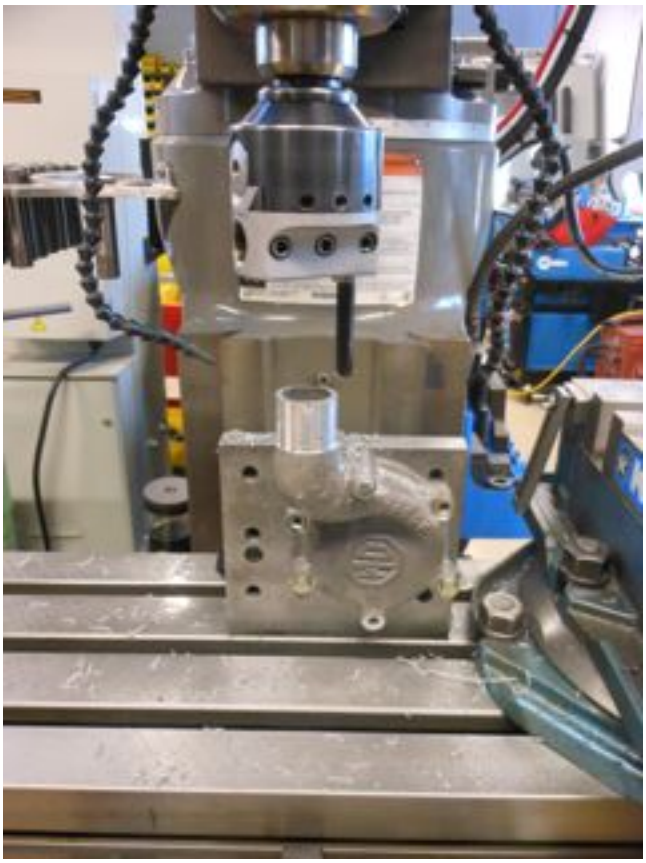
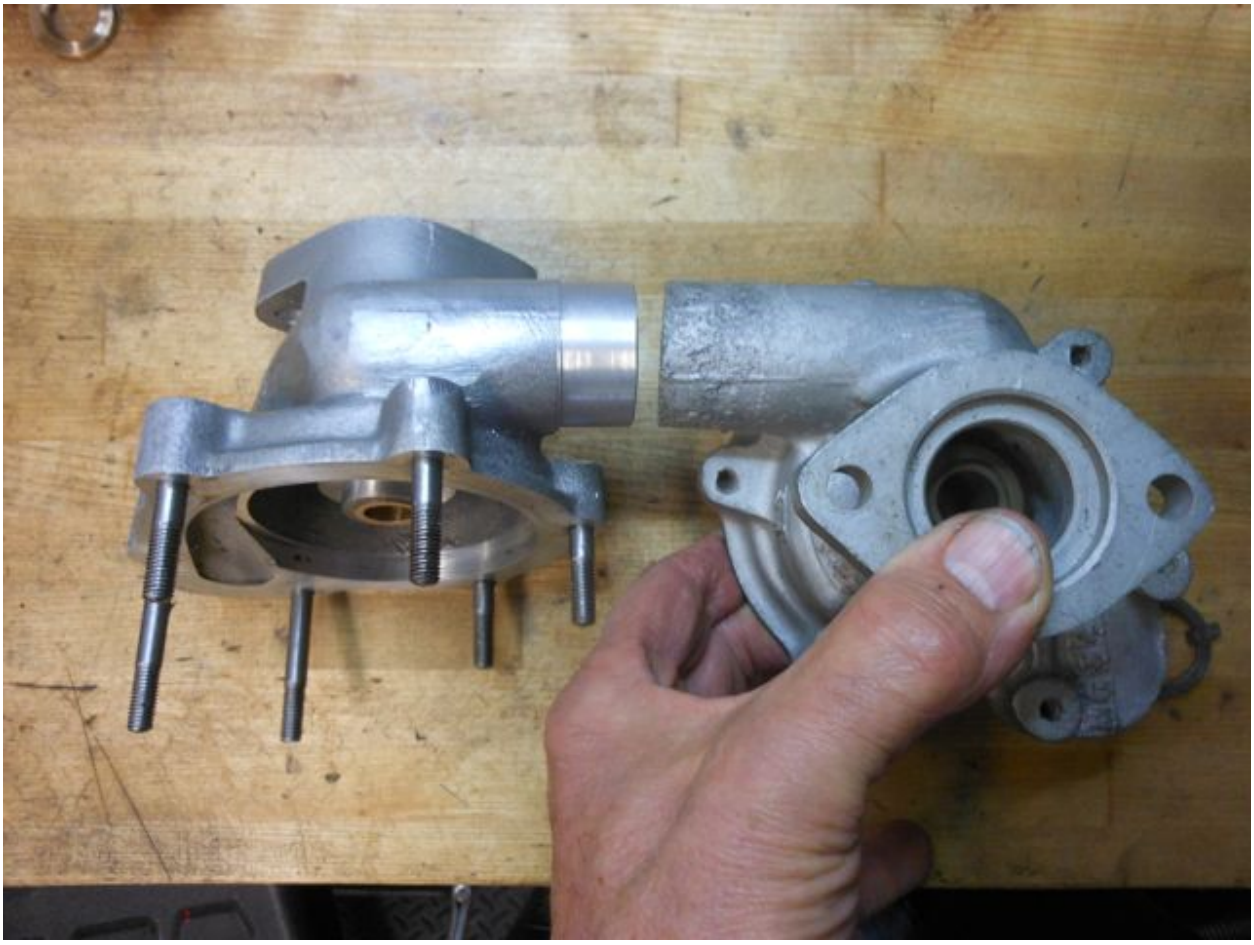
Triple-M Water Pumps:

