PROPER SETTING OF THE TIMING CHAIN FOR THE ISETTA 300

Bill Rogers **www.isettaofsc.homestead.com**

Over the past several years, I have seen several persons request information on how to set the timing of the camshaft on the Isetta 300 engine. The information in the repair manual is somewhat deficient in its explanation. The manual refers to a hole in the camshaft sprocket, which on every engine I have torn down, is not present. In this document, I will attempt to explain how the timing of the camshaft should be accomplished and fill in some of the gaps that exist in the repair manual. I have used this method on many engines and never had a problem.

Prior to installing the chain back on the sprockets, it is very important to check the chain for wear. This is best done by inspecting each link for any "play" between the links. A chain in good condition should move freely and have no noticeable slack in the chain joints. If you find any play in the joints, replace the chain. The photo below shows two chains that were laid out side by side. The top chain was one removed from an engine while the bottom chain is new. The opposite ends of the chains were held at the same point such that the lengths should have been the same. As you can see in the photograph, the used chain is slightly longer than the new chain (bottom). This additional length was due to very small amounts of play in a number of the chains links. The overall difference in the lengths of these two chains is about 3 mm. This extra length allowed the chain to "slap" against the oil spout and the engine's case creating a clicking noise in the engine. This occurred even though a new tensioner was installed.

Once you have a good chain, the first step is to place the crankshaft in the top-dead-center (TDC) position. This can be accomplished by several means. I prefer to use the marks on the flywheel for this purpose. Other ways to accomplish this it to place the crankshaft in its TDC position by looking at either the connecting rod or the keyway on the crankshafts timing sprocket. If the piston is installed, moving it to its highest position in the cylinder will accomplish this same task. Refer to the pictures on the next page for locations of the keyway and timing marks.

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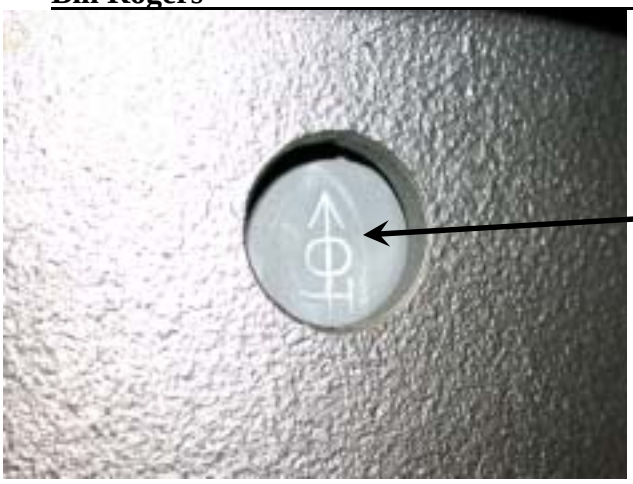
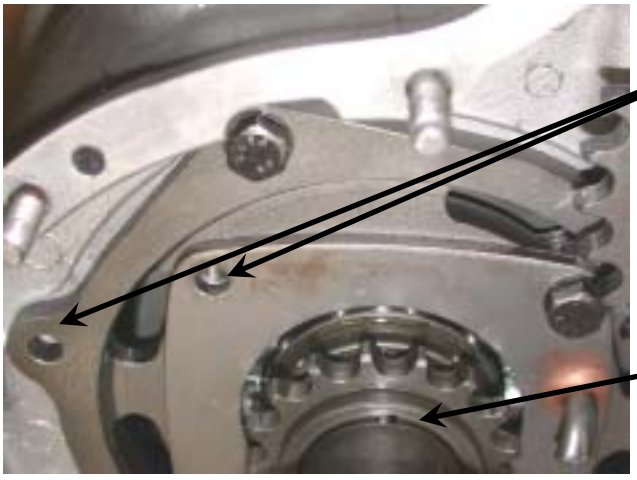


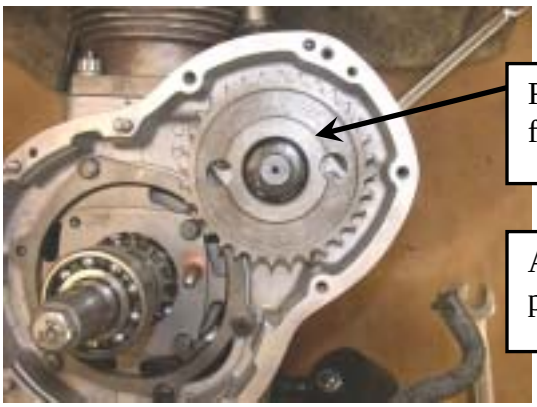
Move the timing mark within the timing hole on the side of the engine case to its TDC position (OT or "ON TOP").



