

Wal-Mart sack, doubled over (4 layers) poked loose into the oil reservoir. Screwed cap on, just like normal. No leaks when tipped on side.



Removed hood, side panels, and driven clutch.  
Need T-25 torx bit for side panels, 14 mm for clutch.  
Tipped sled on side, supported by Rubbermaid stool.  
Oil stays in DD.



Removed foot pocket brace. Four T-20 torx screws.





T-30 torx bit for  
13 DD cover bolts.



One cover bolt is impossible to get at with a ratchet. Had to use the T-30 bit with a 5/16" wrench. The rest were easy.





Grabbed the drain plug with a vice-grip and the secondary clutch shaft in my other hand. Wiggled the cover loose by hand. Easier than I expected. Was careful not to tear the gasket! Gasket popped loose with some TLC from a small screw driver.

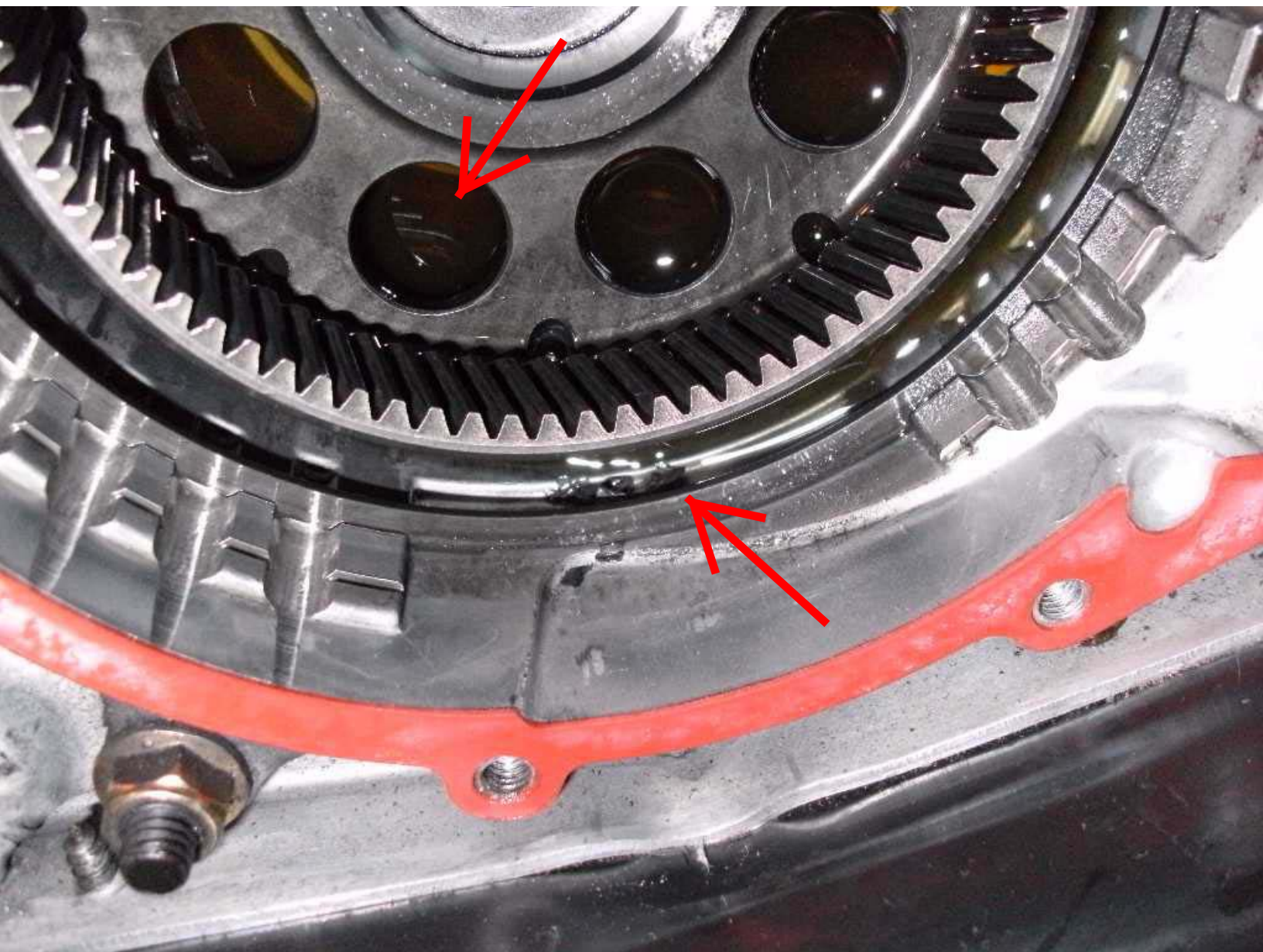


This is what it looks like with the cover removed. The transfer shaft will wiggle free by hand and pull straight up and out - fairly easy. The bad bearing is on the other end of the transfer shaft.





Shrapnel in the DD case!! Removed 2nd snap ring and fished crap out with a magnet. Also through the holes in the drive shaft basket. The DD oil is new and clean. Plan to run it one ride and then flush with fresh oil.