The MMM water pump was not one of MG's stellar designs, and improvements, much less standard rebuilds, require stalwart resolve, creative machining and seductive music piped into one's shop to buttress one's patience for the tasks at hand. One can nearly assemble an entire engine in the time it takes to address all of the water pump's manifold issues. The following is a presentation of "things to consider" when addressing pump challenges and it is not meant as a "how to" guide. If your eyes glaze over, grant yourself permission to skip to the next topic. I will not be offended.

The three pumps with which I have familiarity are J4, P/N/Q/R, and L/K. For ease of description, I will focus on the last two variants. If you have a pile of parts and desire to create a whole out of many, be forewarned that over the years, a number of pumps have been manufactured that deviate subtly from the original design: a lid from one body may not fit the body another, etc. Additionally, the P/N pumps vary from the K/L pumps in that they were designed to fit different front housings: the spigot adaptor for the K/L is larger and requires a larger gear than the N/P/Q/R pumps, whose spigot has a smaller diameter, requiring a smaller gear.

The original pumps, as supplied by MG, were cast of an aluminum alloy prone to corrosion. In my shop inventory I used to have a bin filled with pump castings with holes straight through the bodies and lids. Additionally, in order to save on machine costs, the factory cast the inlets and outlets at approximately the correct size to fit a 1.375 flexible water hose. I say "approximately" because the shanks were tapered to ease removal from the core box when cast and out of round from shrinkage across the part lines of the mold. When hoses are assembled to these shanks, the hose clamp compresses where placed creating a vacant space behind it. Coolant migrates into this space and corrodes the outside of the spigot. A solution is to do what MG was too cheap to do: simply finish the task and machine the pump shanks round to 1.375" so that the hose fits properly. This requires two setups, one for the lid and one for the body. The result is a hose that easily assembles to the pump, fits snugly on the spigot and won't corrode.



