

## Does Your Model A Engine Suffer from Cam Slap?

Do you hear a clacking or slapping noise when the engine is at idle that seems to go away as the engine speeds up? Often, this is mistaken for noisy valves where the valve lash is incorrectly adjusted. Valve noise will occur at all engine speeds but cam or timing gear noise will usually go away as engine speed is increased from idle. Cam or timing gear noise can be a result of a bad cam gear, a loose cam gear nut or excessive timing gear backlash, especially when using aluminum or brass gears. But most often it is the dreaded "CAM SLAP".



*Aluminum Camshaft Timing Gear With Helical Cut Teeth*

Usually, the source of cam slap noise is when the thrust bearing surface of the camshaft is not held tight against the front of the block and the cam is allowed to move slightly fore and aft in the block. In order to better understand why this occurs, let's look at what is actually happening when the engine is running.

As the camshaft rotates, a lobe on the cam moves under and pushes up on a valve lifter which raises a valve. As the cam continues to rotate past the full open position and that valve starts to close, the valve spring will cause the valve to push down on the lifter, holding it tight against the back side of the cam lobe. When the lifter pushes on the back side of the cam lobe, the cam momentarily will try to turn backwards. Because of the configuration of the camshaft of the Model A engine, this phenomenon happens 4 times during one complete revolution of the camshaft.

For quiet operation, the teeth on Model A timing gears are helical cut, or cut at an angle. Because of this angle, as the crankshaft rotates, the crank gear will not only turn the cam gear but also will try to force the cam back toward the rear of the engine keeping the cam tight against the block. Now, at very slow engine speeds, at the point in the rotation when the cam is trying to turn backward, the forces on the gear teeth are reversed and, again because of the angle of the gear teeth, the cam is now being driven toward the front of the engine and away from the block. As the rotation of the cam continues, the cam gear teeth are again loaded on the drive side and once again the cam is forced back toward the rear of the engine. To keep the cam back against the block and not allow it to move, Henry provided a spring loaded plunger that pushes on the front end of the cam. If the plunger spring is not strong enough, at slow engine speeds, the cam still may move forward a little and then slap back

against the block as the forces on the gear teeth change direction. This slight movement of the cam will cause a slapping noise which usually goes away as the speed of the engine is increased from idle. This cam slap noise has become more pronounced with the more aggressive cam profiles we find with touring and high performance cams and with the use of stiffer valve springs.

One way to eliminate cam slap noise is to use a heavier plunger spring. This is OK but increasing the plunger load on the end of the camshaft can result in increase wear of the plunger or the cam itself. I have even seen cases where the cam thrust spring will keep the plunger against the surface on the block is also badly worn when a heavy spring was used.

Another method to solve this problem is to replace the spring with an adjustable bolt that will limit the movement of the plunger. This is done by simply drilling and tapping a hole in the front engine cover and replace the spring with a threaded bolt and lock nut. This will work but may not eliminate all the noise because of the necessary clearance required between the plunger and cam.

A better solution would be to use is a combination of the two, an original softer spring and a means of limiting the movement of the plunger. This consists of a pin that is installed thru the center of the spring with a bolt that pushes only on the end of the pin. The original spring will keep the plunger against the end of the cam at all times but at very low engine speed when the spring does not have enough force to keep the cam in place, the pin will limit the travel of the plunger and keep the cam slap noise in check. The advantage of this design is an overall quieter running engine without increasing the load on the plunger.

Another advantage with the new Burtz engine, is that there will be a slight increase in oil pressure. There is less oil loss from the passage that provides lubrication to the cam thrust surface on the front of the block.



*Finished Installation*

### Modifying the Front Cover

Drill and tap a 5/16-24 hole thru the front engine cover centered in the thrust plunger bore. First drill a 1/4 inch diameter hole from the back side of the front cover. I made a bushing to fit inside the plunger bore to help center the drill.