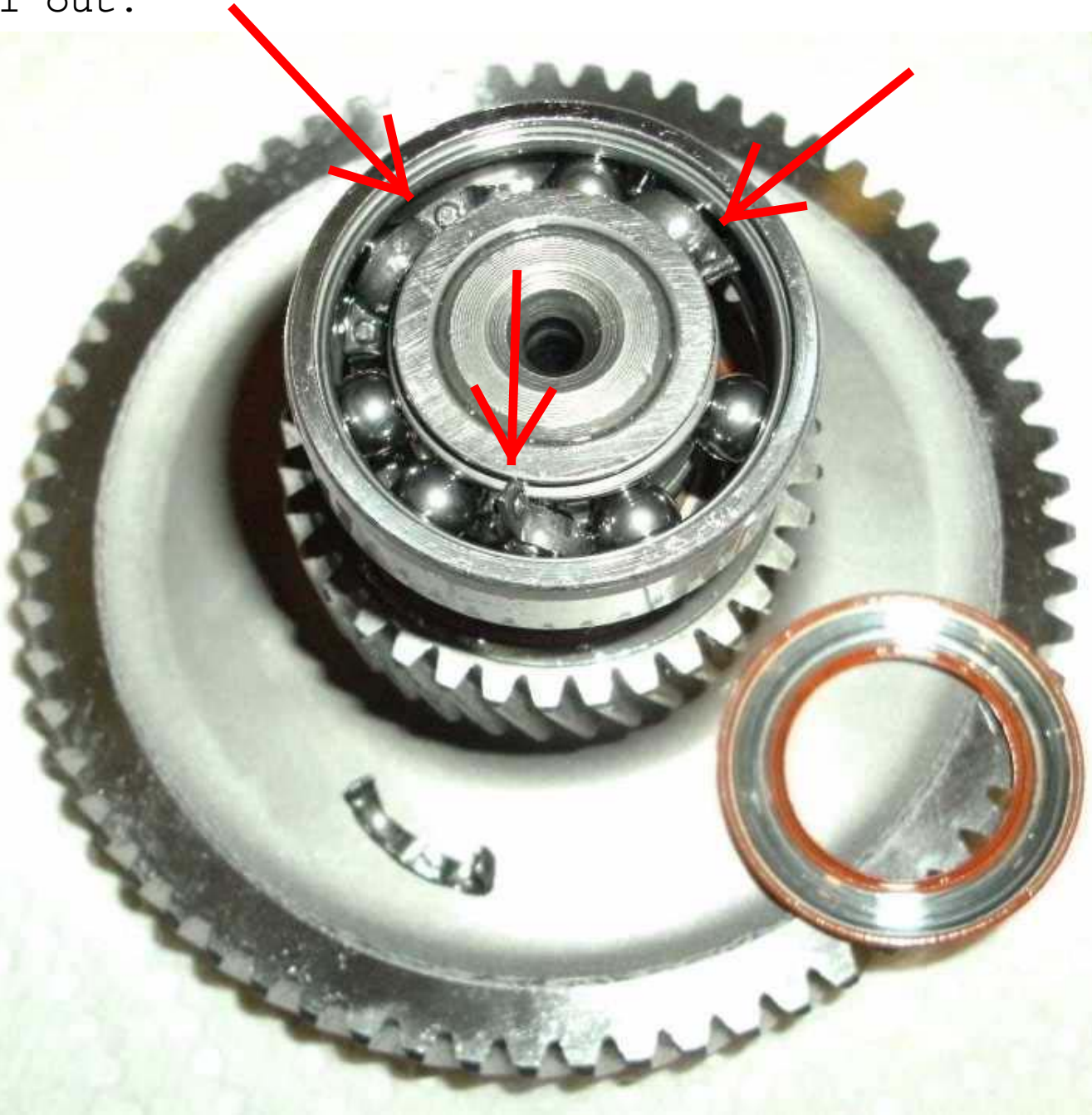




Bad (stock) 6203 bearing, after 600 miles. Cage is half gone. Inner seal popped out and the other seal was twisted. The balls and both races were tight and spun very smooth. Did thrust loads put heavy loads on the cage? Or was the cage just cheap, poor quality, CRAP ??