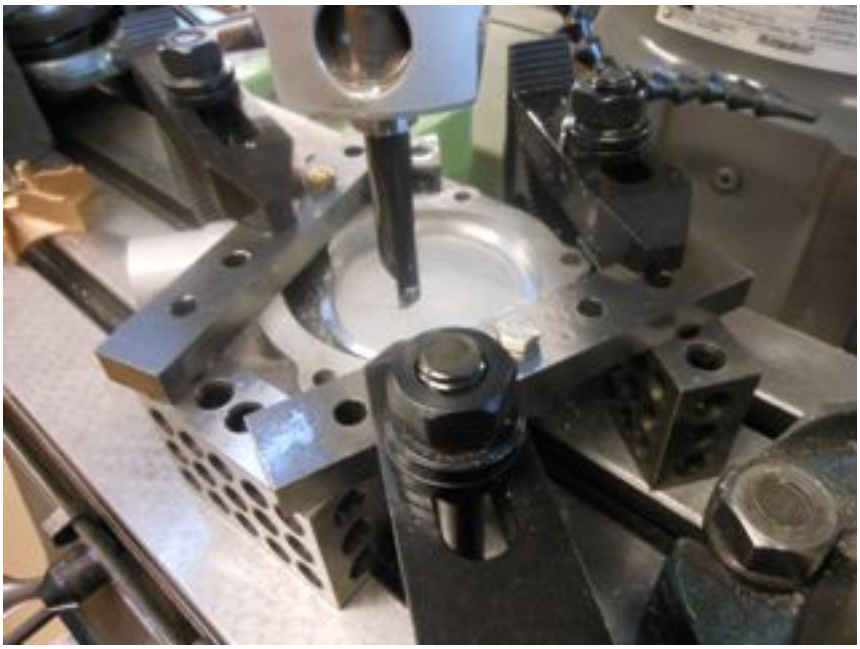


Over the years, both the four and six cylinder cars have lent themselves toward the production of more power through increased displacement and supercharging. This trend motivated interest in designing new and improved impellers to increase coolant flow: the three blade paddle type was becoming inadequate for the task. The racing department in 1934 first experimented with a modified Rolls Royce impeller, a six blade bronze variant which I have cast and used with success for many years. This type is incorporated into newly manufactured pumps available from Vintage MG. Another six blade impeller was designed and made available by Baynton Jones Ltd.

Left to right: Jones, RR, Stock

As designed, the pump shaft must be in perfect axial registration in four separate bores: the cast iron adaptor-spigot, oil seal carrier, packing gland nut and impeller bushing. It is a tall task to insure all these bores are aligned when pressed and bolted together. Water in the pump is isolated from the pump drive by a packing under the impeller. Different series pumps have different designs for the bushing that aids in compressing the packing, however, all compress the gland packing material against the shaft to ensure against leakage. If water is found migrating down the pump shaft, coolant can enter the engine through the pump base. To prevent this from happening, the gland nut may be tightened. There is a point, however, when either the shaft becomes so worn (as seen below) or the nut bottoms out and provides no additional compression for the packing against the shaft. At this point, either new packing, a new shaft, or both are required.

If one disassembles their pump and elects to convert to a high volume impeller as described, be forewarned that the job is not easily accomplished and requires some machine setups to modify the castings. The impeller bores in the pump lids will need to be machined deeper as well as a similar treatment to the pump bodies. In addition, a modification to the center casting to accept the impeller vanes will need to be accomplished.



Helpful Tips:

Experience often provides wisdoms which are much less expensive to learn vicariously than by trial and error. Here are someI've learned, divided into two categories: All Pumps and New Pumps.

All Pumps:

1. The front engine castings onto which the water pumps are bolted have an internal ledge which is intended to capture the oil and feed it to the spigot-adaptor of the water pump. This oil lubricates the water pump shaft that is turned by the crank skew gear. Trapping this oil can be enhanced by using a carbide ball cutter to create a "valley" in front of the hole.