Note, if you do not have a spot face tool, you can skip the first and second steps and go directly to the third step. After the hole is tapped, use a flat file to carefully make a small flat area for the lock nut to seat against.

Second, from the outside of the cover, use a spot facing tool with a 1/4 inch pilot to square the surface that the nut will tighten against. Just face a small area. Remove as little material as possible in order to keep the casting as thick as possible.

Third, enlarge the hole using a letter size "I" drill. This is the correct drill size for a 5/16-24 thread tap. I made a second bushing for the letter "I" drill.

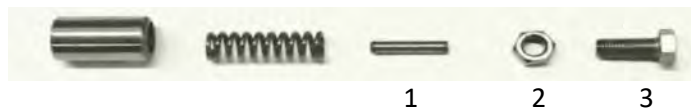
### Installation & Adjustment

Install the front cover as you normally would with the plunger and spring in place. Insert the pin thru the tapped hole followed by the bolt and lock nut. Screw the bolt in until it just comes into contact with the pin. At this point, the pin should be bottomed out in the bottom of the plunger. Back off the bolt ever so slightly and lock the bolt in place with the nut. Do not over tighten the lock nut as you do not want to strip the threads in the cast iron cover. A little gasket sealer on the bolt threads may help prevent any oil from seeping out around the bolt.

When properly adjusted, there will be just a few thousands clearance in the end of the pin and bottom of the plunger. You do not want to add any pre-load to the plunger. The idea is to limit how far the camshaft could move away from the block by limiting the travel of the plunger.

### Additional Parts Needed

- 1 - One pin, 1/4 inch dia. X 1 & 1/8 inches long
- 2 - One, 5/16-24 fine thread nut
- 3 - One, 5/16-24 X 3/4 inch long fine thread grade 8 bolt



### Tools Needed



1/4 inch drill and bushing



Spot face with 1/4 inch pilot



Letter "i" drill and bushing



5/16-24 TAP

## NEWS BITS

### Robert "Bart" Bartholomew Passes

Bart Bartholomew passed away at his home in Long Beach on November 25, 2022. Bart was born in Minneapolis, Minnesota where he attended University High, graduating in 1955. He was also a graduate of Dartmouth College. In the 60's, Bart began working at CDC as a Public Health Advisor in Oklahoma City, Reno, Olympia, San Mateo, Orange County, and Los Angeles County. He was a lifetime member of the Watsonian Society, an organization of Public Health Advisors.



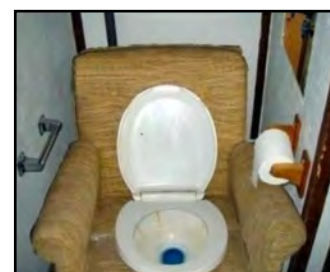
Bart's interest in cars started as a teenager and continued throughout his life. In addition to being a member of Santa Anita A's, Bart was also a member of FAST and the Diamond Tread Chapter of MAFCA in which he served as Editor of the Diamond Tread News for six years and Editor Emeritus contributing material for the Diamond Tread News for 5 1/2 years. His other hobbies were carving wooden toys and creatively using stamps to make greeting cards.

Bart's wife, Sharon, passed away in 2005. He is survived by his two sons and their wives, Lee and Kathy Bartholomew of Redondo Beach and Rex Bartholomew and Lisa Miller of Long Beach; grandson Max Miller of Long Beach; life partner Vicky Bartlett of South Pasadena; and two sisters Polly Feigl of Seattle, WA and Susan Bartholomew of Hamden, CT.

A Celebration of Life was held on Saturday, January 21, at 11 am at the Unitarian Universalist Church of Long Beach located at [5450 Atherton St., Long Beach, CA 90815](https://www.google.com/maps/place/5450+Atherton+St,+Long+Beach,+CA+90815).

## INTERESTING PROJECT IDEAS

Bob Travis suggested these projects for those who have extra spare time.



**Who said men can't decorate**