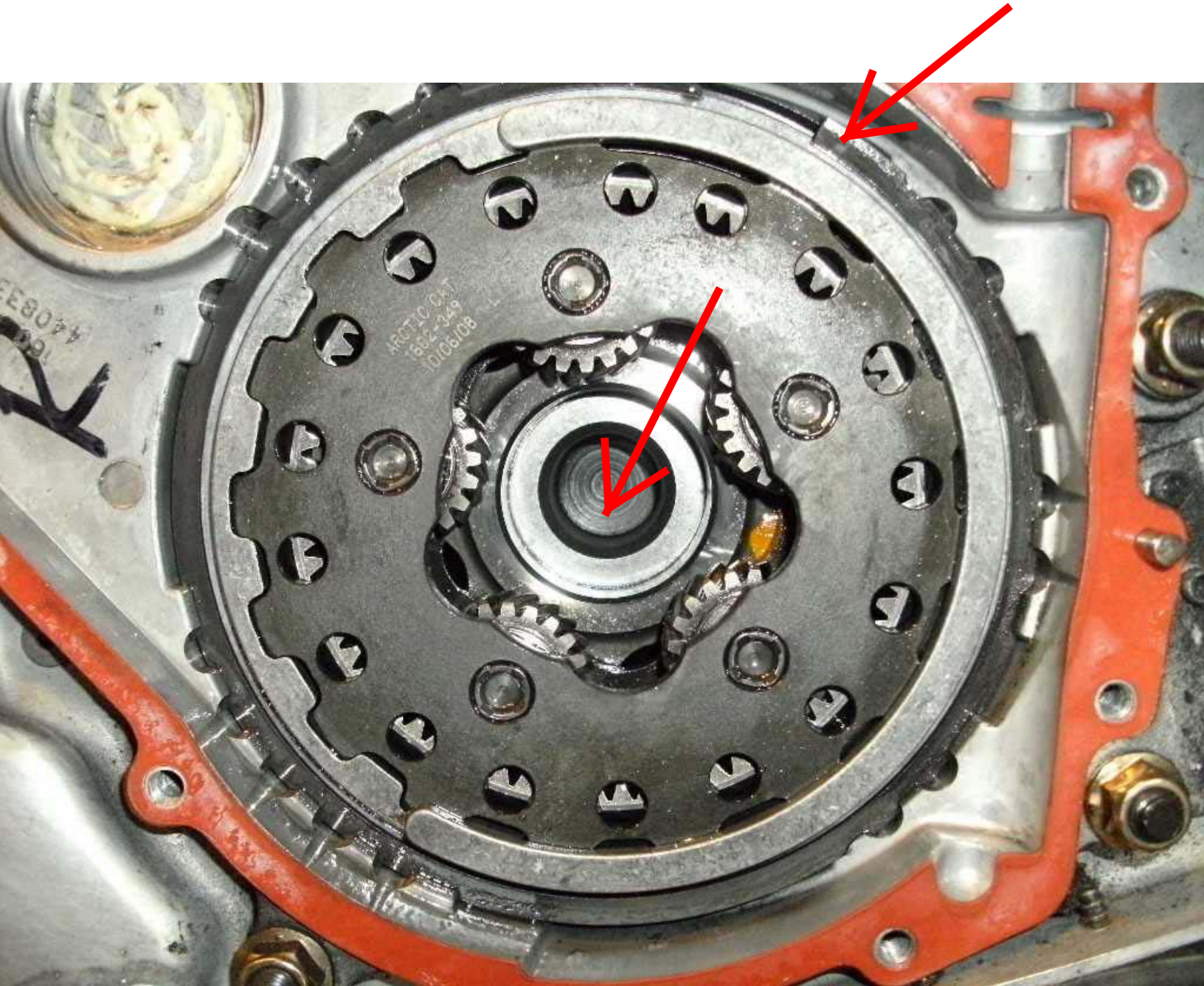


Portions of the cage remained in the bearing, surrounding three of the balls. The loose piece of cage was also in the bearing, held in by the seal. The outer seal was in place, until I popped it off with a screwdriver. Then the loose piece of cage fell out.





The center hole in the output drive shaft was full of metal filings, cleaned with an oily paper towel. Note the end of the snap ring - easy to pop out with a small screwdriver.