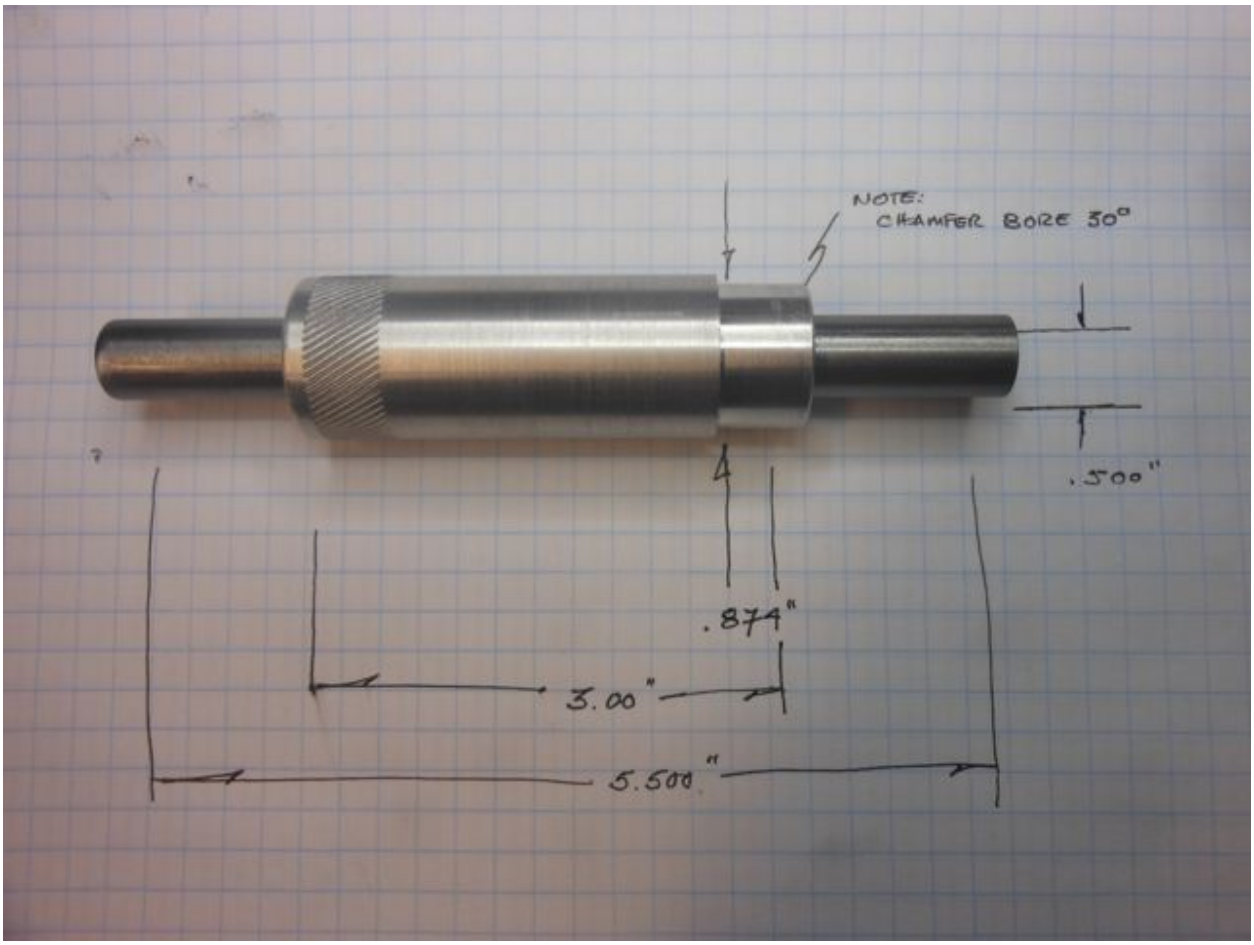
2. As water enters the pump, it must negotiate an abrupt transition to the vane cavity. This can be enhanced by tapering the entrance. The coolant is subjected to less turbulence and flow is enhanced.

3. For many years, I used 1/8" water pump packing and wound it around the shaft (opposite to rotation) and enhanced its lubrication with Penrite water pump grease laced with graphite powder. Today, an acceptable variation is to

cut two 2.375" strips of Palmetto graphite and PTFE loaded woven 3/16" aramid packing. Lace it with either a lithium grease or the Penrite water pump grease to wrap around the shaft making certain the butt ends of the packing are 180 degrees opposite from each other.

4. To facilitate the assembly of the pump shaft through the packing installed in the pump, a shaft of the same diameter as the pump shaft (.500") can be installed while installing the packing and a machined tube slid over the shaft

