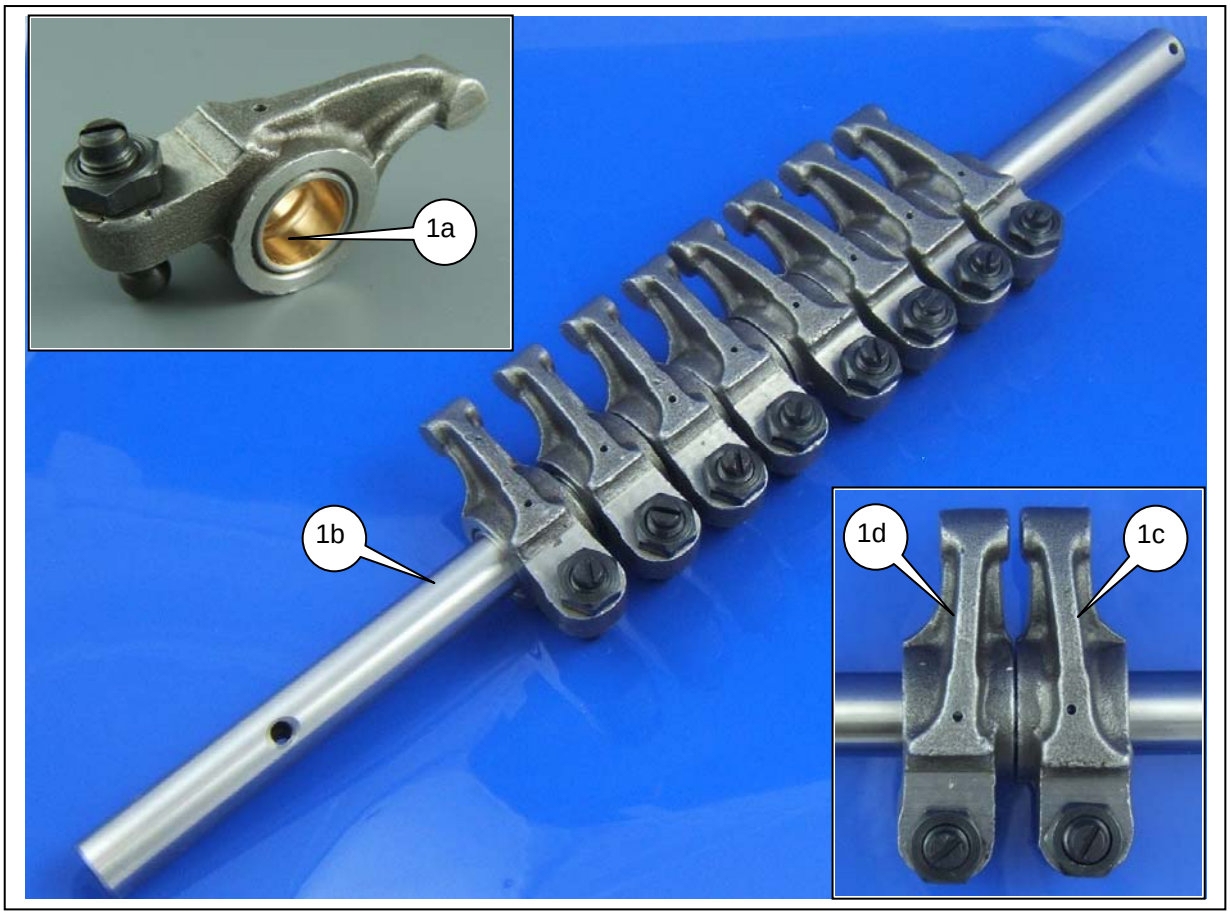
Supplemental Information & Instructions
for
839-138 Rocker Shaft w/Bushed Rocker Arms
Spitfire MK IV & 1500, MG Midget 1500

A little background…

Anyone rebuilding a rocker shaft assembly for a Spitfire or a Midget will have to deal with the rocker arm to shaft clearance. The stock rocker arms were never bushed, and the tolerances specified are based to the steel on steel interface. The Midget 1500 workshop manual gives shaft diameter as 0.5607" to 0.5612", and the rocker arm bore is given as 0.563" to 0.564". This translates to a clearance of 0.0028" to 0.0033". If your rockers are worn, they must be replaced. If the bore diameter in the new rocker is on the high side, and your new rocker shaft is on the small side of the range, the clearance will approach the maximum allowed. In addition, the stock un-bushed rocker arms wear more quickly than rocker arms fitted with bushings. This will in time reduce your oil pressure.