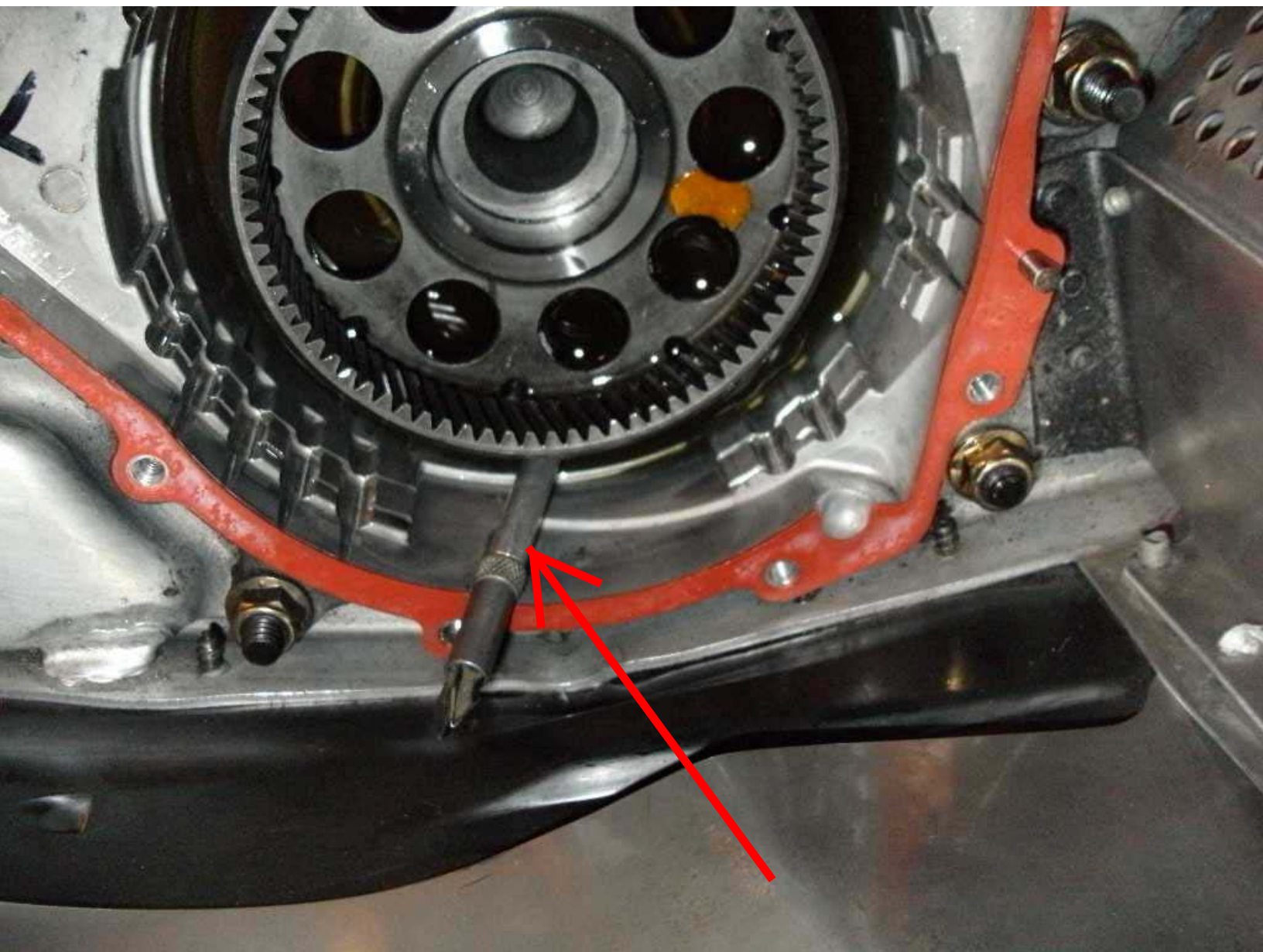


Easy to pop the snap ring out with a small screwdriver. Then the planetary basket easily lifts out by hand.





A magnet easily grabbed loose metal parts and debris from the bearing cage. Wiped out every thing with clean paper towels - sludge and small metal flakes.