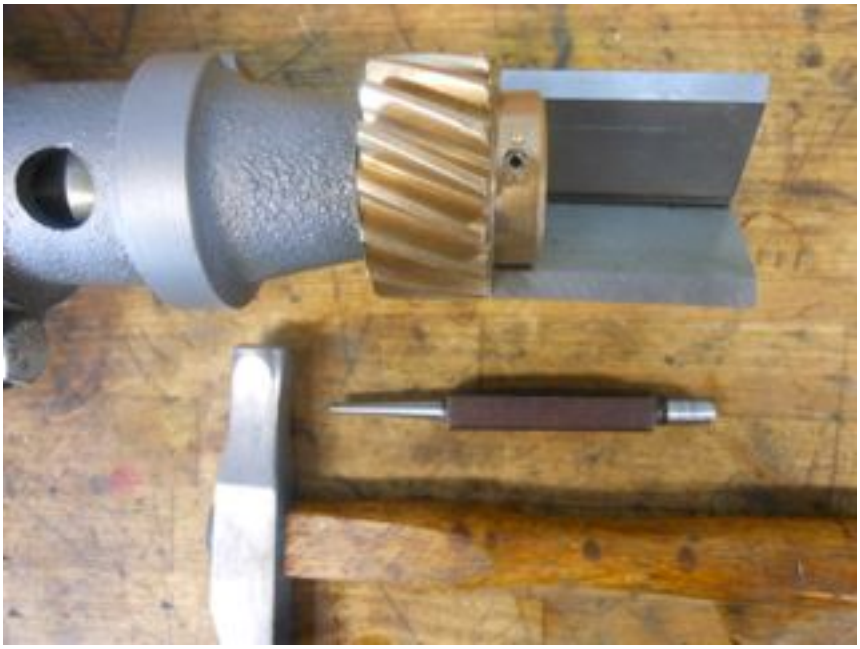
to compress the packing into the housing bore. The end of the aluminum is machined to a 30 degree taper to mimmic the gland packing nut. The pump shaft and spigot casting can then be assembled to the pump body, pushing the "dummy" shaft out while pushing the pump shaft in. This prevents the pump shaft from catching the packing material on installation. Note: for installing a pump shaft with a threaded end such as is used to mount a modern six bladed impeller, bore and thread the end to accept the new shaft. Simply thread the two together to provide a continuous shaft surface.



5. On the base of the aluminum pump casting there is a receiver for a packing seal to prevent water draining down the shaft and into the engine. This packing can be upgraded with the use of a modern lip seal. Two options are available: the first uses a Timken seal 471526 which can press into the aluminum bore and is used if there is an election to either not use the coil spring to keep the gland nut from rotating or if a spring seat is provided above the seal so as not to have the spring compress on the seal; the second is to use Timken seal 410119 which, depending on the pump series, you must either machine the bronze seal carrier to suit the seal's OD or machine a seal carrier from scratch to fit the seal. Because the seal is a press fit into the seal carrier and the seal carrier is a press fit into the housing, it is helpful to have a small press.