Moss decided to address these issues by arranging for special rocker arms to be made. These are identical to the OE rocker in shape, but are fitted with a bronze rocker arm bushing (1a). The challenge was figuring out how to deliver bushed rocker arms that would have the proper clearance when fitted to a new rocker shaft. We know that the optimum clearance between the bushing and the shaft is generally given as 0.002" to 0.003". Rocker shafts are made to a standard dimension, with some tolerance. That means the actual diameter of the shaft will vary a little bit. If we honed these rocker arms to fit a "standard" rocker shaft perfectly, they really would not be perfect when they were installed. The actual clearance would vary from shaft to shaft. That would be ok, but that was not what we were trying to achieve.

The Solution

We send rocker shafts and rocker arms to Rocker Arm Specialists here in the US. They match a set of eight bushed rocker arms - four 839-115 “odd” rocker arms (1c) and four 839-125 “even” rockers arms (1d)- to a specific rocker shaft by honing the bushings to give a finished clearance of 2 thousandths (0.002”). Because we are matching rocker arms to a individual shaft, we don’t have to compromise on the clearance to allow for variances in the actual diameter of different rocker shafts . We are holding a tighter tolerance to make sure that the rocker arm is always floating on an oil film. If you want to check the dimensions, be aware that you cannot accurately measure the ID of the bushing with callipers- you need an inside mic.

When a rocker arm is installed, the “tip” on the end of the rocker rests on the tip of the valve stem. The tip has to be very hard, usually between RC 50-52 (Rockwell C scale). The tip also has to be shaped so that it is perpendicular to the long axis of the rocker arm. With mass produced rocker arms the tips are shaped to fit a specification, and there is a range that defines “acceptable”. Again, we were aiming a little higher. The tips of these rocker arms have been re-radiused to ensure that the contact pad (C) is precisely perpendicular to the long axis (A) of the rocker arm and parallel to the bore axis (B). The re-radiused tip of the rocker arm will contact the tip of the valve stem all across the surface, ideally in the middle of the valve stem (Fig 3). Since we are not supplying the complete head, there are limits to what we can do, so we have some advice for you and your machinist. After the rocker assembly has been bolted down, coat the tip of the valve with a black felt tip pen or use machinists blue. After the engine has turned over several times, move the rocker arms out of the way and look at the wear pattern on the tips of the valve stems. If the wear pattern is offset ***closer*** to the rocker shaft, you can raise the rocker pedestals on shims. If the wear pattern is offset ***farther away*** from the rocker shaft, valves have been “tipped” or shortened too much, or the head of the valve is not deep enough in the new valve seats.
Before you do anything to correct either condition, talk to your engine builder or machinist.

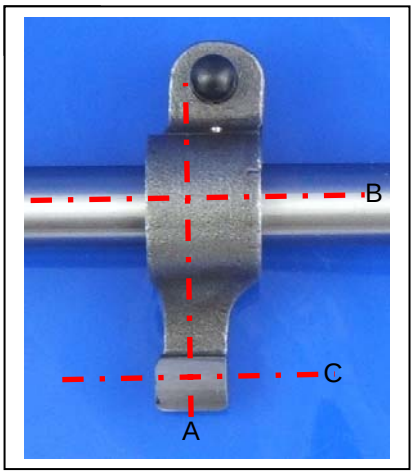
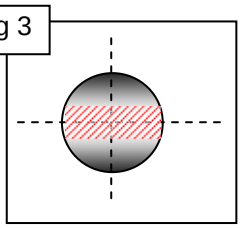


Fig 3



The advantages of the bushed rocker arms are numerous. With bushings honed to fit a specific rocker shaft, the advantages are maximized. The rocker shafts will last longer. With the tighter tolerances, you will not lose as much oil pressure as you would with the stock un-bushed rocker arms. By offering this assembly to Spitfire and Midget 1500 owners, we are addressing a problem that has plagued engine builders for quite a while.

*Although every effort has been made to ensure the accuracy and clarity of this information, errors and/or omissions on our part are almost inevitable. Any suggestions that you may have that will improve the information (especially detailed installation notes) are welcome. Please use the simple email form on the **“Contact Us”** page on the Moss website: http://www.mossmotors.com/AboutMoss/ContactUs.aspx*
If you prefer, you may call our Technical Services Department at 805-681-3411. So many people call us for help that we are often not able to answer the calls as fast as we’d like, and you may be asked to leave a message. We apologize in advance for the inconvenience. We will get back to you within 2 business days.

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