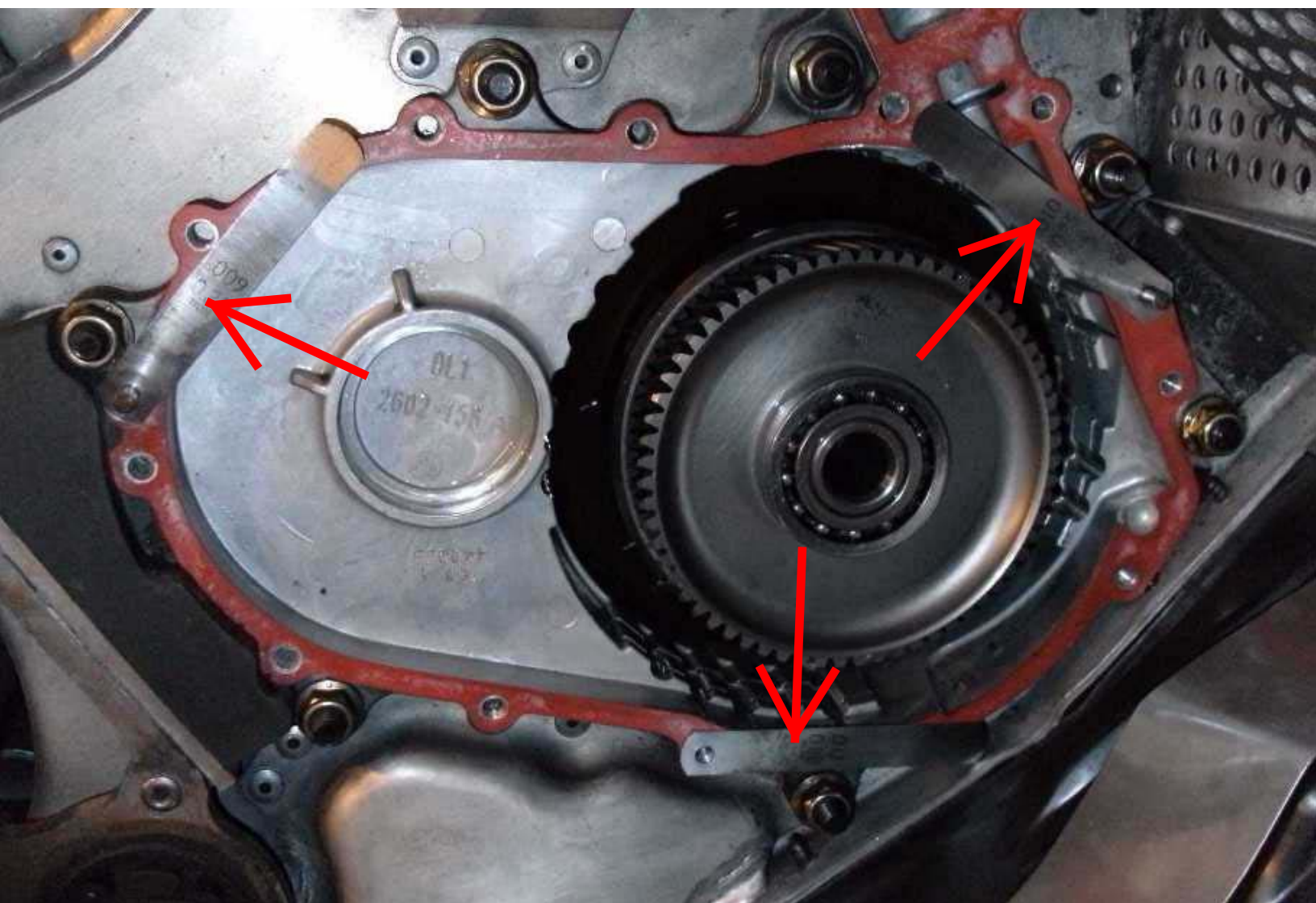


Cage Debris

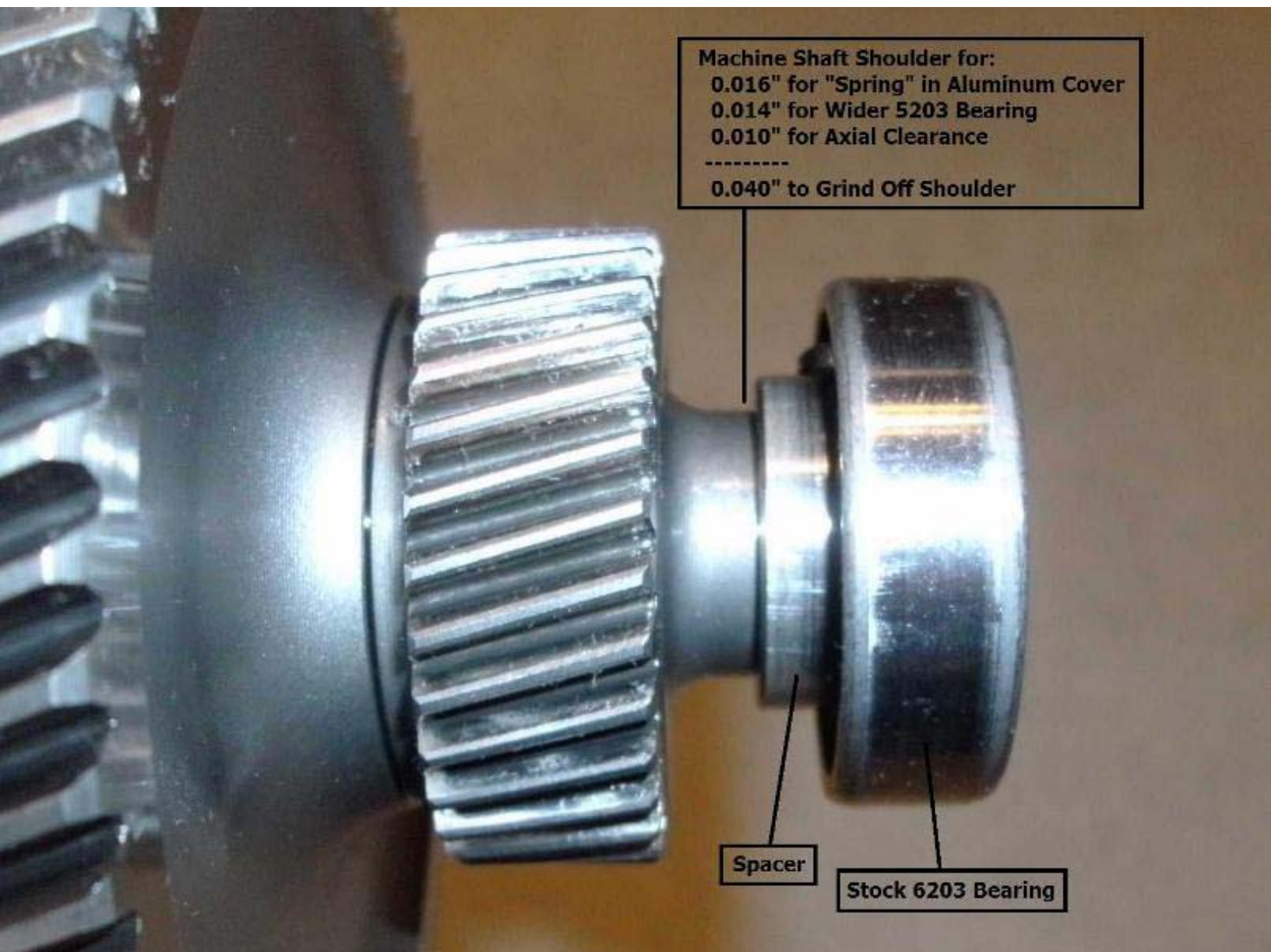




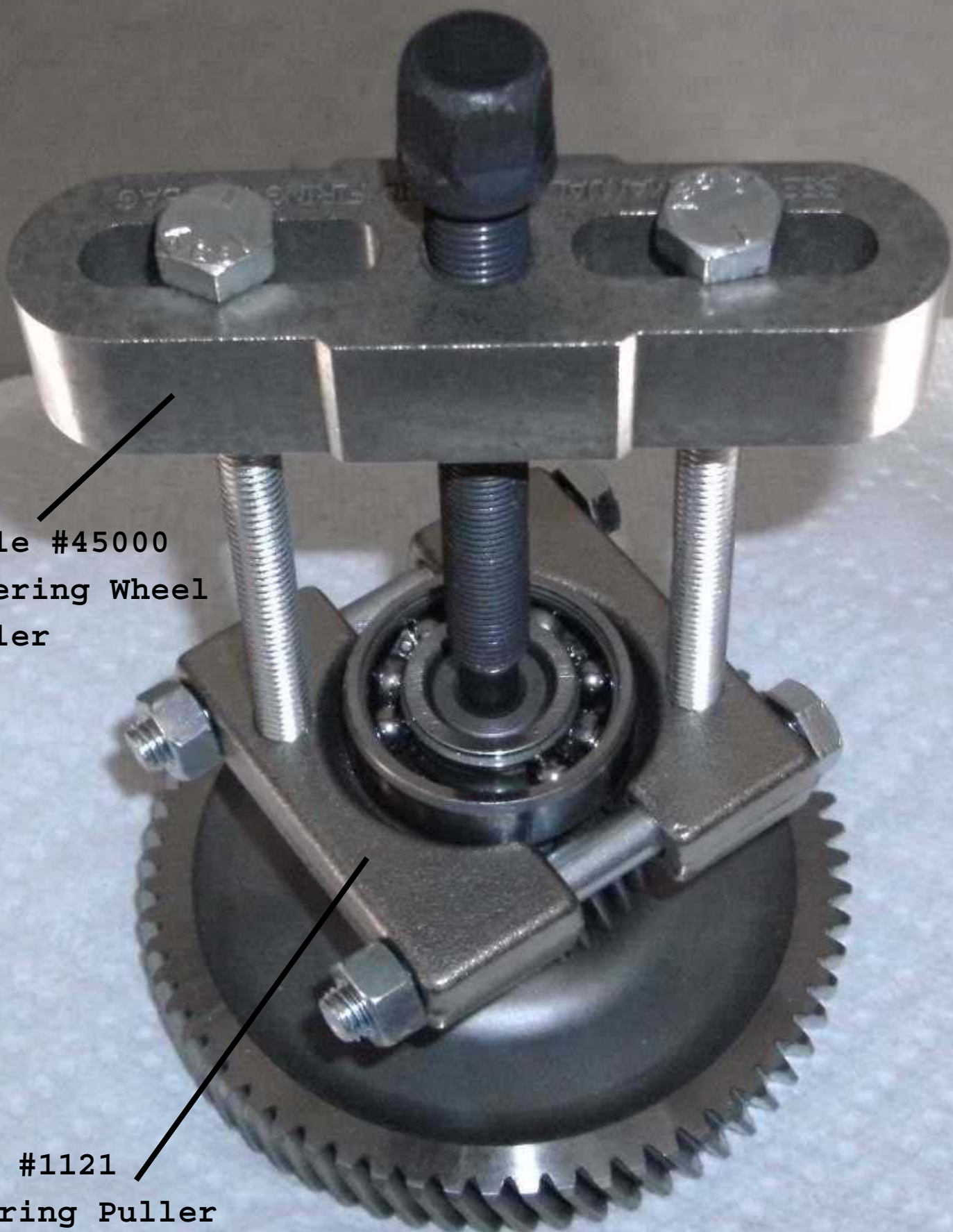
Measured the transfer shaft length by putting three feeler gauges under the cover and checking when the rocking stopped. My transfer shaft is about 0.016" too long (with the stock spacer and bearing). Would be 0.014" worse with the wider 5203 bearing.



My transfer shaft stuck past the end of the 6203 bearing by only 0.014". Some guys say it should be 0.050". Maybe the shafts were made with poor dimensional accuracy on their length? My shoulder looks like it extends further out on the shaft, as compared to other photos from other machines.







Lisle #45000  
Steering Wheel  
Puller  
\$22

OTC #1121  
Bearing Puller  
\$40

Stock 6203 bearing (0.472" thick) with damaged race.  
Stock spacer (0.202" thick).

New SKF 5203(3203)ATN9/C3 Explorer bearing (0.688").





Some machine shops in Reno said the gear shaft would be too hard to cut effectively with ceramic tools. One shop recommended A&J Grinding for precise results.