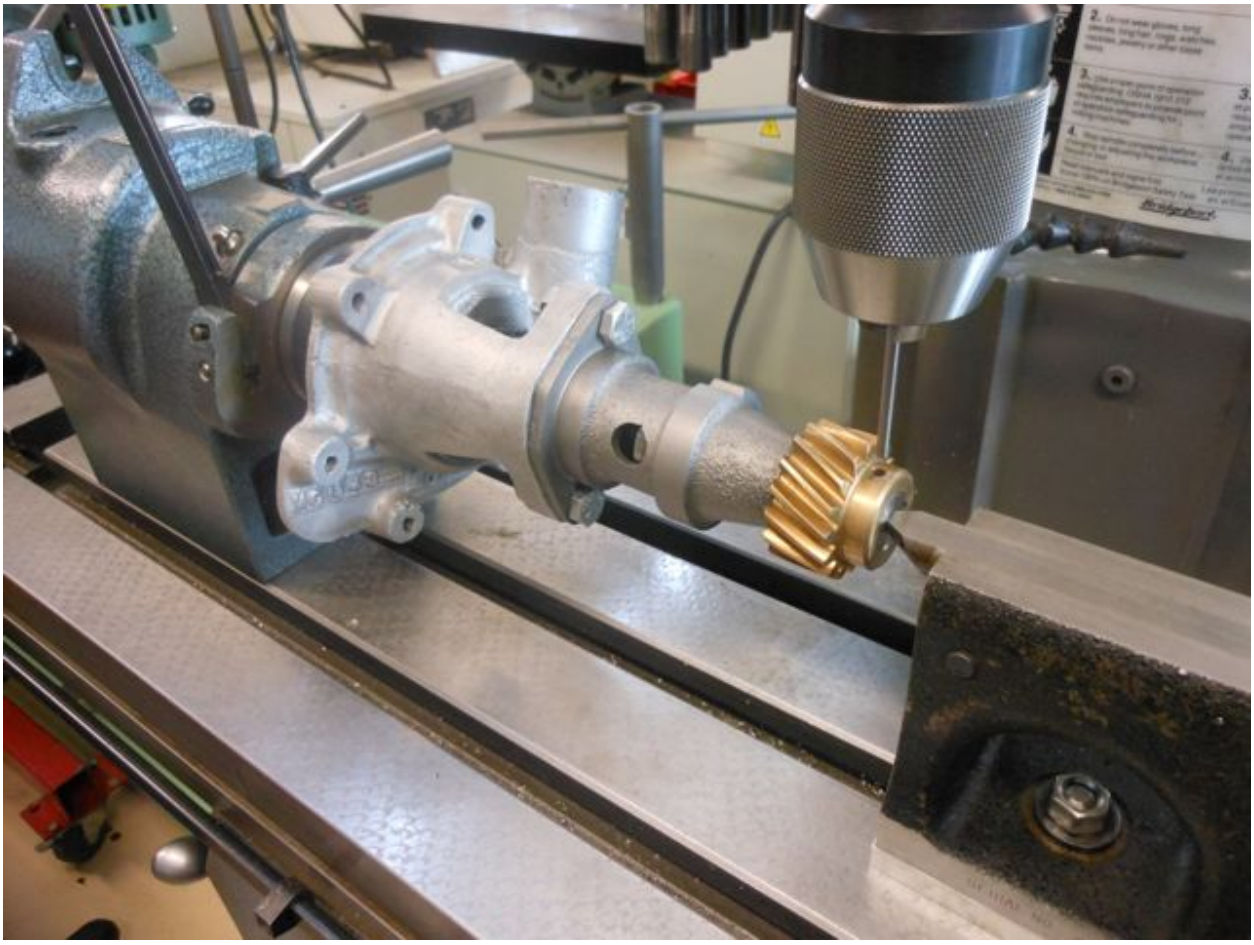
6. The bronze drive gear on the original pumps were retained by a solid pin peened on both ends to keep the pin from backing out. A gear can be re-installed after rebuilding the pump and retained with a roll pin of the same

original diameter, 1/8". It is good practice, however, to shorten the length of the pin by .070" (or so) less than the diameter of the boss through which the pin is driven. This permits the placement of two punch dimples per side to slightly close off the bore to prevent pin extraction.



Note: it is somewhat maddening that new drive gears have the pin bores predrilled. This is unnecessary and requires additional effort to accurately

