.

This completes the assembly of the basic "short block". All in all, the assembly went well. The few issues that were found were easily resolved and I am confident the new Burtz Model A Engine will be far superior to any of our previously available options and will result in an engine that is smoother, stronger and much more reliable than the original Model A or B engines. Also, it should not leak oil.

Part 3 will appear in the March Newsletter