Cylindrical OD & ID Grinding  
Form Grinding  
Centerless Thru & Infeed  
Tool & Cutter Grinding  
Prototype & Production

**(775) 356-1040**

## **A & J Grinding**

*"Making Sparks in Nevada"*

**Doug Stafford**

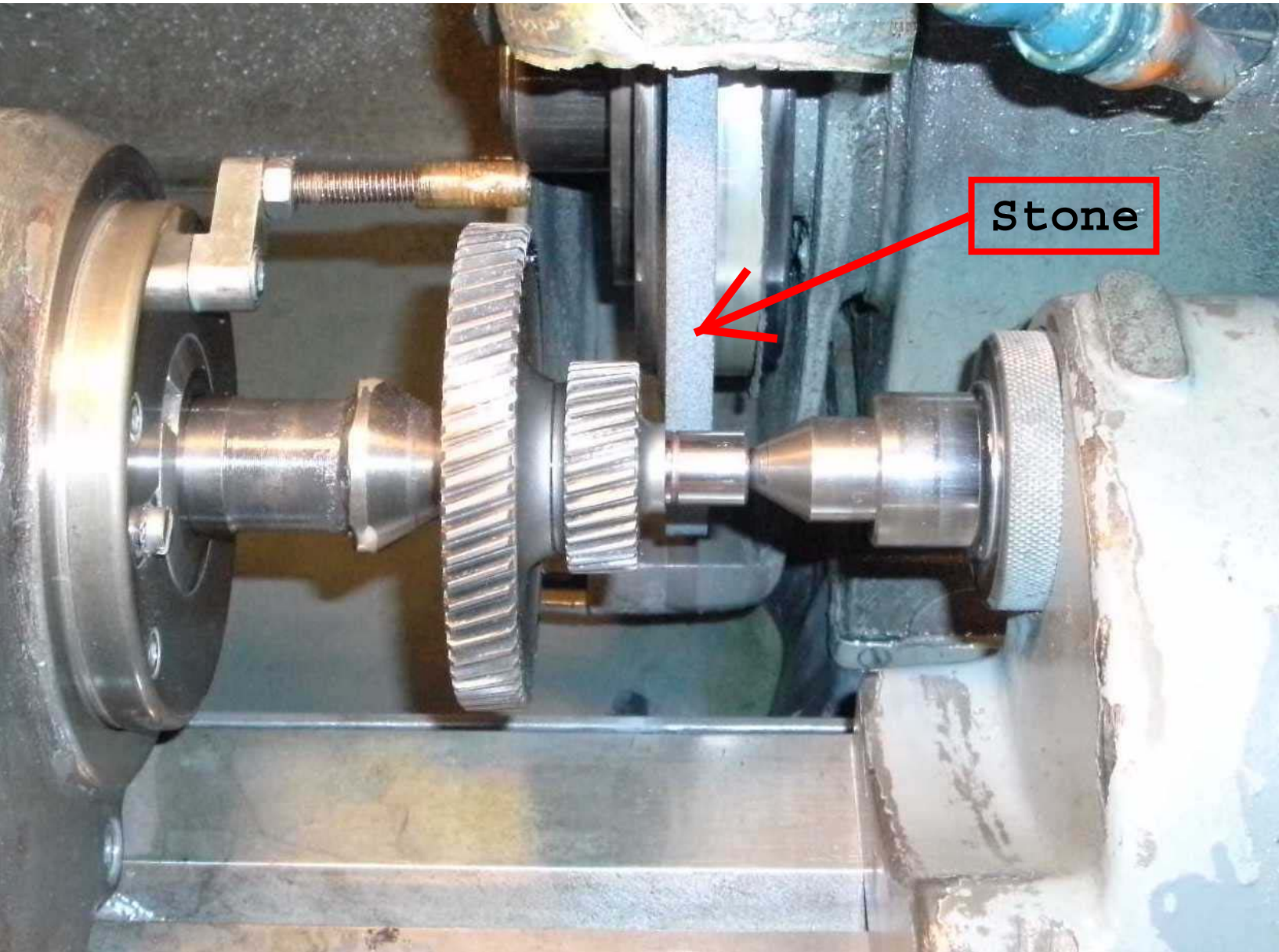
1845 Hymer Avenue  
Sparks, NV 89431  
FAX (775) 356-0657

This is Doug from A&J Grinding. His family has been doing precision grinding for many years. Does lots of hard shafts for bearing fits. That's my shaft in his machine. Very smart and nice guy. Did a beautiful job for \$50, completed the same day.





His grinding machine (one of many) is dual centered and liquid cooled. He dresses the stone to cut only on the corner. Doug matched the shaft size, without touching the original shaft surface and moved the shoulder back exactly 0.040". He's a precision guy.









Undercut at  
the end of  
the original  
shaft

Pressed the new bearing on  
at home with a C-clamp.  
Kind of Mickey Mouse,  
but it worked.





Drove the final  
distance with  
a socket on the  
inner race.