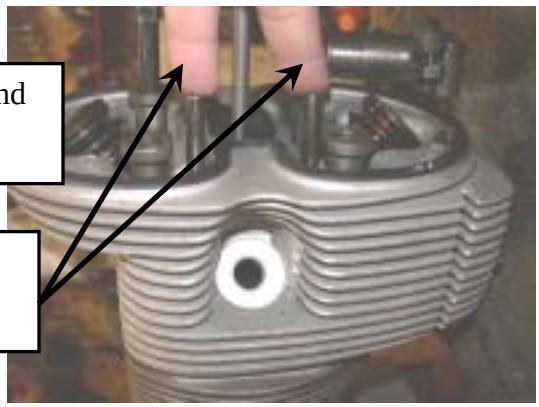
(Note the chain tensioner and spring are removed for chain installation)

Move the crankshaft so that the keyway for the timing sprocket is located straight up.

To begin the process, you must first locate the proper position of the camshaft. This is accomplished by rotating the camshaft so that the two cams are at their "overlap" position. This is the position the cam would be in with the engine at its TDC position on the exhaust stroke. In this position, the piston is at TDC, the exhaust valve is closing and the intake valve is opening. To find this position, install the cam followers and pushrods in the pushrod tubes. Rotate the cam sprocket with one hand and apply slight downward pressure with two fingers of the other hand on the pushrods.



Rotate back and forth slowly



Apply light pressure

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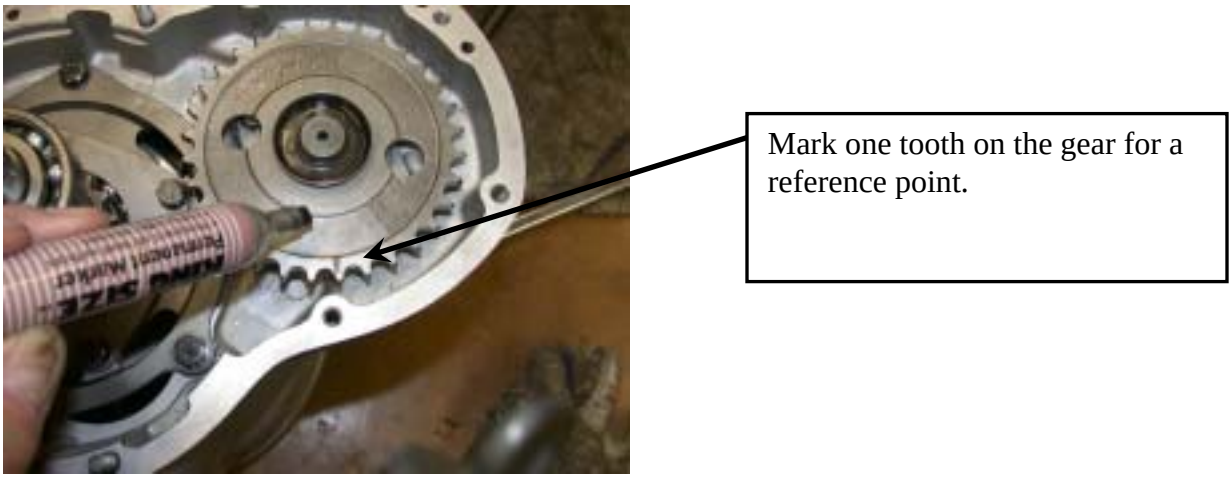
While rotating the camshaft sprocket, you will feel a point where the intake pushrod is rising and the exhaust pushrod is falling simultaneously. When the two rods are of equal length, stop rotating the camshaft sprocket. Clean a spot on the camshaft sprocket and mark it with some type of marker. This is the point that you want to maintain when the crankshaft and camshaft are both at TDC. In the photograph below, I use the threaded hole in the case as a reference point. Mark one of the teeth of the gear so you can return the sprocket to this position.



Once the TDC position of the cam is identified, rotate the sprocket counterclockwise about ¾ of a turn to allow you to "thread" the chain onto the sprocket.

Install the chain on the sprocket and rotate the sprocket clockwise until you return the sprocket to its marked position. Be sure to start the chain about four to five links beyond the "marked" tooth.

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With the chain in position around the camshaft sprocket, wrap the chain around the crankshaft sprocket and bring the two ends together. Install the link and the chain tensioner and you will have a perfectly timed camshaft!

With a proper length chain, the tensioner should ride on the chain as shown in the above photograph. If the tensioner is mainly in contact near the end of the tensioner, this indicates the chain is too long and has worn. There should be very little deflection in the chain. Another check is to rotate the crankshaft after the head has been installed and valves adjusted. The camshaft sprocket should rotate smoothly and there should be no slack on the bottom side of the chain during any part of the rotation. Be sure to rotate the crankshaft through at least two revolutions.