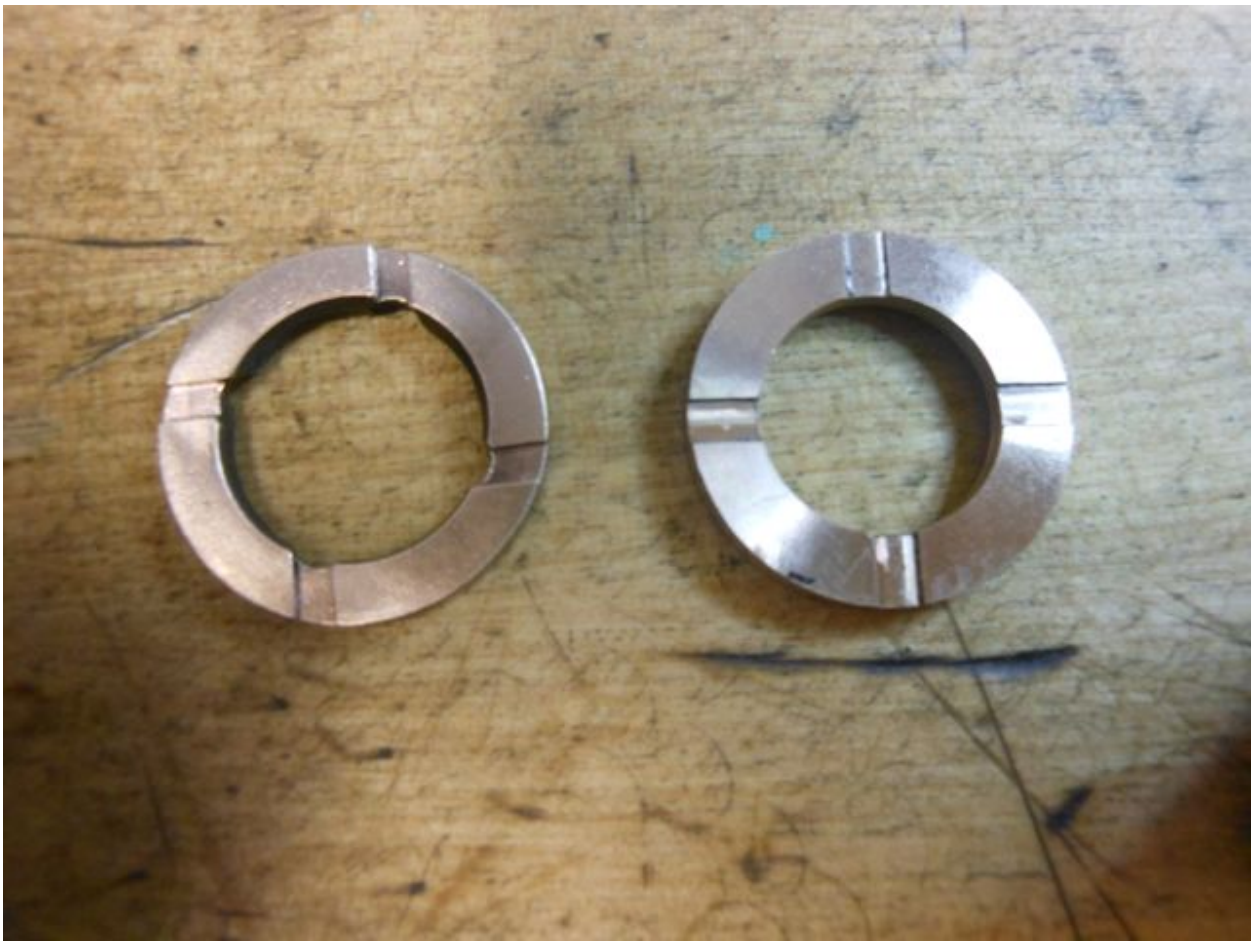
locate the pin bore and bore the assembly exactly in position. When locating the gear and boring the pin bore, make sure there is at least .004" end play in the pump shaft. Place a feeler gauge between the gear and cast iron pump extension prior to drilling the pin bore.



New Pumps;

MMM suppliers have had new pumps on the market for many years. The quality of the aluminum is often far superior to the original material and the possibility to purchase a six blade RR type impeller, as from Vintage MG, has increased the options to the restorer. This is a huge service to all who desire an upgrade to their engines. It is prudent however to disassemble what you've purchased to ensure the pumps longevity in service.

1. The new pumps, depending on the supplier, have bronze thrust washers with oil grooves cut radially from the center. This design differs from original and misses the intent of the grooves. Instead of drawing oil into the shaft bore to lubricate the housing, the oil is flung outward to do the opposite of the designed intent. The original washer has grooves cut off center with slots filed into the ID of the bore. The grooves then act like a water wheel pulling oil into the shaft when rotated. The grooves in the internal bore of the washer provided space for the oil to enter the bore in the cast iron base. A subtle but important point.



2. On the disassembly of a new pump, one might find that the impeller wobbles. The probable cause is the internal threaded bore of the impeller is jamming on the root of the last thread of the shaft causing it to cock on assembly. The correct machine practice would have been to undercut the shaft at the base of the thread to permit the impeller seat against a surface cut orthogonal to the axis of the shaft. To remedy this, machine the shaft for this

provision with a parting tool on a lathe. The impeller will then always locate in the same position and trimming the machined planes of the impeller at this time will remove all wobble. Note: if this remedy is required, additional calculations and machining will be required to set the impeller clearance to the pump and the end-play to the shaft.

My discovery in writing this Tech Article is that it is nearly as exhausting to write about water pumps as it is to rebuild them. For those willing to address pump issues on their own cars, I hope the article proves useful. But whether you are a hands on or hands off owner, the article should awaken an appreciation of how lucky we are to have MMM suppliers willing to take on the challenge of manufacturing this pesky component for our cars.
By suffering through to this article's end, you have indeed mustered stalwart resolve ... perhaps the seductive music still plays in the background.

Good Luck,
Chris Leydon

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