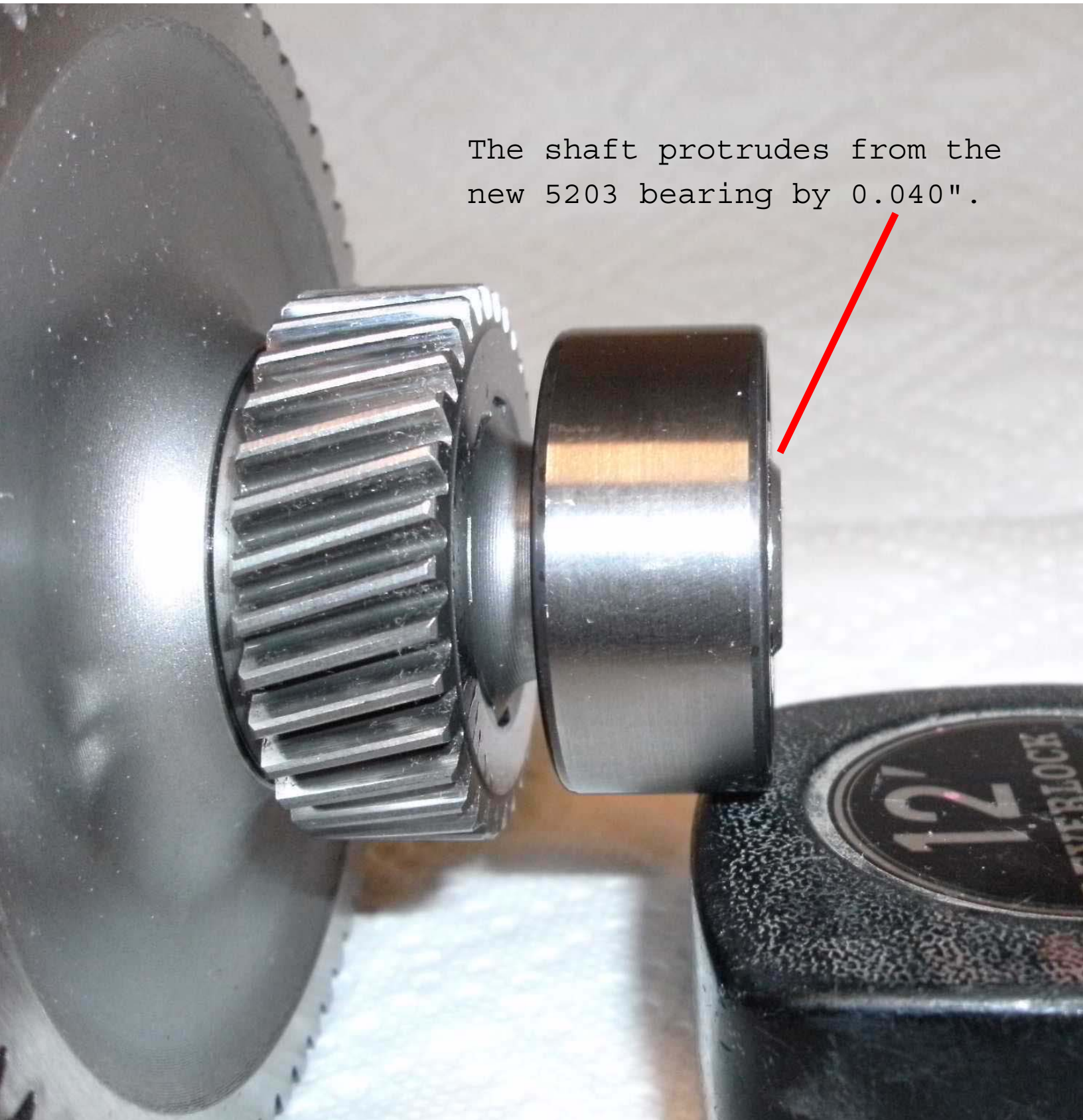


Layout with the new 5203 bearing.  
Inner race up tight against the  
new shoulder.





The shaft protrudes from the  
new 5203 bearing by 0.040".



## Reassembly

When I thought the job was nearly complete, I experienced some trouble during final reassembly. Couldn't get the bearings on both of the gearbox shafts to line up with their matching aluminum support pockets. Fiddled with it for over an hour! One bearing would line up and not the other.

Decided to use fine-grit emery cloth to break the sharp corner on the aluminum, where the bearings start to enter the pockets. To provide just a tiny guiding radius, to start the bearings. On the upper gear shaft, I worked on the aluminum housing mounted in the machine, the left half of the DD. For the lower shaft bearing pocket, I worked on the aluminum DD cover.

Cleaned the grit and aluminum with oil and clean rags. Worked the cover into place, and both bearings lined up! No "rocking" on the cover, after removing 0.040" from the transfer shaft shoulder. Nice to see the DD closed up!

Two of the cover screws were "pre-stripped" from the factory. They wouldn't take half the torque compared to the other 11 screws. They have some bite and lock-tite, and are in non-critical locations. Next time I'll remove the entire DD, and drill / tap all 13 to the next larger size.

Decided to install a BikeMaster magnetic drain plug - details on following page.



# Amazon . com

**POWERSPORT  
SUPERSTORE**



BikeMaster Aluminum Magnetic Oil Drain Plug -  
12mm x 1.5 FHM050-A12-1.5

by [BikeMaster](#)

([1 customer review](#)) |

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Price: **\$15.51**

**In Stock.**

Ships from and sold by [Powersport Superstore](#).

## Product Features

- Protect your bike at the same time make it look better
- Your choice of billet aluminum or steel drain plugs
- Comes with powerful magnets embedded in them so they catch any ferrous metallic particles that might be etc.
- Clean metallic particles off next time you drain the oil